

of crop cultivation. On the other hand, the decline in the Patagonian area, where there is no alternative productive use of land because of climatic limitations, was primarily due to the cold wave during 1984. The share of the Pampa region in the number of sheep thus declined to 25% in 1985.

(3) Pigs

The swine population during 1981-1985 averaged 3.5 million. 82% of them are found in the six provinces in the eastern central part, and 11% in the nine provinces north thereof, and thus concentrated mostly in the pampean wheat and maize producing areas. According to the estimates by the National Service of Rural Economy and Sociology (SNESR), the population has been decreasing since the late 1970s. This decline was probably related with the decline of beef exports which increased the domestic supply of beef at cheaper prices.

(4) Horses

Horses are traditionally associated with cattle farming, and thus raised primarily in the areas where cattle are raised. The 1977 census showed that 50% of the horse population was found in the Pampa region, and 35% in the area north of it. Along with the advent of motorization, the population followed a long-term trend of decline since the early 1950s when it numbered some 7 million.

(5) Poultry

Although the distribution is not known, the bulk of the poultry population would be in the Pampa region where some 80% of the human population lives. The total number of domestic poultry, mostly chickens, has been steadily increasing in the last ten years or so, but some signs of decline are observed since 1984.

(6) General trend of major livestock products

Meat is the most important livestock product in Argentina, with the annual production of over 3 million tons, of which beef accounts for some 2.5 to 3.0 million (Table II-2-2). Annual milk production for consumption and processing averaged 5.6 million liters during the period of 1981 to 1985. The production of eggs increased steadily during the 1970s, but shows a declining trend since the beginning of the 1980s, probably for the same reason as was the case with pork. Hides and skins, and wool are major subproducts, and substantial proportions of their production are exported. In sum, the mainstay of Argentine livestock production is cattle and its related products.

2-1-2 Cattle Population and Management

(1) Trends of cattle population

Beef has the overwhelming share in Argentina's meat production which constitutes the mainstay of the country's livestock sector. Figure II-2-2 shows the trend of cattle population since the 1960s.

Table II-2-2 Production of Livestock and Poultry Products

Year	Beef ¹⁾ (———)	Mutton ¹⁾ (——— 1,000 tons ———)	Pork ¹⁾ tons ———)	Horsemeat ²⁾ ———)	Poultry (Million heads)	Milk (Million liters)	Hen Eggs (Million)	Leather ²⁾ (——— 1,000 tons ———)	Wool ³⁾ tons ———)
1970	2,624	176	211		116		3,146		
1971	2,001	175	248		132		3,120		
1972	2,191	132	216		127		3,280		
1973	2,149	127	258	53	127		3,307	56	
1974	2,163	112	240	29	186		3,623	43	159
1975	2,439	123	255	29	179		3,541	38	164
1976	2,811	127	258	38	171		3,415	76	154
1977	2,914	132	242	38	168		3,324	76	154
1978	3,146	127	213	44	172		3,702	84	155
1979	3,020	130	258	44	190		4,072	82	155
1980	2,839	112	263	33	225		4,777	87	155
1981	2,939	114	253	32	237		5,128	99	155
1982	2,551	110	230	42	250	5,120	5,367	59	150
1983	2,384	111	207	43	240	5,487	5,262	52	150
1984	2,558			38	260	5,639	5,219		137
1985	2,740			34	245	5,233	4,740		145
						5,653			(est.)

Source: SNESR and JNC.

Notes : 1) Carcas weight

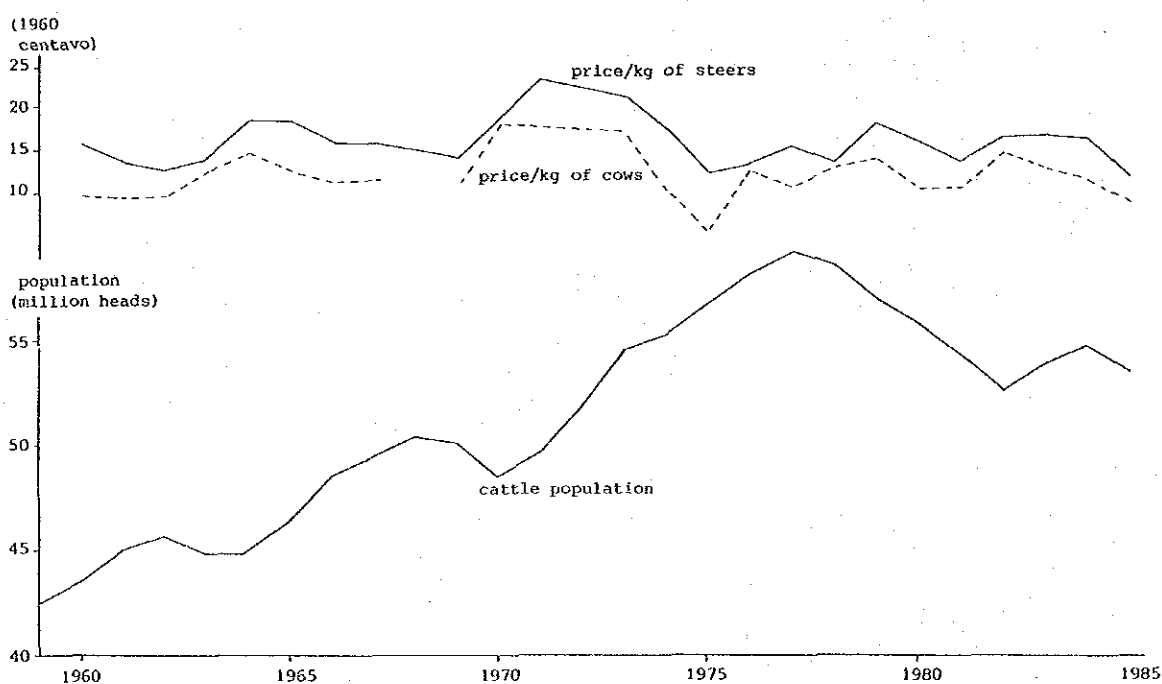
2) Product weight of export

3) Figures in sheep cycle years (e.g. the cycle year 1974/75 = 1974)

The long-term trend in cattle population is one of gradual increase from some 30 million heads in the 1930s to some 40 million in the 1950s, and this increasing trend generally continued through 1977 when the population reached a historical high of 60 million heads. The cattle population, however, showed a distinct dip both during 1963-1964 and 1969-1970, influenced by the liquidation phase of the so-called livestock cycle when the number of slaughters increased along with the declining trend in cattle prices.

The trend of cattle population after the mid-1970s shows some irregular aspects by comparison with the preceding livestock cycles. As will be discussed in the later section, the cattle industry in Argentina began to face adverse external conditions since 1974, such as the general slump of world demand for beef caused by the first oil crisis and the shrinkage of its largest traditional export market due to the Common Agricultural Policy of the EC. Both export prices and domestic prices began to decline and the number of slaughters increased sharply from 1975 to 1978.

Figure II-2-2 Trends of Cattle Population



Source: AACREA, Precios Agropecuarios, various issues.
SNESR, mimeograph printout.

Because of the impact of this liquidation phase, the cattle population began to decrease since 1978. However, compared with the previous liquidation phase in the early half of the 1960s or in the beginning of the 1970s, the decrease lasted much longer, i.e., five years through 1982, or even eight years through 1985 if some recovery observed in 1983 and 1984 could be considered a temporary respite. This substantial delay of the transition to another expanding phase of the population was related to the drop of Argentine beef's international competitiveness, partly caused by the overvalued peso during the late 1970s and partly by the subsidized export drives of other beef producers in the international market, and also related to the progress of agriculturalization chiefly observed in the Pampa region. This situation is reflected in the generally stagnant movement of domestic prices of steers for slaughter during the decade of 1975-1985.

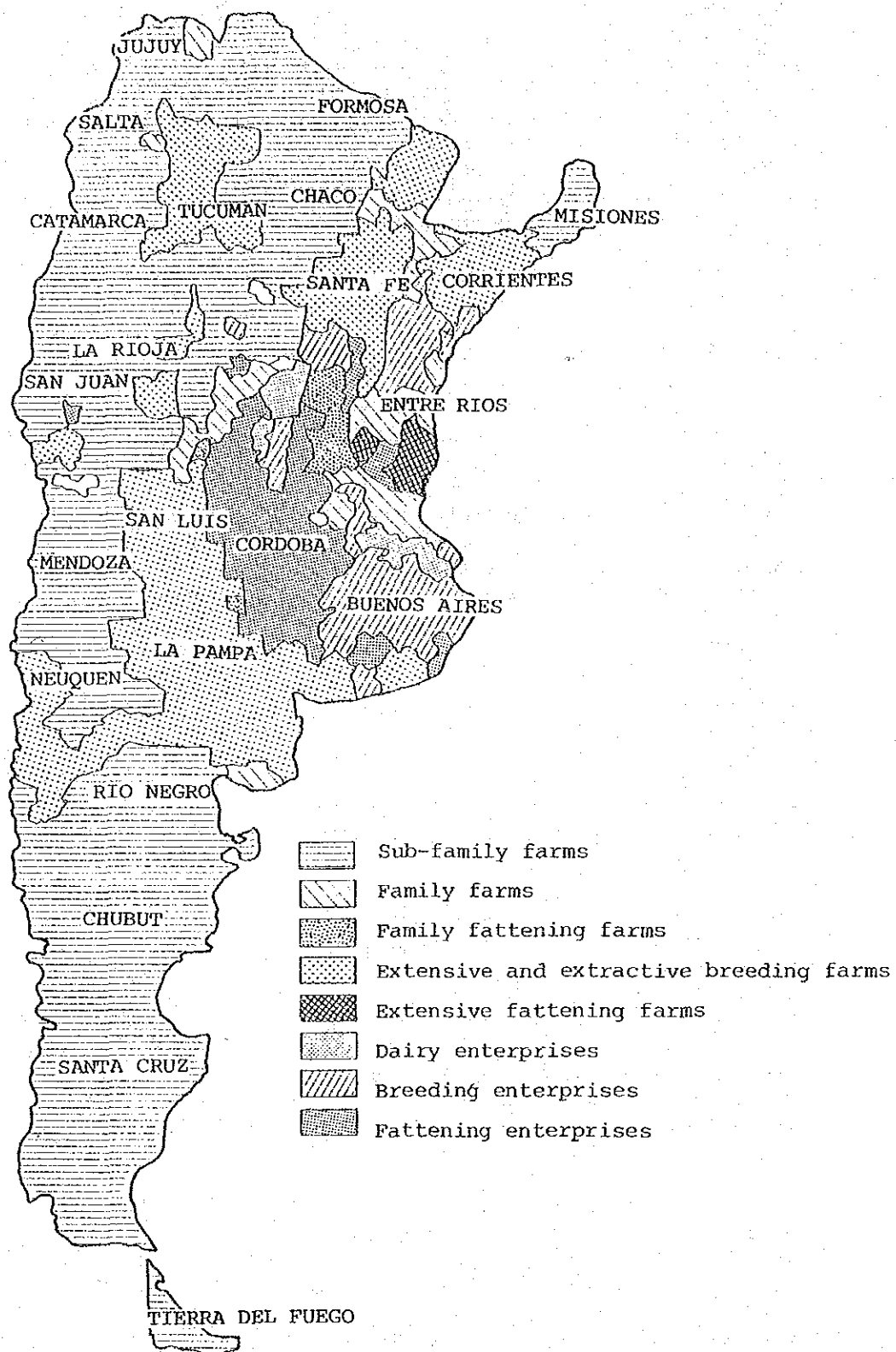
(2) Characteristics of cattle management

Cattle management in Argentina is generally characterized by its large-scale operations based on extensive grazing. Cattle farming is divided into breeding (*cria*) and fattening (*invernada* or *engorde*). The breeding operations are mostly carried out extensively in areas less favored by natural conditions or less suitable to crop cultivation, such as in the fringes of the Pampa region with drier climatic conditions. Fattening is done mainly in the Pampa region in relatively more intensive manners than breeding, and traditionally it is complementarily integrated with crop cultivation. In the fattening farms of 300 - 5,000 ha, about one-third of the land is commonly used for cereal production, and after three to five years of cropping, depending on the soil conditions, the land is turned to pastures for four to seven years until the soil fertility recovers. This type of mixed farming has evolved different systems of farming according to the varying natural conditions, the different regional structures of land distribution, and so on. In smaller farms, cattle raising is usually a subsidiary operation compared with crop cultivation.

Figure II-2-3 shows the distribution of the types of cattle farms in Argentina. Breeding farms are mostly located in the fringes of the Pampas (La Pampa, San Luis, and the north of Santa Fe Provinces), parts of the Northwestern (NOA) and Northeastern (NEA) regions, and the central eastern area called Cuenca del Salado in Buenos Aires Province. Breeding operations in the fringes of the Pampas, the NOA and the NEA are mostly of extensive and extractive types mainly utilizing natural pastures, whereas they are conducted relatively more intensively by farming enterprises in Buenos Aires Province and some part of Entre Rios Province.

Fattening farms are chiefly found in the western half of Buenos Aires Province, and the southeastern part of Cordoba Province and the southern edge of Santa Fe Province which are contiguous to it. The operations in these areas are mostly done by large-scale farming enterprises. Relatively extensive fattening operations are found in the southern part of Entre Rios Province, while family-size farms specialize in fattening operations in the south of Santa Fe Province.

Figure II-2-3 Types of Cattle Farms



Source: SENASA, PLANARSA, Oct. 1985

Table II-2-3 Area Used for Cattle Raising in Pampean Region

(1,000 ha)

	Total Area of Cattle Farming	Annual Pastures	Permanent Pastures	Natural 1) Pastures	Total Area of Crop Cultivation	Total Area in Use
Buenos Aires			6,914			
1976	19,203			12,279	6,611	30,011
1977	22,435	2,938	7,105	12,392	5,934	30,307
1980	19,556	3,114	4,915	11,527	6,480	30,286
1982	19,423	1,813	4,784	12,826	8,428	29,960
Cordoba			5,347			
1976	12,669			7,322	2,750	17,648
1979	11,251	2,641	3,751	4,659	2,255	14,588
1980	10,962	3,026	2,307	5,629	2,811	14,597
1981	10,474	2,368	2,185	5,921	2,584	14,578
1982	10,056	1,662	2,191	6,204	3,411	14,445
Santa Fe						
1979	8,251	580	2,695	4,976	2,663	12,559
1980	8,836	677	1,931	6,228	2,773	12,559
1982	8,788	393	1,999	6,396	2,962	12,557
Entre Rios			683			
1976	5,637			4,954	1,119	8,154
1979	5,854	238	478	5,138	969	7,313
1980	5,281	348	422	4,512	880	7,310
1981	6,043	254	407	5,382	925	7,288
1982	5,623	210	438	4,975	995	7,291
La Pampa			1,272			
1976	5,316			4,044	878	6,878
1979	6,096	830	1,358	3,908	571	6,901
1980	6,019	1,194	735	4,089	776	6,903
1981	5,494	805	789	3,900	969	6,877
1982	5,466	726	815	3,925	1,158	6,909
Total Five Prov.						
1979	53,887	7,227	15,587	31,073	12,391	71,668
1980	50,654	8,359	10,311	31,985	13,720	71,656
1982	49,356	4,804	10,227	34,325	16,956	71,162

Source: SNESR

Note : 1) Includes mountain areas.

In the northern area of Buenos Aires Province, which constitutes part of the traditional maize-growing zone, relatively smaller farming units are dominant in number and cattle fattening is usually a subsidiary operation to crop cultivation in such farms. As already mentioned in the earlier sections on the crop sector, smaller farms in this area began during the 1970s to specialize in more intensive crop cultivation, largely at the expense of the cattle farming phase.

As shown in the same figure, concentrations of dairy farming enterprises are found to the south of Buenos Aires City, and in the northeastern part of Cordoba Province and the southwestern part of Santa Fe Province. Dairy farming in these areas employs more intensive cattle and pasture management than beef cattle fattening farms.

The land use in the Pampa region underwent the process of agriculturalization in the last ten to fifteen years, mainly because cattle farming lost its profitability relative to crop cultivation along with the reduction and the structural change of Argentina's beef export market. Table II-2-3 shows the trends of the cattle farming areas of five provinces in the Pampa region from the late 1970s to the early 1980s. The general pattern is the reduction of the cattle farming area and the expansion of the cropped area. Excluding the figures for 1976 which seem to have been compiled by slightly different methods, the combined area of crop cultivation in five provinces expanded by 37% during 1979-1982, whereas that of cattle farming decreased by -8%.

Especially notable is the 34% reduction of both annual and permanent cultivated pastures. This decline was partly offset by the expansion of natural pastures (including mountainous areas), indicating either that the investment in pasture development faltered to revert the cultivated pastures to natural conditions, or that the cultivated pastures were turned to crop cultivation where it was possible to do so. As a result, the percentage of natural pastures including mountainous areas increased during 1979-1982 from 58% to 70% (48% for natural pastures and 21% for mountainous areas), whereas that of permanent cultivated pastures dropped from nearly 30% to a little over 20%, and annual cultivated pastures from 13% to a little less than 10%. Although not clear from the figures in the table, it is reported that along with the expansion of crop cultivation in pasture areas, cattle farming moved to the areas with less favorable conditions where permanent cultivated pastures increased in order to offset the decline in productivity of cattle farming in such areas.

2-1-3 Research and Development Efforts and Diffusion of Technology

(1) Breeds and productivity of beef cattle

Most of beef cattle raised in Argentina are of European breeds. A limited number of Zebu, often crossed with European breeds, are raised in sub-tropical and tropical areas in the Northwest and the Northeast, and a scattering of the local mixed breeds called criollo are found in some parts. Although statistical information is not

available, the major European breeds of cattle are Aberdeen Angus and Hereford. According to the informed opinion of an expert at the INTA Regional Experimental Station at Pergamino, the rough breakdown of cattle population by breed is 45% for Aberdeen Angus, 20% for Hereford, 10% each for shorthorn and continental Dutch Friesian, and 12% for Zebu. The remaining 3% consists of continental Charolais, Limousin, Blonde d'Aquitaine, Simmental, etc., which are chiefly raised for experimental rearing or as special breeders.

Cattle are raised as herds and marketed in lots of 10 to 30 heads in Argentina. Therefore, the productivity of a herd as a whole is more important in cattle farming than that of an individual animal as is the case in Japan. The common pattern of cattle rearing is as follows.

As a general rule, animals bred and reared in breeding farms (the process called *cria*) are sold at the age of 7 - 10 months, weighing 170 - 180 kg, to fattening farms (the process called *invernada*), and fattened for about 12 months to 420 - 440 kg. Crosses of Zebu and Hereford raised in some parts of Chaco, Santa Fe and Cordoba are usually moved from *cria* at 180 - 200 kg and fattened to 450 - 480 kg.

Cows (*vaca*) for culling weigh about 400 kg at the age of some 7 years, heifers (*vaquillona*) 250 - 320 kg at the age of 15 - 20 months, and female calves (*ternera*) 170 - 230 kg at 7 - 12 months. With respect to male animals, steers (*novillo*) on average weigh 420 - 460 kg, and 460 - 480 kg when well fattened, and younger steers (*novillito*) after re-rearing (*recria*) 380 - 420 kg. Calves (*terneros*) for slaughter weigh 220 - 260 kg.

The period of fattening lasts 12 months for animals in good conditions and up to 20 months for ones with low productivity. The daily gain in weight ranges from 450 g to 700 g. The productivity per ha averages 220 kg in live weight, but reaches as high as 700 kg at experimental stations. On the levels of producers, the productivity per ha varies widely as shown below.

Subaverage farmers	180 kg/ha
Average farmers	220 - 250 kg/ha
CREA (private extension association) member	300 - 380 kg/ha
Leading farmers	400 - 480 kg/ha
Experimental stations	500 - 720 kg/ha

(2) Technology improvement and diffusion

(a) Role of research and experiments

The public sector activities in research and experiments are chiefly carried out by the National Institute of Agricultural Technology (INTA). Public sector experimental stations began to be

established early in the present century, and they were reorganized and integrated as INTA in 1956, under the administrative supervision of the Secretariat of Agriculture, Livestock and Fisheries. In addition, public and private universities, often in cooperation with the INTA, engage in research and development related to livestock.

The INTA has three central facilities located in Castelar near the capital. They are the National Research Center of Natural Resources, the National Research Center of Agronomic Sciences, and the National Research Center of Veterinary Sciences. These Centers engage in basic as well as applied research, and function as central referrals for experimental stations. Experiments are carried out by the INTA's 13 regional experimental stations (EERA) and 21 experimental stations (EEA) below them. In addition, provincial governments have their own stations. These stations also engage in extension works, and the INTA has some 220 extension offices under these stations.

With respect to the livestock sector, the EERA in Balcarce is in charge of beef cattle, coordinating experimental work conducted at various other EERAs and EEAs. Similarly, EERA in Rafaela of Santa Fe Province is in charge of dairy, coordinating experimental work carried out at two other locations. Experiments on sheep farming are made at six locations in Patagonia and the Pampa region, nationally coordinated by the EERA in Bariloche. The EERA in Pergamino is in charge of chickens, pigs and honeybees coordinating experimental work carried out at two other locations each. This EERA is also in charge of studies on pastures and feed grains.

The national program on beef cattle under coordination by the EERA in Balcarce covers a wide range of fields, such as soil sciences, meteorology, pests and diseases and machinery and equipment. Special emphasis is presently placed on animal health, covering reproductive disorders, parasites, diarrhea of calves, mineral and other nutritional deficiencies, poisoning, and so forth.

In addition to regular experimental work, the EERA of Balcarce, in particular, maintains close cooperation with the Faculties of Agronomy and Veterinary Sciences of Mar del Plata University nearby, and participates in the training of technicians in agricultural and livestock sciences. The EERA of Pergamino, on the other hand, owns a sizable experimental pasture, and conducts research on better varieties of grass and the methods of pasture grazing.

Each EERA posts subject-matter specialists for survey at extension offices under its management in the same manner as in the USA. Field tests are carried out on the fields of cooperating farmers. The results of experiments are compiled and disseminated through rural extension offices by means of lectures and pamphlets. The EERAs also give periodical seminars for extension workers and veterinarians for re-training.

(b) Technical standards of livestock producers

In traditional fattening operations, the pasture land is divided by fixed fences into blocks of about 100 ha each, partly as a measure

to control animal health problems, and separately grazes droves of 50 to 100 heads grouped by different stages of growth. The arrangement is basically similar, though more extensive, in breeding operations. Two to three bulls are contained in each drove where natural mating and parturition are the rule, and calves are collected about twice a year to sell them to fattening farms.

With respect to cattle fattening, more intensive types of grazing divide the farm area into about ten blocks, each consisting of five to about six lots where the herd grazes about ten days each, and rotate the herd between blocks every 50 to 60 days. Grazing is more intensive in dairy farming, which employs strip grazing of one day per lot with blocks of eight lots each.

The grazing methods of varying intensity mentioned above are basically related to the differences in the grazing capacity of land, which largely depend on natural conditions like soils and climate. On improved pastures in the Pampa region, the grazing capacity varies from 1.0 AU (animal unit equivalent to a cow of 400 kg) to 2.0 AU per ha. On natural pastures, it ranges from 0.1 AU to 1.0 AU (Figure II-2-4). Outside the Pampa region, the capacity is much lower, varying from 0.07 to 0.8 AU on improved pastures and from 0.04 to 0.5 AU per ha. The improvement of the grazing capacity is one of the important objectives in experimental work at EERAs.

Because cattle farming is based on grassland of extensive scale, artificial feeding of formula feeds is not common. But a limited number of cattle farming enterprises began to use supplementary feeding of coarse grains in recent years. The emphasis of experimental stations is on hay feeding. Grass is harvested during the peak growing season in spring and fall to maintain balanced feeding of cattle. It is said that the grazing capacity of this method is 1 AU per ha. Silage is not considered suitable in Argentina, because it requires sizable investments in facility installation and machinery and larger labor input.

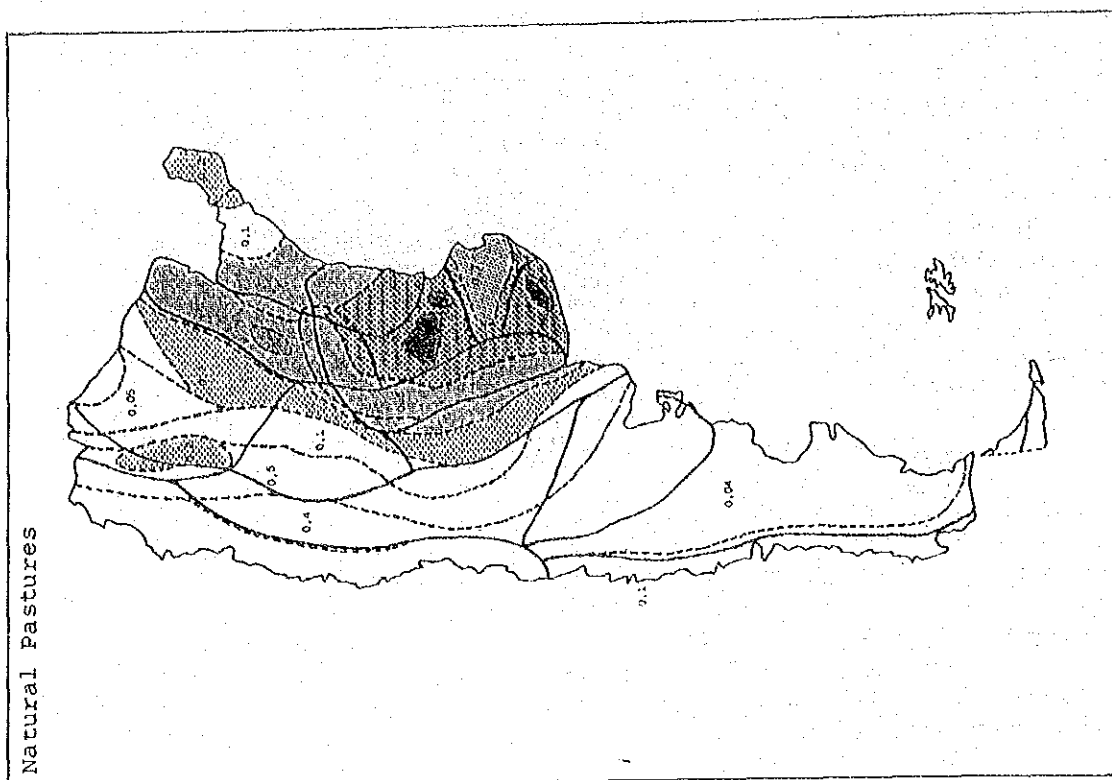
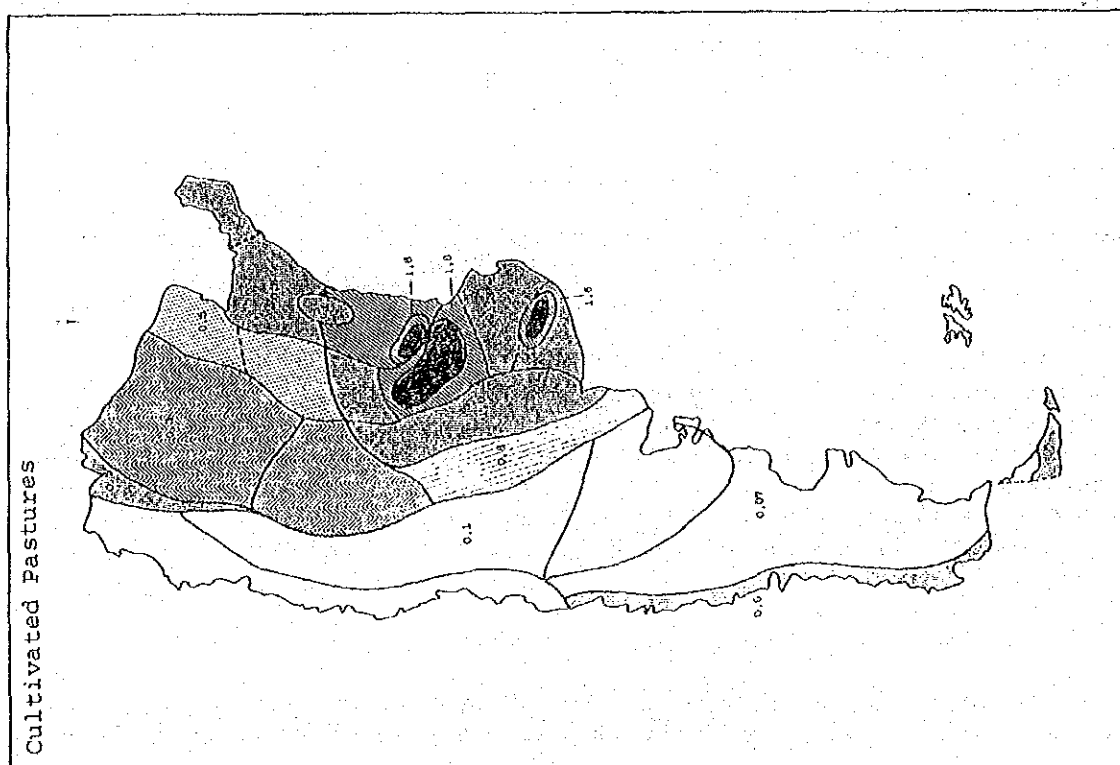
In addition to the activities carried out by public institutions, private organizations and consultants are active in disseminating improved methods of cattle farming. For example, AACREA (Argentine Association of Regional Consortiums of Agricultural Experimentation) provides such extension services for its members on the basis of the findings at INTA stations and overseas. Another group under the guidance of a private consultant is active in introducing the method of one day grazing practiced in dairy farming to beef cattle. The method recommended by the group is to divide by fixed fences the farm area, for example, of 300 ha into three blocks, which are in turn subdivided by electric wires into small lots of from 0.4 to 0.5 ha. The herd grazes one day to one day and a half in each lot. One member of the group achieved by this method the productivity of 600 kg in live weight per ha in his farm in the northwestern part of Cordoba Province.

(c) Improvement and development of pastures

As mentioned already, beef cattle farming in Argentina entirely relies on grassland. INTA EERAs and other organizations carry out

Figure II-2-4 Cattle Grazing Capacity

(Unit: AU/ha)



Source: J Josifovich, Areas Forrajeras y de Produccion Animal en la Argentina, INTA 1982.

field tests to select suitable grass varieties for different agroecological areas. The INTA, for instance, developed lists of recommended gramineous and leguminous varieties of grass and edible shrubs for each of the 19 agroecological regions on the basis of extensive surveys conducted over the country. Mixed sowing of six to eight leguminous varieties such as alfalfa, vetches and clovers is recommended for pastures after crop cultivation. On the whole, grassland in Argentina does not have the problem of acid soils, and the problems of alkaline soils and waterlogging are found in limited locations.

Land preparation is done mostly for pastures after crop cultivation. Disc harrows are used to turn and pulverize soils and seeds of pasture grass is sown by drills. The costs of such operations done by contractors are about A\$30 - 40 per ha for harrowing and A\$10 for drilling. Application of fertilizers is rarely done, but in some areas phosphatic fertilizers are applied in small quantity to remedy phosphate deficiencies in the soils.

(d) Animal health

The check and control against infectious diseases are in the hand of the Sanitary Combat Service (SELSA), one of the three departments of the National Animal Health Service (SENASA) of the Secretariat of Agriculture, Livestock and Fisheries. The SELSA administratively divides the country into 22 regions, each covered by its center. These centers carry out their operations through some 290 local commissions which are responsible for technical aspects of control and prevention, and about 1,500 delegations which attend to administrative matters connected with animal health. A total of 297 veterinarians are assigned for the work. In addition, each province maintains a similar organization which coordinates with the SELSA centers to combat animal health problems.

The programs for animal health is prepared in each province by the Animal Health Commission (consisting of farmers, technical experts, school teachers, etc.), and implemented upon approval and under supervision by the SELSA. These programs cover major diseases and pests as follows.

- 1) Foot-and-mouth disease (aftosa)
- 2) Brucellosis (Brucelosis)
- 3) Tuberculosis
- 4) Scabies (Sarna)
- 5) Mite (Garrapata)
- 6) Cyst (Hidatidosis)
- 7) Equine encephalitis (Encefalitis equina)
- 8) Equine infectious anemia (Anemia infecciosa equina)
- 9) Equine influenza (Influenza equina)
- 10) Swine cholera (Peste porcina clasica)
- 11) Aujeszky disease (Aujeszky)
- 12) Rabies (Rabia)
- 13) Salmonella disease (Salmonelosis)
- 14) Newcastle disease (New-castle afeccion)

The most important disease is the foot-and-mouth disease which affects even-toed ungulates, and Argentina has been implementing various measures in close coordination with the Pan-American Center of Foot-and-Mouth Disease headquartered at Rio de Janeiro. The system developed to combat this disease is as follows. The country is divided into the endemic region north of River Colorado and the free region south thereof, and vaccinations thrice a year are made compulsory in the endemic region. Farmers themselves vaccinate the herd and the SELSA issues certificates of vaccination only by checking the receipts of vaccine purchase. This check system leaves enough room for negligence on the part of cattle farmers, and makes it difficult to eliminate the disease.

In order to remedy the deficiencies of the present system, therefore, the SENASA has recently formulated a new national program called PLANARSA with technical cooperation from the Pan-American Center of Foot-and-Mouth Disease, and is currently negotiating a loan from Inter-American Development Bank.

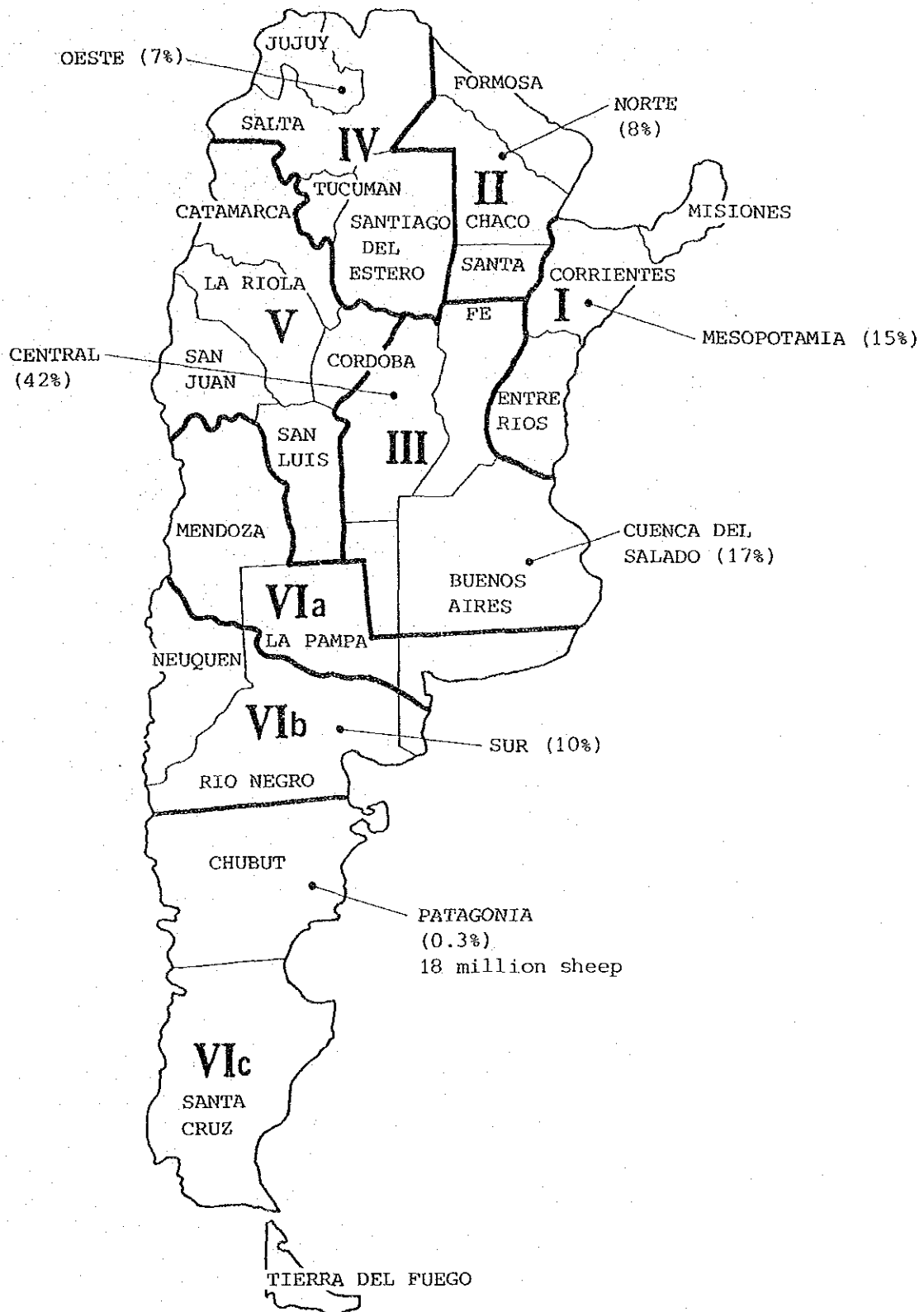
According to the PLANARSA, the country is divided into seven zones as shown in Figure II-2-5, with six different classifications according to the prevalence of the disease (Table II-2-4). The official vaccinations are made compulsory in Zones I to IV. Vaccines will be changed to oil adjuvant types which require vaccinations twice a year instead of three times. Especially targetted areas are Zones I, II and IV where cattle breeding is predominant, and the movements of animals out of these zones are strictly checked. With respect to Zones V and VI where the occurrences of the disease are sporadic, vaccinations are done when the disease breaks out.

The PLANARSA also includes measures against other important infectious diseases like brucellosis and tuberculosis. Three departments of the SENASA, that is, the SELSA, the SELAB (Laboratory Service) and the SIPA (Animal Products Inspection Service), are expected to coordinate their activities closely to eradicate the foot-and-mouth disease by the end of the Plan.

The check and control of animal products and their processing facilities, which are no less important than animal health, are done by the SIPA, which has 900 to 1,000 offices all over the country. In addition to livestock and poultry products, SIPA offices inspect fishery products in coastal areas. SIPA's control extends to products crossing provincial boundaries and for export, and the provincial governments are in charge of products marketed within the boundaries. With respect to slaughterhouses and meat processing plants, the SIPA inspects some 150 installations which account for about 70% of the total annual slaughters.

Vaccines and drugs are under the supervision of the SELAB. Eleven companies, of which seven are subsidiaries of foreign firms, produce vaccines for the foot-and-mouth disease, and two of them produce oil adjuvants. The total manufacturing capacity is 150 million doses, which are sufficient to meet the national requirements.

Figure II-2-5 Zoning of PLANARSA



Source: SENASA, PLANARSA

Note : Percentages indicate regions' shares in the total cattle population.

Table II-2-4 FMD Eradication Program (PLANARSA)

Region	Initial Situation	1st Stage	2nd Stage	3rd Stage
I	Endemic	Undamaged	Undamaged	Free
II	Endemic	Paraendemic with endemic niches	Undamaged	Free
III	Epiendemic	Paraendemic (high risk)	Paraendemic (low risk)	Free
IV	Endemic/Paraendemic (high risk)	Paraendemic (high risk)	Paraendemic (low risk)	Free
V-A	Paraendemic (high risk)	Paraendemic (low risk)	Paraendemic (low risk)	Free
V-B	Paraendemic (high risk)	Undamaged	Free	Free
VI	Paraendemic L.R. with poss. endemic niches	Undamaged	Undamaged	Free
VII-A	Free	Free	Free	Free
VII-B	Free	Free	Free	Free

Source: SENASA, PLANARSA

2-1-4 Trends in Beef Production and Marketing

(1) Trends in beef production

The Argentine beef production fluctuates in a so-called livestock cycle between an expansion phase and a liquidation phase normally in relationship to the upward and downward price movements. In the former phase, the number of slaughters declines to build up the herd, whereas in the latter phase, slaughters of cattle, especially of cows, heifers and young feeder cattle, increase and consequently the average carcass weight per head drops. As shown in Figure II-2-6, one livestock cycle had lasted for about six to seven years until the mid-1970, but the cyclical trend afterward changed somewhat due partly to the shrinkage of the external demand, showing more irregular fluctuations. Especially the recent liquidation phase has continued for more seven years to this day.

The main explanatory factor of the livestock cycle could be sought in the fluctuations of domestic cattle prices which are to some

extent under the influence of export prices. As shown in Figure II-2-7, the expansion phases started following the increase in cattle prices, for example, in 1963 and 1969, and the liquidation phases followed the decrease in cattle prices in 1965 and in 1974. Because the cattle prices have shown frequent ups and downs since mid-1970s, the so-called livestock cycle has been out of the normal pattern.

Table II-2-5 shows various manifestations of livestock cycles since the 1960s. In the beginning of the 1970s, the beef production was reduced to 2.0 - 2.2 million tons in carcass weight owing largely to the efforts to recover the cattle stock after the liquidation phase in the latter half of the 1960s. In the mid-1970s, the cattle prices in the domestic market sharply declined in real terms reflecting the setback in beef export, and the number of slaughters began to increase, showing a start of another liquidation phase, as indicated by the higher ratio of cows in the total slaughters. Slaughters reached a historical high of 16.3 million heads with the cow ratio of 49% in 1978. Because of the large slaughters, though the average carcass weight declined to 200 kg, the beef production increased to 3.1 million tons in the said year, which is 1.6 times as large as the lowest figure observed in 1971. The average annual rate of increase in beef production was 8.9% in the period of 1975-1978 compared with 3.6% in the preceding years of 1972-1975. The beef production decreased to 2.4 million tons in 1983, which seemed to indicate the end of the long liquidation phase, but it increased again to more than 2.7 million tons in 1985 and is estimated to be still relatively high at around 2.6 million tons in 1986.

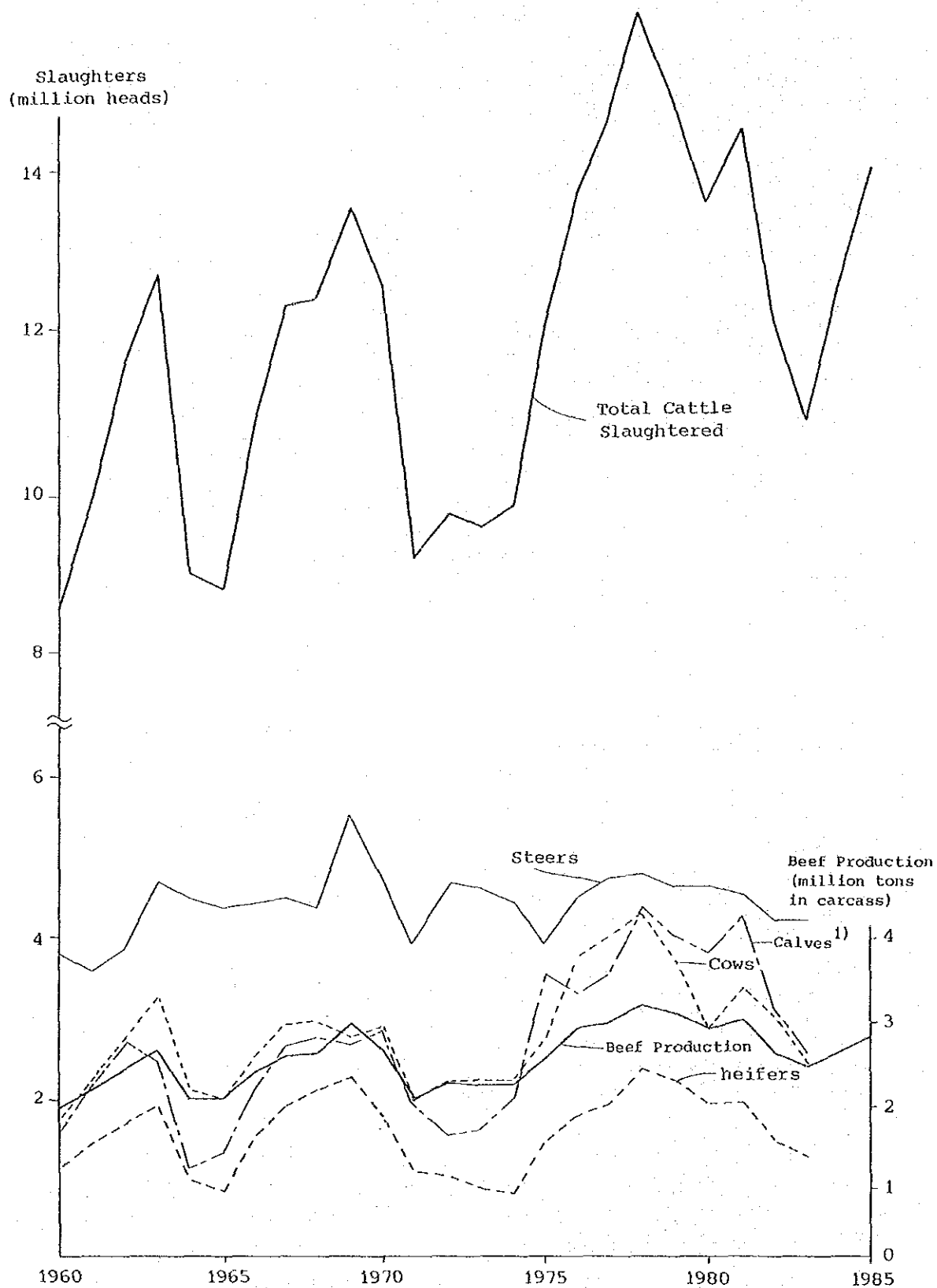
Cyclical fluctuations can be found in most of the beef producing and exporting countries in the world. However, it is a special feature of the Argentine beef production that the present liquidation phase, which also started in the mid-1970s in the other major producing countries such as the USA, Canada and Australia but ceased by the beginning of the 1980s, has lasted for more than seven years. This situation can be attributed to the declined profitability of beef production compared with crop cultivation, and the weaker demand in external markets, especially the shrinkage of the EC market. It is reported that the cycle is now about to enter an expansion phase within 1986. However, the expected transition seems to face considerable difficulties, partly because the current price control would not help improve the profitability of beef production, partly because producers are short of capital necessary for the recuperation due to the continued slump in the last ten years. In addition, the current tightened availability of financing discourages investments. The lagging attempts at selectively exporting higher-priced beef products would also delay the recuperation efforts.

(2) Processing and marketing

Coupled with the continued reduction of beef exports, the higher level of production has significantly affected the mechanism of meat processing and marketing.

Figure II-2-8 shows the major marketing channels of cattle and meat in Argentina. With respect to cattle, there are two types of

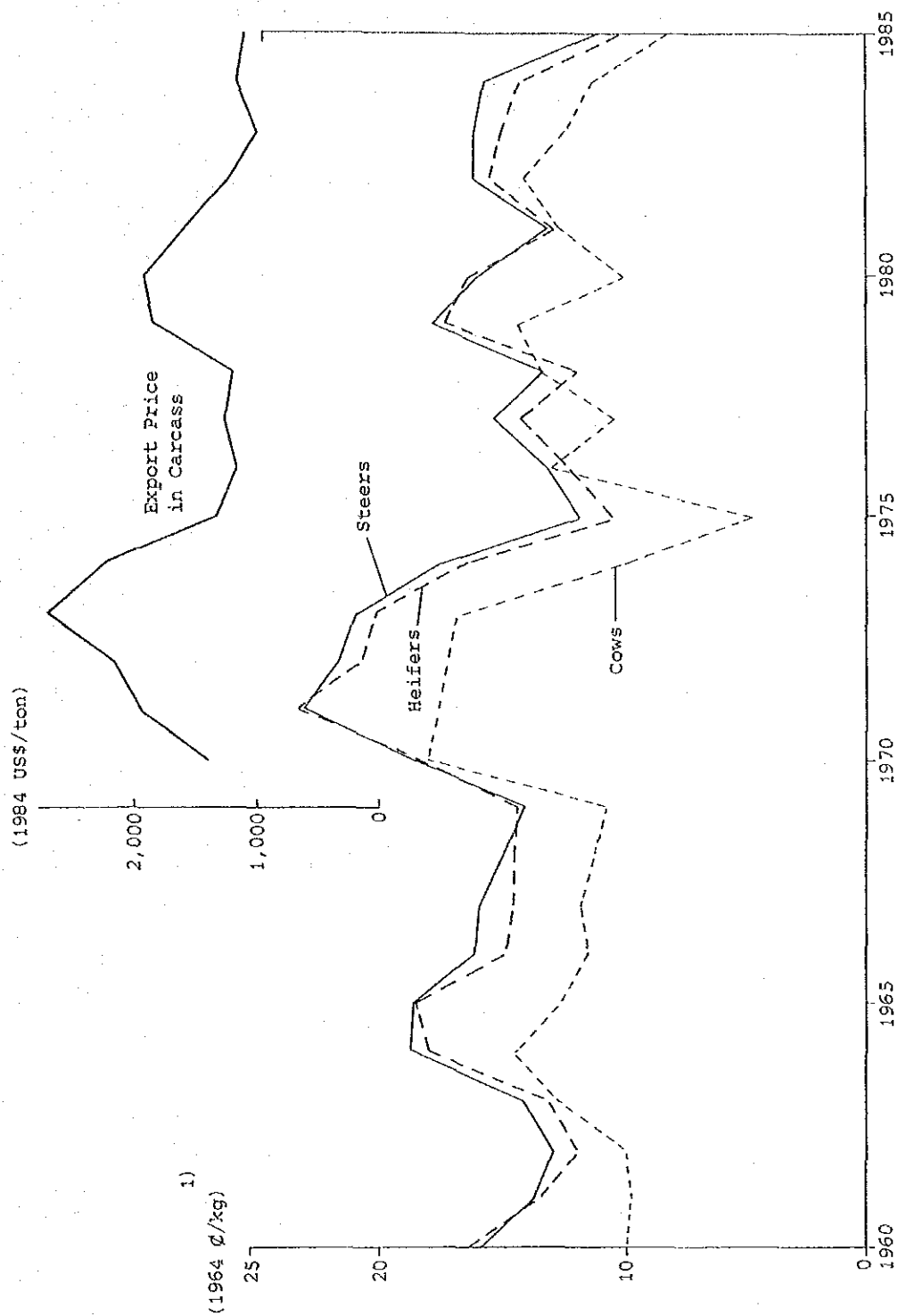
Figure II-2-6 Slaughters by Classification of Cattle and Beef Production in Carcass Weight (1960-1985)



Source: Junta Nacional de Carnes, "Síntesis Estadística".

Note : 1) terneros and novillitos

Figure II-2-7 Trends in Cattle Prices by Classification (1960-1985) and Export Price in Carcass (1970-1985)



Source: Cattle; CREA "Series de Precios Agropecuarios". Export; Junta Nacional de Carnes.

Note : 1) Prices at the Liniers Market

Table II-2-5 Trend of Livestock Cycles in Beef Production

Year	Total Slaughters (million heads)	Price Index of Steers 1)	% of Female Slaughters	Exports (% in heads)	Domestic Consum.	Average Export Price (bone-in carcass: US\$/ton)	Average Net Weight per head (kg)	Beef Production (1,000 tons)
1959	9.1	108	43	27	73	n.d.	213	1,944
1960	8.9	100	42	26	80	n.d.	213	1,893
1961	10.2	87	45	19	81	340	210	2,145
1962	11.8	85	50	23	77	290	203	2,379
1963	12.9	93	49	28	72	310	202	2,605
1964	9.4	124	40	29	71	500	216	2,019
1965	9.1	116	40	25	75	620	218	1,995
1966	11.1	101	44	25	75	550	210	2,321
1967	12.5	100	48	28	72	440	201	2,522
1968	12.8	94	50	24	76	440	200	2,561
1969	13.8	90	45	27	73	442	209	2,883
1970	12.9	116	46	26	74	498	203	2,624
1971	9.5	157	42	25	75	736	211	2,001
1972	10.0	149	39	32	68	834	219	2,191
1973	9.8	141	39	25	75	1,195	219	2,149
1974	10.1	111	40	14	86	1,144	214	2,163
1975	12.1	74	45	11	89	765	201	2,439
1976	13.9	87	46	19	81	705	203	2,811
1977	14.7	96	47	21	79	801	198	2,914
1978	16.3	86	49	23	77	828	200	3,146
1979	15.2	112	47	21	79	1,417	198	3,020
1980	13.8	97	41	16	84	1,649	205	2,839
1981	14.6	80	44	18	82	1,523	200	2,939
1982	12.4	107	42	20	80	1,199	206	2,551
1983	11.2	101	40	17	83	1,162	212	2,390
1984 2)	12.3	96	43	10	90	1,204	208	2,558
1985 3)	13.7	66	46	10	90	1,115	196	2,740
1986	13.0	-	-	-	-	1,200	206	2,680

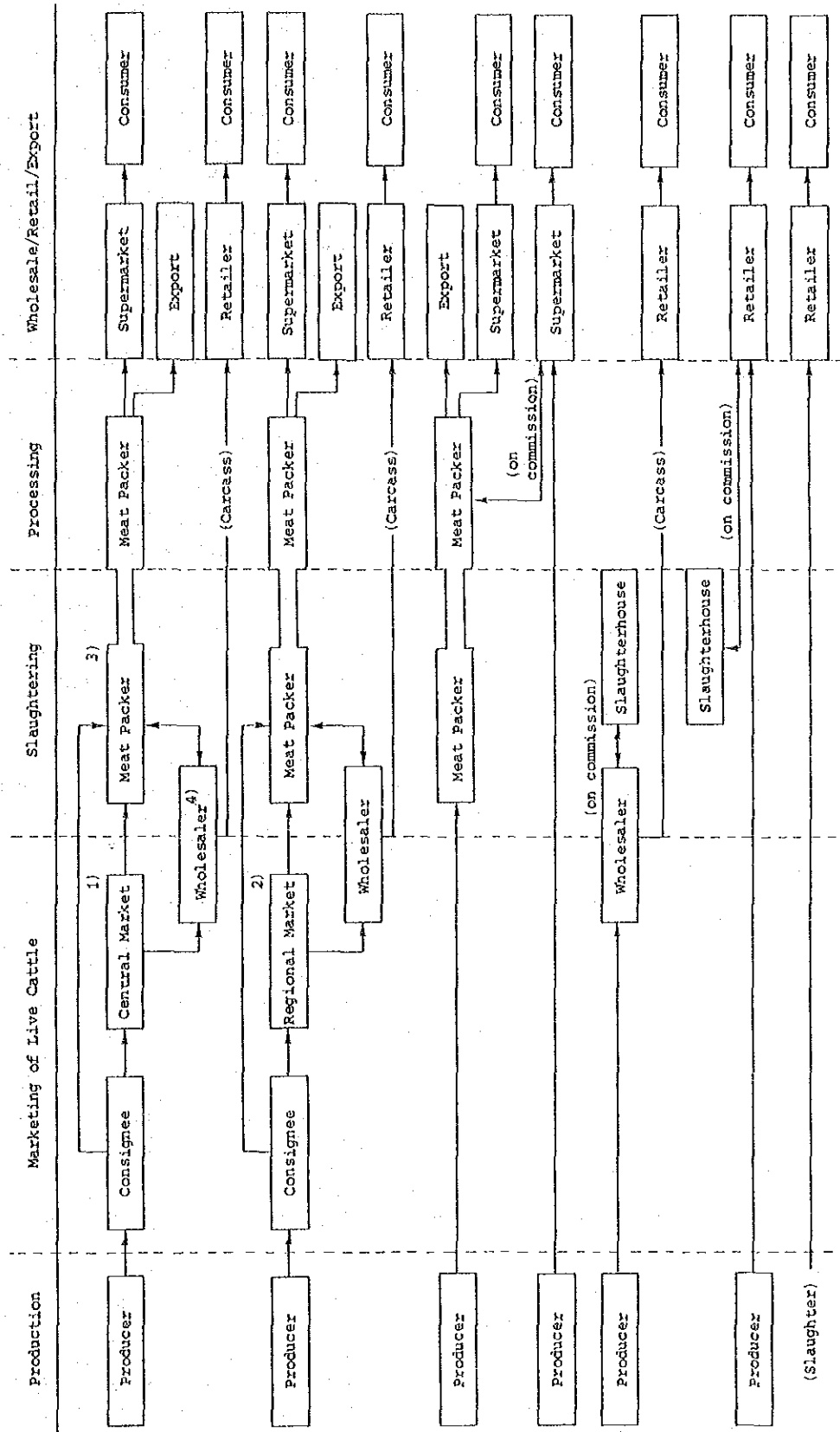
Source: Junta Nacional de Carnes

Notes: 1) 1960 = 100, prices at Liniers Market.

2) Provisional

3) Estimate

Figure II-2-8 Marketing Channels of Live Cattle and Beef in Argentina



Source: On the basis of interviews made by the Study Team.

Source: On the basis of interviews made by the Study Team.
Notes: 1) "Mercado Central" in Liniers, Rosario, Santa Fe, Córdoba.

2) "Remate Feria".

3) Frigoríficos.

4) Matarifes.

marketing: namely, through 1) public markets which are divided into central markets (mercados centrales) under the supervision of the Secretariat of Agriculture, Livestock and Fisheries and local public fairs (remates ferias) under municipal administration, and through 2) bilateral negotiations between cattle producers and wholesalers/processors. For cattle marketing, two types of intermediaries are involved: 1) consignees (consignatarios) who sell cattle on commission from producers either directly to processors and distributors or through public cattle markets, and 2) broker-cum-wholesalers (matarifes) who buy cattle from producers, have them slaughtered at slaughterhouses or meat-processing factories (frigorificos), and sell to retailers.

The meat processing industry has three categories of agents: 1) slaughterhouses with cold storage facilities or meatpacking plant called frigorificos which are oriented to external markets, 2) frigorificos oriented to the domestic market, and 3) slaughterhouses without cold storage (mataderos). Frigorificos are inspected in terms of quality control and classification by the National Meat Board (JNC) and sanitary control by the National Service of Animal Health (SENASA) of the Secretariat of Agriculture, Livestock, and Fishery. Mataderos are normally under the sanitary control of municipal administration. Meat in various forms, such as half or quarter carcasses, packed cuts, canned or other types of meat manufactures, is distributed directly or through matarifes to supermarkets or retailers for the domestic market, or exported directly from frigorificos for external markets. The meat processed in slaughterhouses not subject to the inspection of the SENASA is in principle prohibited to be sold across the provincial boundaries for sanitary reasons.

As regards the market of live cattle, there are two categories of public markets as mentioned above. Transactions at public markets are normally done by consignees at a commission of 3% on the sale. The central markets are located at Buenos Aires, Rosario, Santa Fe, and Cordoba, and their combined throughput was 2.9 million heads in 1983, accounting for about 30% of the total registered transactions in cattle. Of the four central markets, the Liniers Market of Buenos Aires has the largest share of approximately 90%. A number of local public fairs made up about 60% of the total registered transactions, or 5.8 million heads in the same year. The remaining 10% moved directly from producers to frigorificos.

There are a certain number of cattle traded without registration, namely, direct sales from cattle producers to mataderos or other local processing plants and exportation on the hoof. The approximate number can be estimated by the difference between the total number of slaughters registered plus exports of live cattle and the number of registered transactions. The operations without registration accounted for an estimated 10% of the total slaughters registered in 1983. But this figure is variable year by year, becoming for example as high as 34% in 1979.

In mid-1985, the Program of the Protection of Cattle Raising, approved by the Ministry of Economy by means of Resolution No. 459, was announced with express objectives to recover price levels for

cattle and eliminate distortions between different categories of cattle. The first action was the provision of credit amounting to A\$5 million to assist the purchase of "novillos terminados" (developed steers) and the retention of live cattle for later slaughter. The Banco de la Nacion Argentina controls the channelling of the credit and has granted loans exclusively to operators in the cattle and meat markets. However, because of the high interest rates in the local financial market and the weakened domestic and external demand, the liquidation of cattle stock increased in 1985. Freezing of sales prices of cattle at the Liniers since mid-1985 reduced the share of the market, which indicates that the price control policy was not necessarily supportive of cattle producers' recuperation efforts.

The Central Market of Liniers, which has been in operation for more than a century, has a daily capacity of 350,000 heads of cattle, 12,000 - 15,000 heads of pigs, and 7,000 heads of sheep. The Ministry of Economy has recently decided to abolish the Liniers for such reasons as its superannuated facilities, prevention of infectious animal diseases, and development of the existing local public markets.

According to the statistics published by the JNC, the frigorificos exporting beef in any form numbered 79 in 1983, of which more than 40 firms are approved by the EC and about 20 by the USA. And 55 frigorificos subject to the quality control and classification by the JNC operate to supply only to the domestic market. The accurate number of mataderos is not available, but it is estimated that 600 are under municipal control and 1,000 are run like household industries. Slaughters at mataderos under municipal control account for about 50% of the total officially registered slaughters in recent years, while frigorificos for the remaining 50%. In terms of beef production in carcass weight, frigorificos account for nearly 60% of the total, because the average carcass weight per head slaughtered at frigorificos is over 200 kg (230 kg in 1983) compared with about 190 kg at mataderos. The average carcass weight at exporting frigorificos is much higher at 252 kg in 1983. This is primarily because frigorificos, especially those oriented for exports, generally process cattle of higher quality.

The most severely affected by the sharp decline in beef exports are naturally frigorificos, especially those with strong export orientation. According to the statistics of the JNC, the combined production of beef by the 79 exporting frigorificos dropped from 1.8 million tons in carcass weight in 1978 to 1.3 million in 1983, at an average annual decrease rate of 6.3% in comparison with 5.4% of the national total. The situation must have been exacerbated further after 1983, because the beef exports declined to 250,000 - 260,000 tons in 1984 and 1985 from 415,000 tons in 1983. The combined rate of idle facilities at frigorificos today reaches 50% according to an estimate by the JNC.

Along with the decline in beef exports since 1978, the export-oriented frigorificos had to expand their sales in the domestic market through the diversification of their products. However, the Argentine domestic market of meat products is dominated by beef without higher degree of processing, and traditionally intermediated

by matarifes who use mataderos for slaughter. Frigorificos satisfactorily equipped with processing facilities are not competitive with mataderos which operate at lower costs with poor facilities and irregular tax payment and labor standards.¹⁾

The matarifes today use not only mataderos but also frigorificos with idle capacities for slaughter, but distribute beef without cold storage to supermarkets or retailers, and have an estimated share of 80% in the Argentine beef market. According to the Animal Products Inspection Service (SIPA) of the SENASA, it controls about 70% of the total cattle slaughters with 1,500 inspectors posted at 900 - 1,000 local offices, but only 40% of the matarifes are considered to have licenses issued by the SIPA. Especially in local areas where the official inspection system is not well established, the activities of matarifes affect the marketing efforts of frigorificos. This situation contains a crucial problem concerning the meat marketing system in Argentina. Although there are a considerable number of meat processing plants equipped with facilities to meet the requirements of the developed countries, most of the meat consumed domestically is distributed outside the channels provided by such frigorificos. The existence of processing and marketing which utilizes primitive facilities is a health hazard for domestic consumers. Moreover, the dualism affects the country's export prospects in the long run, by discouraging the confidence in Argentine meat products.

1) However, it should be noted that an export-oriented meat packing company interviewed during the present study reports that it has made relatively satisfactory achievements in sales by product diversification and is continuing research to develop new products oriented to both external and domestic markets.

2-2 External and Domestic Demand for Beef

2-2-1 Trends in Exports

Argentine beef exports tended to fluctuate along with the domestic beef production until recently. For example, they increased considerably as the production increased during the liquidation phase of the livestock cycle. Some change appeared since the mid-1970s. The exports declined from 551,000 tons (carcass weight) in 1973 to 289,000 tons in 1974 and 262,000 tons in 1975, while the production continued to increase from 2.15 million tons in 1973 to 2.16 million in 1974 and 2.44 million in 1975. Because of the first oil crisis which depressed the external demand, the export ratio in the total production was reduced to 10.7% in 1975. Although the export volume and the export ratio recovered after 1975 along with increased production, reaching a peak of 740,000 tons and the ratio of 23.5% in 1978, they again began to decline since the late 1970s. The exports sharply dropped to 250,000 tons in 1984 from 415,000 tons in the previous year, and the export ratio shrunk to 9.8%, whereas production increased from 2.39 million tons to 2.56 millions. While the production further increased to 2.74 million tons in 1985, the exports were stagnant at 260,000 tons, with an export ratio of 9.5%. The decreasing tendency in beef exports is more acute in terms of value, which shows a continued decline since 1979 (Table II-2-6).

The decline in beef exports was due to a combination of domestic and external factors, such as the overvalued peso in the later 1970s which reduced the competitiveness of Argentine products, the import restrictions and export drive of beef by the EC, the main traditional importer of Argentine beef, and the general deterioration of demand in the world market by the worldwide economic recession after the second oil crisis. Of these negative factors, the strong competition, particularly with subsidized exporters, in the world market seems to have had the largest adverse effect on the Argentine beef exports.

While the Argentine exports were less than halved from the average of 673,000 tons during 1977-1979 to 308,000 tons during 1983-1985, the total beef exports by the main exporting countries in the so-called aftosic (FMD) circuit increased 35% from 1.55 million tons in 1977-1979 to 2.10 million in 1983-1985. Among those exporters, Brazil and the EC are most noticeable, increasing their exports by 184% and 232% respectively over the period. As a result, the share of Brazil and the EC in the total exports of the aftosic circuit increased from 11% and 14% in 1977-1979 to 24% and 35% in 1983-1985 respectively, while the share of Argentina dropped from 43% to 15%.

It should be noted that the total volume of the world beef trade did not change significantly during the period under consideration, due partly to the increase of the exports by the aftosic countries and partly to the decrease of exports by the non-aftosic countries. As a result, the combined share of the aftosic circuit in the world beef market increased from 46% in 1977-1979 to 61% in 1983-1985. The USA, another main importer of Argentine beef products but belongs to the non-aftosic circuit, also increased considerably its beef exports over the same period (Table II-2-7). Besides losing main traditional markets in Europe, Argentina now faces stiff competition from Brazil and the EC

Table II-2-6 Argentine Exports of Beef (chilled, frozen, canned and cooked)
in Carcass Weight by Destination (1965-1985)

(1,000 tons)

Year	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986 ¹⁾
Destinations																		
West Germany	39	62	52	153	106	30	25	73	69	77	57	35	43	51	52	37	43	15
Belgium	22	22	13	15	14	5	2	6	8	10	5	2	3	2	2	1	2	0
France	31	34	27	59	30	9	7	18	20	23	12	8	6	7	7	4	4	2
Netherlands	50	34	15	20	30	10	10	16	23	23	27	14	11	14	13	10	14	5
Italy	54	63	48	60	62	11	13	30	34	28	28	15	17	16	14	5	10	1
U.K.	222	159	112	157	121	70	45	73	66	100	95	68	84	26	-	-	-	0
EC (9)	410	374	267	464	363	135	102	216	220	261	224	142	164	116	88	57	73	23
Chilled + Frozen	333	281	209	393	318	96	40	108	123	132	115	74	87	63	59	36	49	15
Canned + Cooked	85	93	58	71	45	39	62	108	97	129	109	68	77	53	29	21	24	8
Greece	44	45	15	22	21	10	10	36	46	57	42	18	1	3	2	1	1	0
EC (10)	462	419	282	486	384	145	112	252	266	318	266	160	165	119	90	58	74	23
U S A (including Puerto Rico)	150	142	107	107	98	85	70	99	87	125	114	88	65	84	93	87	103	27
USSR	-	-	-	-	-	29	42	17	48	-	49	131	114	102	90	49	-	-
Israel	23	24	20	20	21	7	16	24	17	31	40	17	23	21	31	12	18	7
Egypt	2	-	-	-	-	-	-	16	6	10	33	8	43	75	35	3	1	0
Algolia	-	-	-	-	-	-	-	-	2	3	3	1	6	14	6	1	2	0
The Rest of Africa	-	2	-	-	-	-	2	19	50	57	21	6	5	9	6	2	14	1
Iran	-	-	-	-	-	-	-	-	-	-	-	7	4	9	-	-	-	-
Iraq	-	-	-	-	-	-	-	-	-	-	1	1	5	23	4	-	-	-
Saudi Arabia	-	-	-	-	-	-	-	-	3	6	6	6	3	2	8	6	4	1
The Rest of M.E.	-	-	-	-	-	-	1	1	1	6	19	2	6	4	2	1	1	0
Canary Islands	8	8	8	8	8	5	7	11	16	13	12	5	5	5	5	3	4	1
Austria	-	-	-	-	-	-	1	18	5	11	-	-	1	2	1	0	0	0
Spain	35	35	-	-	-	1	-	15	21	35	15	-	-	-	-	0	0	0
Portugal	1	-	1	-	-	-	-	26	17	4	8	2	-	-	-	-	-	-
Switzerland	15	17	13	15	16	7	3	6	6	12	10	7	9	7	8	6	3	1
East Europe	15	12	-	7	1	-	-	-	3	-	-	-	6	2	3	0	-	-
Brazil	-	1	-	-	5	2	0	3	3	60	70	5	-	-	-	-	1	1
Chile	12	17	37	47	19	-	-	1	9	18	7	9	12	9	2	2	8	1
Peru	8	7	3	4	-	-	-	3	4	1	-	-	6	12	5	6	2	2
Canada	13	7	2	4	3	3	4	5	4	10	6	3	2	2	2	1	2	0
Others	31	24	4	5	6	5	4	11	15	20	17	11	6	21	24	13	23	6
Chilled + Frozen	14	7	3	2	2	1	-	2	3	8	8	3	3	6	5	4	6	2
Canned + Cooked	17	17	1	3	4	4	4	9	12	12	9	8	3	15	19	9	17	4
Total	775	715	477	703	551	289	262	527	583	740	697	469	486	522	415	250	260	71
Total Value (million US\$)	n.a.	356	351	587	659	331	201	372	467	613	988	773	740	626	482	301	290	
Total Value (1984 constant Price) 2)	n.a.	1,064	955	1,539	1,527	660	355	636	746	908	1,304	890	784	650	495	301	292	
Total Production (1,000 ton)	2,883	2,624	2,001	2,191	2,149	2,163	2,439	2,811	2,914	3,146	3,020	2,839	2,939	2,551	2,390	2,558	2,740	

Source: Junta Nacional de Carnes

Notes : 1) The first quarter

2) These values are adjusted by wholesale price index in the USA (1984 = 100).

Table II-2-7 Beef Exports by Major Exporter in Aftosic and Non-aftosic Circuits (Carcass Weight)

1. Aftosic circuit (1,000 tons)						
	Argentina	Brazil	Uruguay	E.E.C.	Eastern Europe	Total
1977	583	226	130	152	340	1,431
1978	740	161	119	168	379	1,567
1979	697	140	81	338	397	1,653
1977/79	673 (43%)	176 (11%)	110 (7%)	219 (14%)	372 (24%)	1,550
1980	469	205	115	642	404	1,837
1981	486	321	170	662	381	2,023
1982	552	396	170	480	392	1,960
1983	415	500	240	600	400	2,155
1984	250	500	140	785	400	2,079
1985*	260	500	70	800	420	2,050
1983/85	308 (15%)	500 (24%)	150 (7%)	728 (35%)	407 (19%)	2,095
1977/79 - 83/85	-365	+324	+40	+509	+35	+545

2. Non-Aftosic Circuit						
	Australia	N. Zealand	U.S.A.	Canada	Central America	Total
1977	1140	403	47	110	130	1,833
1978	1200	357	60	95	156	1,868
1979	1100	343	78	88	158	1,767
1977/79	1147 (63%)	368 (20%)	62 (3%)	98 (5%)	148 (8%)	1,823
1980	885	344	80	105	113	1,527
1981	710	347	100	112	101	1,370
1982	940	366	115	140	91	1,652
1983	770	372	125	138	81	1,486
1984	615	300	152	116	65	1,248
1985*	660	315	170	110	65	1,320
1983/85	682 (51%)	329 (24%)	149 (11%)	121 (9%)	70 (5%)	
1977/79 - 83/85	-465	-39	+87	+23	-78	-472

3. Total (1 and 2)			
	Aftosic	Non-Aftosic	Total
1977	1,431	1,833	3,264
1978	1,562	1,868	3,430
1979	1,652	1,767	3,419
1977/79	1,550 (46%)	1,823 (54%)	3,373
1980	1,837	1,527	3,364
1981	2,023	1,370	3,393
1982	1,960	1,652	3,612
1983	2,155	1,486	3,641
1984	2,079	1,248	3,327
1985*	2,050	1,320	3,370
1983/85	2,095 (61%)	1,351 (39%)	3,446
1977/79 - 83/85	+545	-472	+73

Source: JNC

Note : E.E.C. comprises France, Ireland, W. Germany, Denmark, United Kingdom, Italy, Netherlands and Belgium.
 Eastern Europe comprises Rumania, Hungary, Poland, East Germany, Bulgaria and Yugoslavia.
 Central America comprises Costa Rica, Honduras, Guatemala, Nicaragua, El Salvador, Panama and Dominican Republic.

in such non-traditional markets as the Middle East and North Africa. These new exporters generally rely on direct and indirect subsidies to obtain an edge in the world market. Subsidized export drives not only reduced the export markets for Argentine beef but also distorted the pricing mechanism in the international market, which is reflected in the reduction of Argentine beef exports in terms of value.

The changing market situation for Argentine beef is more clearly seen in the changes of export destinations. In the beginning of the 1970s, more than a half of the total exports (in carcass weight) went to the EC, averaging 377,000 tons annually during 1969-73. However, the situation changed distinctly in 1974 by the new agricultural policy of the EC which restricted beef imports to protect domestic producers. The exports to the EC declined sharply from 363,000 tons in 1973 to 135,000 tons in 1974 and 102,000 tons in 1975, with the EC's share in the Argentina's total beef exports dropping to 47% and 39% respectively. Although the annual exports to the EC remained more than 200,000 tons in the late 1970s, their share continued to decline to 32% in 1979. The exports to the EC further decreased to 142,000 tons and 30% in the share in 1981, and went down further in 1983 following the loss of the British market in 1982. However, the main importer of Argentina's chilled and frozen beef was still the EC, particularly West Germany with a total of 49,000 tons in 1985.

The markets in the Middle East and North Africa began to assume importance along with the shrinkage of the EC market, but has been stagnant or declining in recent years, probably due to the export drives by new exporters to these regions. The USA, including Puerto Rico, has emerged as the most important market for Argentine beef products, all of which are canned and frozen cooked meat. Its import of 103,000 tons in carcass weight equivalent accounted for 40% of the total in 1985. However, the exports to the USA have been rather stagnant in recent years. The exports to the USSR reached 131,000 tons in 1980, and stayed around 100,000 tons during 1981-1983 on the basis of the bilateral agreement of five years ending in 1985. But the exports were halved in 1984 and ceased in 1985 by the USSR's decision of the import suspension in August 1984. The situations in the other important markets such as Israel and Switzerland are also variable according to economic conditions therein.

The above-mentioned circumstances have changed the composition of Argentine beef exports. Traditionally, chilled and frozen fresh meat (including manufacturing type) accounted for 70%, and canned and frozen cooked meat for the remainder in terms of value. The ratio was changed to 49% and 51% in 1985 (Table II-2-8). In terms of export volume, chilled and frozen quarters declined during the period of 1978-1985 from 30,000 tons to 3,000, chilled and frozen cuts from 221,000 tons to 62,000 tons, and the frozen manufacturing type from 79,000 tons to 9,000 tons. During the same period, frozen cooked beef declined from 35,000 tons to 24,000 tons and canned beef from 72,000 tons to 30,000 tons. The sharper reduction observed in chilled and frozen fresh beef can be attributed largely to the shrinkage of the EC market which has traditionally been the main buyer of these products.

Of the total beef exports of 260,000 tons in carcass weight in 1985, 42% were chilled and frozen meat and 58% canned and frozen cooked.

Table II-2-8 Beef Exports by Major Product (1973-1983)

	Chilled and Frozen Quarters	Chilled and Frozen Cuts	Frozen Manu- facturing Type	Cooked Frozen	Canned	Other Canned	Total
	(1,000 ton)						
1973	49,940	185,003	59,288	18,393	30,392	9,610	352,626
1974	7,128	69,776	29,402	11,548	34,658	8,683	161,195
1975	3,959	41,919	33,197	14,159	39,749	5,676	138,659
1976	51,694	100,019	72,224	26,107	54,603	9,309	313,956
1977	49,503	139,772	88,858	24,910	48,764	9,241	361,048
1978	29,572	220,700	79,496	35,423	71,647	9,016	445,854
1979	90,460	169,143	78,873	33,355	56,910	9,977	438,718
1980	14,262	131,367	58,366	23,498	40,797	5,240	273,530
1981	69,515	89,743	60,742	19,556	40,376	3,021	282,953
1982	81,882	95,845	65,342	20,927	40,523	5,752	310,271
1983	31,078	84,785	61,263	22,014	34,675	6,026	239,841
1984	6,766	48,327	28,439	21,826	24,842	4,828	135,028
1985	3,024	62,328	9,127	23,869	29,643	10,561	138,552

Source: JNC

The main buyer of chilled and frozen beef was the EC, accounting for 49%, and the remaining 54% was chiefly exported to Israel, Angola, Chile and Switzerland. On the other hand, the main buyer of canned and frozen cooked beef was the USA (68%), followed by the EC (16%) (Table II-2-9). In terms of value, the EC and the USA accounted for 62% (US\$88.9 million) of the total chilled and frozen beef and 72% (US\$108.0 million) of the total canned and frozen cooked respectively. This means that the beef products exported to these countries had generally higher unit prices. The relative importance of major export destinations (EC and USA) and the higher unit prices therein did not change much, and therefore, it can be said that the reduced participation in the traditional beef markets of those developed countries has had the largest negative impact on the decline of Argentine meat exports.

The average unit price of beef exports declined from the latest peak of US\$1,915 per ton of carcass weight in 1980 to US\$1,124 per ton in 1985 in real terms (1984 constant price adjusted by the wholesale price index in the USA) (Table II-2-10). The decline in unit price appears to be due to the combined effects of such factors as the diminished international prices influenced by the subsidized export drives by the EC and others, the weaker demand in the world beef market, and the shrinkage of the Argentina's traditional markets which buy higher-priced products. The Argentina's disadvantage in price competition seems to be more aggravated under the EC's Common Agricultural Policy. For example, the average unit price of frozen manufacturing type beef in 1985 was US\$731/ton for West Germany, US\$617/ton for Netherlands and US\$600/ton for France, compared with US\$827/ton for Chile.

It is reported that the exports of quality cuts and canned beef have begun to increase by the policy of targetting such exports toward developed countries. The export promotion of quality beef for developed markets would require a wide range of improvements in quality control and product development in order to establish high international recognition. The present marketing system and quality and sanitary control for domestic consumption appear to constrain such promotional efforts as discussed in the previous section.

The export taxation is regarded as another negative institutional factor that adversely affects Argentina's competitiveness in international beef market. The export taxes as of June 1986 are 6% of the FOB value for special cuts and canned beef, 10% for manufacturing type beef (boneless), and 15.5% for less-processed beef (with bone). Although these rates are considerably lower than the levels in the mid-1970s, the taxation seems to be discouraging export promotion efforts of the private sector. Export taxation is a striking contrast to the policies of subsidized exports pursued by other exporting countries, and it would be necessary to reduce the rates and adjust them flexibly and selectively in order to support the recuperation efforts among cattle producers and meat processors.

2-2-2 Trends in Domestic Consumption

The domestic consumption of beef in Argentina fluctuates mainly according to such factors as production, exports and population growth.

Table II-2-9 Beef Exports by Destination (1980-1985)

Destination	1980			1981			1982			1983			1984			1985		
	Chilled and Frozen	Canned and Cooked	Total	Chilled and Frozen	Canned and Cooked	Total	Chilled and Frozen	Canned and Cooked	Total	Chilled and Frozen	Canned and Cooked	Total	Chilled and Frozen	Canned and Cooked	Total	Chilled and Frozen	Canned and Cooked	Total
Carcass Weight (1,000 tons)																		
USA	-	87.9	87.9	-	64.5	64.5	-	83.5	83.5	-	92.0	92.0	-	87.0	87.0	-	102.9	102.9
EC	92.0	67.5	159.5	88.3	76.7	165.0	67.1	52.7	119.8	60.1	28.8	88.9	37.4	20.9	58.3	49.7	24.1	73.8
USSR	131.3	-	131.3	113.9	-	113.9	101.5	-	101.5	88.4	-	88.4	48.9	-	48.9	-	-	-
Others	75.1	15.2	90.3	125.9	16.7	142.6	190.8	26.4	217.2	110.8	29.9	140.7	38.2	17.6	55.8	59.5	23.8	83.0
Total	298.4	170.6	469.0	328.1	157.9	486.0	359.4	162.6	522.0	259.3	150.7	410.0	124.5	125.5	250.0	109.2	150.8	260.0
Value (US\$ million)																		
USA	-	130.8	130.8	-	100.7	100.7	-	94.3	94.3	-	103.2	103.2	-	99.3	99.3	-	108.0	108.0
EC	206.8	89.1	295.9	170.4	95.8	266.2	117.1	47.9	165.0	113.5	23.0	136.6	81.4	15.6	97.0	88.9	16.6	105.5
USSR	178.7	-	178.7	141.3	-	141.3	90.7	-	90.7	77.3	-	77.3	41.7	-	41.7	-	-	-
Israel	31.3	-	31.3	42.0	-	42.1	28.6	-	28.6	37.0	-	37.0	14.4	-	14.4	16.5	-	16.5
Egypt	12.3	1.2	13.5	60.2	0.4	60.6	87.6	0.5	88.0	29.1	3.2	36.3	-	1.8	1.8	-	0.6	0.6
Peru	0.3	-	0.3	7.8	-	7.8	14.2	-	14.2	5.6	-	5.6	6.1	-	6.1	2.1	-	2.1
Saudi Arabia	10.6	0.9	11.5	5.0	-	5.0	2.2	1.0	3.2	8.5	0.7	9.2	4.9	0.6	5.5	3.0	0.2	3.2
Switzerland	24.1	0.1	24.2	28.0	0.2	28.2	14.4	0.4	14.8	14.6	0.3	14.9	8.1	1.1	9.2	5.0	0.3	5.4
Chile	14.6	-	14.6	17.1	-	17.1	11.2	-	11.2	2.0	-	2.0	2.3	-	2.3	5.2	-	5.2
Iran	9.7	-	9.7	5.2	-	5.2	9.5	-	9.5	-	-	-	-	-	-	-	-	-
Argentina	1.0	-	1.0	8.6	1.5	10.0	16.3	2.7	19.0	5.4	1.5	6.9	-	0.6	0.7	-	2.3	2.3
Iraq	-	1.7	1.7	-	5.1	5.1	29.0	1.8	30.8	6.7	-	6.7	-	-	-	-	-	-
Angola	2.7	-	2.7	4.0	-	4.0	4.1	-	4.1	3.6	-	3.6	1.1	-	1.1	9.1	-	9.1
Others	34.4	23.4	57.7	31.1	15.7	46.8	25.7	26.6	52.3	22.3	24.7	47.0	8.8	14.1	22.9	13.5	22.5	35.9
Total	526.0	247.2	773.0	520.8	219.4	740.1	450.6	175.3	625.7	325.6	156.6	486.3	168.8	133.2	302.0	143.3	150.5	293.9

Source: Servicio Nacional de Economía y Sociología Rural (SNEER)

Table II-2-10 Average Unit Price by Major Beef Product Exported

(1984 US\$/ton)

	Quarters		Cuts		Frozen Manufacturing Type			Cooked Frozen	Canned	In Carcass
	Chilled	Frozen	Chilled	Frozen	Bone-in	Boneless				
1970	2,046	1,478	3,246	2,294	1,349	1,625	4,244	2,591	1,404	
1971	2,438	2,035	4,509	3,318	1,885	2,348	5,114	3,855	2,002	
1972	2,814	2,120	4,716	3,390	2,267	2,824	4,554	3,770	2,189	
1973	3,725	2,808	5,860	4,096	2,617	3,474	6,482	4,347	2,771	
1974	3,818	2,396	4,785	3,642	-	2,589	5,338	4,812	2,284	
1975	1,453	1,574	4,107	2,652	763	1,811	3,241	2,918	1,355	
1976	1,523	1,024	3,415	2,184	772	1,418	3,039	2,791	1,188	
1977	1,882	1,456	3,363	2,108	1,227	1,534	3,162	2,643	1,280	
1978	1,726	1,238	3,434	1,920	1,078	1,379	3,047	2,474	1,227	
1979	2,581	1,914	3,139	3,169	1,711	2,297	4,662	3,384	1,871	
1980	2,324	2,004	6,413	3,022	1,669	2,388	4,960	5,166	1,915	
1981	1,810	2,050	4,836	2,943	1,307	1,932	3,359	3,161	2,612	
1982	1,446	1,703	3,459	2,235	1,122	1,445	3,300	1,708	1,246	
1983	1,497	1,534	3,719	1,959	963	1,319	3,429	2,046	1,027	
1984	1,750	1,285	3,710	1,893	853	1,273	3,461	1,921	1,202	
1985	-	763	3,567	1,574	743	754	3,186	1,806	1,124	

Source: Junta Nacional de Carnes

Taking into account the relatively low population growth of 1.8% per annum, the former two factors can be regarded as most important.

In the early 1970s, the total beef consumption declined to less than 1.5 million tons in carcass weight in 1973 from the peak of 2.1 million in 1969, largely due to the beginning of the expansion phase of the livestock cycle. In terms of per capita consumption, 1973 recorded a historical low of 61.4 kg per annum against 92.3 kg in 1969. Along with the start of the new liquidation phase and the sharp decline of exports in the mid-1970s, beef consumption began to increase, reaching 2.4 million tons and 90 kg per capita in 1978. Domestic consumption rose to 77% of the total production. After declining to less than 2 million tons and 67 kg per capita in 1983, the domestic consumption again rose to 2.4 million tons and 80 kg per capita in 1985. This increase was due to the continued liquidation phase, further declines of exports, sharp falls of cattle prices in real term, and the price control regime introduced by the Austral Plan. It should be noted that the share of domestic consumption in production reached an unprecedented high level of 90% in 1984 and 1985 (Table II-2-11). Beef consumption in 1986 could be larger, because the average per capita consumption in Greater Buenos Aires during the first four months of 1986 was 96 kg compared with 89 kg during the same period in 1985.

Although there are no relevant statistics illustrating the characteristics of domestic beef consumption, a large part of beef consumed in Argentina is bought fresh by households. It is reported that approximately 8%, or 219,000 tons in carcass weight, of the total beef production in 1985 is processed into such products as canned beef, sausages and hamburger patties, of which nearly 70% are exported as canned and cooked beef. That is to say, the processed beef accounts for less than 3% of the total beef consumed in 1985. The consumers' preference is said to be for fresh, unprocessed beef because of the traditional eating habits and relatively low prices of such beef. Despite the diversification efforts by some frigorificos, therefore, the demand for processed beef seems rather stagnant, except for hamburger patties.

Judging from the past trends in beef consumption and the high level of annual per capita meat consumption of over 100 kg including pork (7 kg), mutton (3 kg) and chicken (10 kg) in recent years, the domestic demand for meat, especially beef, appears to be nearly saturated. Accordingly, there would be little possibility for further increase in consumption except for the increase by population growth.

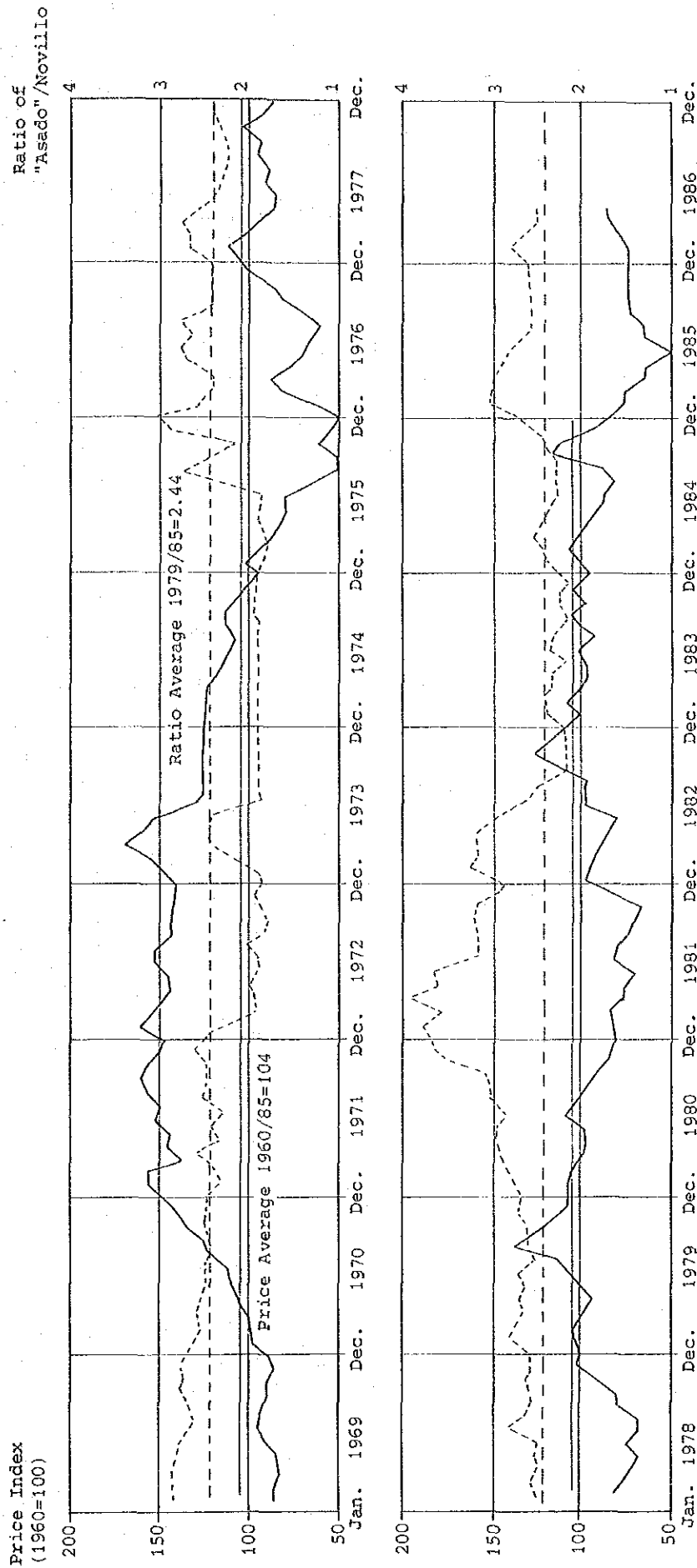
Figure II-2-9 shows the trends in the price index of a steer (novillo) at the Liniers Market and in the ratio of the average retail price per kg of common "asado" beef to the price of a steer per kg of live weight at the Liniers. The figure shows that during the upward movement of novillo prices, the difference between the price of novillo and the retail price stays relatively stable, but that during the downward movement, the difference widens for sometime. That is to say, there is a tendency that the marketing margin of distributors does not immediately reflect the decline in cattle prices. This could be attributed partly to the constraints of the marketing and pricing mechanism. Since June of 1985, prices of selected products have been regulated by the government decree.

Table II-2-11 Trends in Domestic Meat Consumption (1965-1985)

	Population as of 30 June (thousand)	Total		Beef		Mutton		Port	
		ton	kg per capita	ton	kg per capita	ton	kg per capita	ton	kg per capita
1965	21,544	1,824,146	84.6	1,492,915	69.3	125,619	5.8	205,612	9.5
1966	21,880	2,073,214	94.8	1,734,931	79.3	122,556	5.6	215,727	9.9
1967	22,221	2,161,258	97.3	1,825,355	82.1	130,101	5.9	205,802	9.3
1968	22,566	2,279,034	101.0	1,953,892	86.6	147,637	6.5	177,505	7.9
1969	22,917	2,449,585	106.9	2,115,051	92.3	134,769	5.9	199,765	8.7
1970	23,364	2,291,543	98.1	1,956,011	83.7	132,860	5.7	202,672	8.7
1971	23,773	1,902,731	80.0	1,506,893	63.4	153,212	6.4	242,626	10.2
1972	24,189	1,810,060	74.8	1,485,102	61.4	114,397	4.7	210,561	8.7
1973	24,612	1,854,243	79.4	1,612,578	65.5	102,108	4.2	239,557	9.7
1974	25,043	2,178,498	87.0	1,857,033	74.1	87,015	3.5	234,450	9.4
1975	25,481	2,516,218	98.8	2,172,552	85.3	95,992	3.8	247,674	9.7
1976	25,965	2,605,607	100.3	2,277,382	87.7	88,265	3.4	239,960	9.2
1977	26,427	2,633,749	99.6	2,308,776	87.3	90,172	3.4	234,801	8.9
1978	26,897	2,734,564	101.7	2,434,120	90.5	89,060	3.3	211,384	7.9
1979	27,376	2,679,170	97.8	2,322,199	84.8	99,210	3.6	257,761	9.4
1980	27,863	2,746,254	98.6	2,391,240	85.8	91,753	3.3	263,253	9.5
1981	28,358	2,763,246	97.4	2,420,205	85.3	89,864	3.2	253,177	8.9
1982	28,863	2,345,084	81.3	2,030,542	70.3	85,389	3.0	230,033	8.0
1983	29,400	2,268,781	77.2	1,974,573	67.2	87,595	3.0	206,613	7.0
1984	29,900	-	-	2,308,000	77.0	-	-	-	-
1985	30,400	-	-	2,440,000	80.0	-	-	-	-

Source: Population - INDEC
Consumption - Until 1979, Junta Nacional de Carnes and Servicio Nacional de Economía y Sociología Rural
From 1980 Junta Nacional de Carnes

Figure II-2-9 Trends in Price Index of "Novillo" at the Liniers and Ratio of Consumer Price/kg of "Asado" to Price/kg of "Novillo" at the Liniers (Jan. 1969 - Apr. 1984)



As shown in Figure II-2-9, the price index of novillos has been stable since mid-1985, and the relative difference between the retail price of common meat and the price per kg of novillos has also been more or less stable. However, it is notable that the relative difference after mid-1985 is still larger than during the period from late 1982 to 1984. Since May of 1986, price control was changed to the regime of maximum prices, but it is argued that the pricing control, especially over high quality meat, affects the recuperation efforts among producers and processors.

There seems to be a need for developing a pricing mechanism which supports the interests of consumers and producers without overly distorting the market mechanism, such as the system of buffer stock and official market participation, as proposed by the JNC, as well as more rational adjustments of the current price control regime.

2-3 Outlook and Potentials of Development

2-3-1 Policy Orientation and Strategic Measures

Policy objectives and strategies for the livestock sector have been indicated in the National Agricultural and Livestock Program 1984-1987 (PRONAGRO) announced in 1984 by the Secretariat of Agriculture, Livestock and Fisheries. Moreover, the PRONAGRO's proposals related to the commercialization and exportation are being elaborated as the National Meat Plan, which is to be implemented by the JNC as the primary executing agency. The PRONAGRO's policy proposals can be discussed as those chiefly pertaining to herd and pasture management and those related to the system of commercialization. In both of these policy areas, the primary importance is attached to the implementation of anti-cyclical measures which centers around price and incentive policies to counter the long-lasting stagnation and instability of the sector.

(1) Policies for improved herd and pasture management

Both the livestock and the crop sectors in the Pampa region kept increasing its production chiefly by relying on the favorable climatic and soil conditions. With respect to the livestock sector, however, the cattle population has been declining since the late 1970s as a result of its increased opportunity costs relative to the crop sector and the decline and the instability of its profitability.

The major aim of the PRONAGRO is to remedy the short-term fluctuations of cattle and meat prices through a variety of policies on prices, incentives and technology development, and thereby to facilitate the stabilization of cattle population at a reasonably high level and encourage the productivity improvement of cattle farming in the non-traditional areas (mostly the areas outside the Pampa region). Given the generally favorable natural conditions in major cattle farming areas in the country, additional efforts to improve cattle management would raise the level of productivity with relative ease, and make Argentina as a major producer/supplier of low-cost quality beef in the world. Two major areas for such efforts are animal health control and efficiency of land use.

(a) Reduction of losses due to diseases

Among various diseases to which cattle are susceptible, the most important in Argentina is undoubtedly the acutely communicative foot-and-mouth disease. Because of the nature of the disease, the eradication is by no means easy, and long-term sustained efforts with the full awareness on the part of cattle producers and under appropriate official enforcement are thus indispensable. For this purpose, the PLANARSA has been already formulated by the SELSA of the National Service of Animal Health (SENASA) and officially approved, and it is extremely important to implement the plan strictly according to its proposals.

Especially important would be the vaccination in the areas of breeding operations and the strict check and control of the cattle movement therefrom. When these measures are successfully taken, the

occurrences of the disease in the areas of fattening operations would be substantially cut down from the estimated 60% at present in the fattening region. However, considering the absolute need of long-term sustained efforts for complete eradication, the strict implementation would require sufficient manpower and funds for quick information gathering and counteractions.

In addition to the foot-and-mouth disease, Brucellosis and tuberculosis of cattle are also found widely in the country. The rate of Brucellosis affection is said to range from 3% to 16% by region, while the rate of discovering tuberculosis-affected meat at the SIPA's laboratories is said to be 5%. Because these chronic communicative diseases cause substantial economic losses to the producers, and because there is a danger of their being communicated to humans, it is also important to sustain efforts for bringing them under effective control, as already stipulated in the PLANARSA.

Internal and external parasites also bring some economic losses, but their control is technically easier by periodic applications of antiparasitics. It would be necessary to take measures to supply necessary medications at reasonable prices and to establish sufficient dipping facilities. Occurrences of diarrhea, nutritional deficiencies and other common disorders found among young calves can be prevented to a large extent by improving herd management techniques on the farm level.

When all the measures proposed in the PLANARSA are put into effect systematically, it is possible to raise the present breeding efficiency of 70% and the weaning efficiency of 60% - 70% to a considerable extent, thereby improving and stabilizing the productivity of cattle farming. It has to be pointed out that many of the proposed measures require continued efforts for a considerable period of time, and that the SELSA alone cannot implement them to the full effect, unless its efforts are well coordinated and integrated with the activities of the other departments of the SENASA, and other public and private institutions concerned with livestock development.

(b) Improvement of land productivity

As already mentioned, natural grassland (including mountainous areas) accounted for nearly 70% of the combined area used for cattle farming of the five provinces in the Pampa region in 1982. This fact points to the area of possible improvements, even if the Pampa region is endowed with an enormous productive capacity because of its generally good natural conditions. Especially with regard to the fattening operations, an expansion of cultivated pastures and more efficient utilization of their grazing capacity would be important to raise the land productivity on a more stable basis. The present average grazing capacity of cultivated pastures is said to range from 1.0 to 2.0 heads per ha, compared with from 0.1 up to 1.0 head in natural grassland. By turning natural grassland to cultivated pastures, the total productive capacity of the grazing land would increase tremendously, thus enabling a much more efficient and integrated use of agricultural land for both cattle farming and crop cultivation.

Most of the areas utilized for cattle farming within and around the Pampa region are flat and largely free of natural obstacles, implying that the costs of investment in pasture development would not be very high. Supplementary sowing of suitable grasses in natural grassland as well as in land under fallow after the cropping phase, when coupled with more efficient methods of herd and pasture management already practiced by advanced cattle producers, would raise the land productivity in no uncertain terms, as shown by the example of hoof cultivation in New Zealand. With respect to breeding farms which employ far more extensive methods in less favorable areas than fattening farms, artificial pasture development and management would be less easy because of their generally large-scale operations in outlying regions and the difficulty of obtaining necessary manpower, but the approach would be basically the same. As proposed in the PRONAGRO, it would be vital to provide selective credit and to expedite appropriate technological development and diffusion in this regard.

It is just as important as pasture development to disseminate more intensive methods of pasture utilization and management. More systematic utilization of cultivated pastures would certainly be able to improve the average grazing capacity, and when combined with the implementation of policies proposed for adjusting the mechanism of commercialization, would be able to raise the profitability of cattle farming. Trials conducted at the INTA's EERA at Pergamino realized the productivity of 500 - 700 kg in live weight per ha, while a group of advanced cattle producers has achieved the level of 600 kg by applying the method of herd and pasture management similar to dairy farming. Therefore, more intensified efforts to diffuse these already proven methods would be important to raise the average efficiency of fattening operations.

In addition, it would be also necessary to eliminate inedible and harmful grasses from cultivated and natural pastures, either by mechanical or chemical means depending on the cost performance. This point would be especially important in new pasture development. To graze the herd on nutritionally well-balanced grasses with careful management serves as a basic preventive measure for better animal health and quality, lowering the possibility of economic losses due to diseases and other disorders of animal growth.

It is vital to coordinate various measures and actions proposed for effective animal health control and efficient herd and pasture management. It seems that the activities of extension workers of the public institutions like the INTA and private organizations for technical assistance are not always well-coordinated with health services provided by the SELSA on the levels of cattle farms which have varying needs and requirements. It will be important to establish an effective system of cooperation to facilitate better exchange of information and efficient deployment of limited manpower. Furthermore, in order to expedite the process of recuperation for the livestock sector which has been suffering from stagnation for a prolonged period, it is essential to provide selective fiscal and financial incentives to those producers who are prepared to improve their herd and pasture management methods.

(2) Policies to restructure commercialization

The major objectives of the PRONAGRO and the National Meat Plan under preparation lie in the restructuring of the domestic marketing system and the export promotion of meat products. And the primary policy emphasis is in expanding the functions of the JNC, and strengthening the increased participation of frigorificos in the domestic meat marketing.

The functions of the JNC have so far been limited to the administrative supervision of classification and quality control of meat products, and the organization could not directly intervene the domestic market of meat. The prospective policy is to enlarge the functions of the JNC by increasing its financial autonomy through appropriate legislative revisions. For example, the JNC is expected to contribute more actively to the stabilization of both producers' and consumers' prices of meat, on the one hand, and to the export promotion of high-priced or high-value-added meat products, on the other. Proposed measures to be pursued by the JNC are reduction and flexible adjustments of export taxes on meat products, introduction and operation of buffer stocks in frozen meat, strengthening of export financing, negotiations for official bilateral trade agreements, and so on. Among these measures, the flexible adjustments of export taxes depend on the successful introduction of the land tax now being deliberated at the Parliament.

The meat-processing plants called frigorificos have grown primarily with strong orientation toward the external market, but the majority of the plants have been in serious difficulties because of the shrinkage of traditional export markets for Argentine beef and their reduced share in the domestic meat marketing. Strong readjustment policies are thus considered essential to aid the recuperation of the industry.

Among the various proposals presented in the PRONAGRO, the policy which is expected to aid indirectly the selective recuperation of frigorificos seems to be the establishment and execution of norms for domestic commercialization, focusing on the sanitary and quality standards of meat products. As mentioned earlier, slaughterhouses with less than desirable sanitary facilities are currently under operation, processing a considerable part of the domestic supply of fresh meat. Accordingly, the proposed strengthening of sanitary and quality control is likely to work to the advantage of frigorificos which are generally better equipped with necessary facilities.

More direct policy proposals are to provide fiscal and financial incentives, such as in the form of export tax reinversements and export financing, to those frigorificos which actively participate in the government anti-cyclical programs to control the supply and demand of cattle and meat, and in promotional measures for developing high-priced and high-value-added meat products for exportation and/or pre-packaged products with higher sanitary and quality standards for the domestic market.

In addition to fiscal and financial incentives, the Government is proposing to negotiate directly with importing countries for official bilateral trade agreements, and to secure adequate funds for financing the structural readjustments needed for the meat-processing industry.

The various policy proposals briefly mentioned above are expected to make important contributions to the recuperation and stabilization of the livestock industry, and it is desirable to implement them as early as possible. Especially vital will be the institution and enforcement of the sanitary and quality norms in the domestic markets. The success in this measure will not only benefit the domestic consumers but also function to enhance the international confidence in Argentina's meat products as a whole.

With respect to frigorificos, there is undoubtedly a need of restructuring the industry, including possible rationalization. For the activation of the industry, it will be necessary to orient and support selectively the efforts of individual enterprises toward desirable directions of product development for both external and domestic markets. Through the Plan for Recuperation of the Meat-Processing Industry which was begun in late 1984, the government has already been assisting the debt rescheduling of better performing frigorificos, but in addition, it will be necessary to provide fiscal and financial incentives in order to support their efforts for reducing production costs and thereby improving their competitiveness. In this regard, it goes without saying that the proposed flexible and selective application of export taxes and tax reinversements are very important by offering appropriate rewards to those enterprises which make efforts at restructuring.

Considering the present high level of per capita meat consumption in Argentina, the domestic consumption appears unlikely to increase much further. Therefore, the increase in demand will have to be sought in the external markets. For this purpose, it will be essential to step up export promotion efforts. Because of the presence of the foot-and-mouth disease, export targets for fresh, chilled and frozen meat will be necessarily limited, because exports to FMD-free countries are banned until its complete eradication is achieved through the sustained implementation of the PLANARSA. But with regard to cooked meat, there are possibilities for developing new markets through energetic product diversification. The important point in this regard is to develop new products not only in accordance with the sanitary and quality standards enforced in export markets, but also in accordance with the tastes and preferences over preparation methods among consumers there. It will be necessary to strengthen the system for collecting relevant market information, and have it utilized in actual product development. In this respect, it will be useful to encourage the coordinated efforts between the private sector and the public sector institutions like the INTI.

2-3-2 Market Prospects

(1) Asia in world production and trade

(a) Trends in meat consumption

World consumption of total meat increased by 30%, or by 2.7% per annum, from 1969/71 average to 1979/81 average due to the increase in population and income, but remained stagnant in the early 1980s (Table II-2-12). During 1969/71 - 1979/81, the share of Asia in world consumption rose from 21% to 24% for Asia Total, from 19% to 21% for Far East Asia, and from 3% to 5% for Selected Asia.¹⁾ Although Asian consumption of meat is still small relative to its share in total world population (58% for Asia Total, 53% for Far East Asia, and 9% for Selected Asia in 1983), it increased more rapidly than world consumption over the decade of the 1970s.

The growth of consumption in Asia was especially rapid in the later 1970s. During 1969/71 - 1974/76, world consumption of meat grew at an annual rate of 2.4%, while that of Asia Total and Far East Asia annually increased by 2.9% and 2.8% respectively. Over the period from 1974/76 to 1979/81, annual growth rates were 5.3% in Asia Total and 4.9% in Far East Asia, compared with 3.0% in world total. Primarily due to the worldwide economic recession after the second oil crisis which depressed the demand for meat, total world consumption in 1982/83 average recorded no growth relative to 1979/81 average, while consumption in Asia Total and Far East Asia showed a small decline.

The trend in Selected Asia somewhat differs from Asia Total and Far East Asia. The growth of consumption has been not only rapid throughout the 1970s but also more rapid during the earlier half of the decade; 6.3% per annum from 1969/71 to 1974/76 and 5.1% from 1974/76 to 1979/81. Moreover, consumption continued to grow in the early 1980s. Selected Asia, which accounts for 17% of the total population in Far East Asia, generated 31% of the increase in consumption in Far East Asia during the 1970s. As shown in Table II-2-13, this growth in Selected Asia's consumption of meat was primarily due to the rapid increase in Japan and NICs-3 (Hong Kong, Korea and Singapore).

(b) Trends in meat production

World production of meat grew steadily in the 1970s, by 2.4% per annum in the earlier half and 3.5% in the later half, but stopped growing in the early 1980s reflecting the stagnation of demand due to the economic recession after the second oil crisis.

The annual growth rate of production in Asia was more rapid than the world total in the 1970s, accelerating from 2.7% during 1969/71 - 1974/76 to 4.9% during 1974/76 - 1979/81 in both Asia Total and Far East Asia, and the growth continued in the early 1980s. The growth of

1) Asia Total corresponds to Asia as used by the FAO Production Yearbook, and Far East Asia is Asia minus Near East. Selected Asia consists of Hong Kong, Korea, Singapore, Indonesia, Malaysia, the Philippines, Thailand and Japan (see (1) of 1-3-3).

Table II-2-12 Meat Production, Consumption and Trade in Asia

(1,000 tons, %)

	Production			Consumption			Rate of Self-Sufficiency		Import		Export	
	Total	% Share in World	Rate of Growth	Total	% Share in World	Rate of Growth	Total	% Share in World	Total	% Share in World	Total	% Share in World
World												
1969/71	105,865	100	-	105,819	100	-	100.0	100.0	4,481	100.0	4,526	100.0
1974/76	119,322	100	12.7	119,338	100	12.7	100.0	100.0	5,530	100.0	5,535	100.0
1979/81	138,375	100	16.0	138,052	100	15.8	100.2	100.0	7,941	100.0	8,265	100.0
1982/83	138,173	100	0.1	138,006	100	0.0	100.1	100.0	8,655	100.0	8,822	100.0
Asia Total												
1969/71	21,937	21	-	22,234	21	-	98.7	9.9	44	9.9	147	3.2
1974/76	25,031	21	14.1	25,641	22	15.3	97.6	14.8	818	14.8	842	42.2
1979/81	31,815	23	27.1	33,169	24	29.4	95.9	21.8	1,730	21.8	376	79.9
1982/83	29,650	22	6.8	31,271	23	-5.7	94.8	24.3	2,102	24.3	481	27.9
Far East Asia												
1969/71	19,562	18	-	19,778	19	-	98.8	7.9	356	7.9	140	3.1
1974/76	22,309	19	14.0	22,699	19	14.8	98.3	10.6	584	10.6	194	3.5
1979/81	28,275	20	26.7	28,821	21	27.0	98.1	11.0	873	11.0	327	4.0
1982/83	25,712	19	9.1	26,319	19	-8.5	97.7	11.5	993	11.5	386	4.4
Selected Asia												
1969/71	3,480	3	-	3,813	3	-	91.3	7.9	353	7.9	20	0.3
1974/76	4,635	4	33.2	5,174	4	35.7	89.6	10.3	567	10.3	28	0.5
1979/81	5,848	4	26.1	6,644	5	28.4	88.0	10.7	847	10.7	51	0.5
1982/83	6,431	5	10.0	7,310	5	10.0	88.0	11.0	956	11.0	77	0.9

Source: FAO, Production Yearbook and Trade Yearbook, various issues.

Notes: 1) Meat (production) is FAO's total meat which consists of beef, buffalo meat, mutton, goat meat, pig meat, horse meat, poultry meat and meat of all other domestic and wild animals.
 2) Import and export figures are only fresh, chilled and frozen meat (SITC 011) as aggregated by FAO.

3) The rate of growth is relative to the preceding period average.

Table II-2-13 Production and Trade of Meat in Selected Asia

(1,000 tons)

	Produce- tion	Import	Export	Consump- tion	Self- Suffici- ency (%)	Produce- tion	Import	Export	Consump- tion	Self- Suffici- ency (%)	Produce- tion	Import	Export	Consump- tion	Self- Suffici- ency (%)
	(1) Total Meat					(2) Beef					(3) Pork				
Total															
1969/71	3,480	363	20	3,813	91.3	627	42	1	668	93.9	1,389	45	0	1,434	96.9
1971/76	4,625	567	28	5,114	89.0	925	93	1	1,017	91.0	2,037	118	6	2,149	91.8
1979/81	5,868	817	51	6,841	88.0	1,090	198	3	1,285	84.8	2,831	172	1	3,002	91.3
1982/83	6,451	956	71	7,310	88.0	1,142	255	2	1,396	81.9	2,828	210	1	3,037	91.1
Annual Growth (69/71-79/81)	8.3	9.1	9.8	6.7		5.7	16.8	11.6	6.8		7.1	14.3		7.7	
Japan															
1969/71	1,617	201	16	1,892	87.1	258	28	0	286	90.2	656	29	0	685	95.8
1971/76	2,189	421	4	2,576	83.8	324	61	0	385	83.5	1,057	105	0	1,162	91.0
1979/81	2,962	590	4	3,548	80.5	430	126	0	555	77.5	1,434	141	0	1,575	91.0
1982/83	3,173	612	3	3,782	83.8	488	130	0	618	79.0	1,429	154	0	1,583	90.3
Annual Growth (69/71-79/81)	6.0	8.6	-12.9	6.5		5.2	16.1		6.9		8.0	17.1		8.5	
NICs-3															
1969/71	395	82	4	473	83.5	62	11	1	72	86.1	235	10	0	251	93.6
1971/76	619	129	21	751	85.6	98	16	1	115	85.2	282	12	8	299	91.9
1979/81	820	227	23	1,021	80.1	141	56	3	195	72.1	491	29	0	520	91.5
1982/83	907	309	20	1,196	76.8	128	108	2	234	51.7	304	65	1	358	90.3
Annual Growth (69/71-79/81)	7.8	10.7		6.0		8.6	17.7	11.8	10.1		7.7	6.1		7.6	
ASEAN-4															
1969/71	1,438	10	0	1,448	99.3	307	3	0	310	99.0	488	0	0	488	100.0
1971/76	1,833	17	4	1,847	99.2	603	11	0	614	97.9	698	1	0	699	99.9
1979/81	2,008	30	24	2,072	99.7	610	11	0	625	96.8	903	2	1	904	99.9
1982/83	2,361	35	51	2,392	100.8	626	17	0	643	96.9	805	1	0	806	99.9
Annual Growth (69/71-79/81)	3.7	11.6		3.8		6.4	18.9		6.6		6.3			6.4	
	(4) Poultry					(5) Mutton									
Total															
1969/71	706	50	2	753	93.6	39	132	1	170	22.9					
1971/76	1,083	79	4	1,158	93.5	49	147	12	181	26.5					
1979/81	1,829	170	27	1,972	92.7	70	127	15	181	38.0					
1982/83	2,270	213	37	2,446	92.8	73	107	7	173	42.2					
Annual Growth (69/71-79/81)	10.0	13.0	29.7	10.1		6.0	-0.4	29.2	0.8						
Japan															
1969/71	427	19	1	445	96.0	1	123	0	124	0.8					
1971/76	682	28	2	710	96.3	0	113	0	110	0.0					
1979/81	919	82	3	1,008	92.5	0	95	0	95	0.0					
1982/83	1,233	105	3	1,335	92.4	0	84	0	84	0.0					
Annual Growth (69/71-79/81)	8.7	15.7	11.6	9.0			-2.5		-2.6						
NICs-3															
1969/71	72	31	1	102	70.6	3	6	1	8	37.5					
1971/76	113	51	1	163	69.3	2	26	12	37	17.6					
1979/81	200	84	4	280	71.4	4	28	13	49	21.1					
1982/83	281	102	7	390	67.9	4	19	7	26	25.0					
Annual Growth (69/71-79/81)	10.8	10.6	14.9	10.6		2.9	16.7	29.2	9.0						
ASEAN-4															
1969/71	206	0	0	206	100.0	35	3	0	38	92.1					
1971/76	288	0	1	287	100.3	16	2	0	18	95.8					
1979/81	650	4	20	634	102.5	66	4	0	70	94.3					
1982/83	836	8	27	815	102.6	69	4	0	73	91.6					
Annual Growth (69/71-79/81)	12.2			11.9		6.5	2.9		6.3						

Source: FAO, Production Yearbook and Trade Yearbook, various issues.

- Notes :
- 1) Meat (production) is FAO's total meat which consists of beef, buffalo meat, mutton, goat meat, pig meat, horse meat, poultry meat and meat of all other domestic and wild animals.
 - 2) Import and export figures are only fresh, chilled and frozen meat (SITC 011) as aggregated by FAO.
 - 3) For ASEAN countries, beef includes buffalo meat, and mutton includes goat meat.

production in Selected Asia during the 1970s was more rapid than in Asia Total and Far East Asia, though decelerating slightly from 5.9% per annum to 4.8%, and the growth also continued in the early 1980s. Increased production notwithstanding, the self-sufficiency in meat declined in all groups of Asia during the 1970s.

(c) Trends in meat trade

All groups of Asia import meat to satisfy the gap between domestic production and rapidly increasing consumption. Meat imports in Asia Total increased by 373% from around 0.4 million tons in the beginning of the 1970s to about 2.1 million tons in the early 1980s. The share of Asia Total in the world import thus increased from 10% in 1969/71 to 24% in 1982/83. The increase was especially rapid during 1974/76 - 1979/81, with an annual growth rate of 16.2%. Compared with Asia Total, imports in Far East Asia grew more slowly by 178% during 1969/71 - 1982/83, indicating that the rapid expansion of demand for meat imports in Asia Total took place primarily in Near Eastern countries.

As seen from Table II-2-12, Selected Asia accounted for almost all of the imports in Far East Asia. Within Selected Asia, Japan is the largest importer, accounting for some 70% of the group's total imports in 1979/81 (Table II-2-13). However, countries free from the foot-and-mouth disease like Japan and Korea ban imports of meat, ham and sausages, etc. from the disease-present countries. NICs-3 increased their imports at an annual rate of slightly over 10% during 1969/71 - 1979/81, and their combined imports rose from a little less than one third to one half of Japan's imports from 1969/71 to 1982/83. In Japan and NICs-3, the level of self-sufficiency thus dropped noticeably during the 1970s. By comparison, four ASEAN countries showed considerably slower growth in both production and consumption of meat, and the level of self-sufficiency still remains high. However, they, or Thailand to be more precise, have begun to export poultry meat since the late 1970s.

(2) Characteristics and prospects of consumption in Selected Asia

(a) Meat in food consumption

Table II-2-14 shows per capita consumption of meat in Selected Asia according to FAO's Food Balance Sheets. The level of meat consumption is to some extent higher in countries of higher income, but cross-country variations are quite large, ranging from the highest 74.3 kg per year in Hong Kong to 3.4 kg in Indonesia in 1979/81. The percentage of meat in daily per capita calorie intake is highest in Hong Kong, followed by Singapore and Japan, but Korea's percentage was the second lowest after Indonesia in 1979/81. A similar pattern is observable in the percentage of animal products in total daily calorie intake, with Korea's percentage only higher than Indonesia and Thailand.

The selected Asian countries increased their per capita consumption of meat during 1975/77 - 1979/81, with the exception of Indonesia which showed a slight decline. Among the countries with higher income, Korea nearly doubled its per capita consumption from

Table II-2-14 Per Capita Consumption of Meat in Selected Asia in 1975/77 and 1979/81

	Indonesia	Malaysia	Philippines	Thailand	Hong Kong	Korea	Singapore	Japan
1975/77 Average:								
Total Calorie(Kcal/day)	2,115	2,596	2,128	2,206	2,672	2,683	3,040	2,848
% from animal products	2.4	10.9	10.4	6.3	28.7	6.4	21.3	18.7
% from meat	0.9	3.0	5.1	2.8	19.9	2.0	10.0	5.6
% from animal fats	0.1	1.0	0.5	0.3	0.9	1.3	1.5	1.2
Meat consumption(kg/year)	3.5	13.1	15.1	10.7	72.9	7.9	48.0	25.7
Beef	1.0	1.1	1.6	3.0	11.2	2.1	3.3	3.5
Buffalo meat	0.2	0.6	1.0	1.5	0.0	0.0	0.0	0.0
Pork	0.8	4.5	8.1	3.5	37.2	3.1	17.3	10.9
Poultry	0.6	5.7	3.0	1.9	14.9	1.8	20.2	7.1
Mutton	0.3	0.4	0.1	0.0	0.5	0.2	3.1	1.2
Others	0.6	0.8	1.3	0.8	9.1	0.7	4.1	3.0
1979/81 Average:								
Total Calorie(Kcal/day)	2,372	2,518	2,405	2,330	2,771	3,056	3,165	2,852
% from animal products	2.2	14.0	9.5	6.5	30.3	8.8	21.8	20.7
% from meat	0.8	4.0	4.5	3.7	18.0	3.6	12.6	6.3
% from animal fats	0.1	1.0	0.5	0.4	3.8	1.5	0.8	1.4
Meat consumption(kg/year)	3.4	18.8	16.1	14.6	74.3	15.7	63.7	30.1
Beef	0.9	1.4	1.7	3.0	10.3	4.0	4.2	4.8
Buffalo meat	0.0	0.5	1.0	1.5	0.0	0.0	0.0	0.0
Pork	0.6	4.9	8.3	5.0	33.4	7.3	25.5	11.4
Poultry	0.8	10.3	3.4	4.1	17.8	3.2	27.6	10.0
Mutton and goatmeat	0.3	0.3	0.1	0.0	0.7	0.2	2.5	0.8
Others	0.2	1.2	1.3	0.8	12.3	1.0	3.5	3.1

Source: FAO, Food Balance Sheets: 1975-77 Average, 1980, and 1979-81 Average, 1984.
 Note : Animal products include meat, eggs, milk, fish and seafood, and animal oils and fats.

7.9 kg to 15.7 kg, and Singapore and Japan increased their consumption by 32.7% and 17.1% respectively. In Hong Kong, the highest consumer of meat among the eight countries, the increase was only 1.9%. Among the ASEAN countries, the increase in consumption was highest in Malaysia (43.5%), followed by Thailand (36.4%), while the consumption in the Philippines increased by only 6.6%.

As seen from the table, pork and poultry meat account for the bulk of meat consumption in Selected Asia. The percentage of pork is notably high in countries in East Asia or with large Chinese population, ranging from 47% in Korea to 40% in Japan. In ASEAN countries, the percentage is high in the Philippines (51%) and Thailand (34%), but relatively low in Malaysia (26%) and Indonesia (18%) which have large Muslim population. From 1975/77 to 1979/81, per capita consumption of poultry meat increased considerably in most of the eight selected countries; by 116% in Thailand, 81% in Malaysia, 78% in Korea, 41% in Japan, 37% in Singapore, and so on. The percentage of poultry meat consumption is higher than that of pork in Malaysia (55%), Singapore (43%) and Indonesia (23.5%), and it ranges from 20% to 30% of total meat consumption among the rest of the countries.

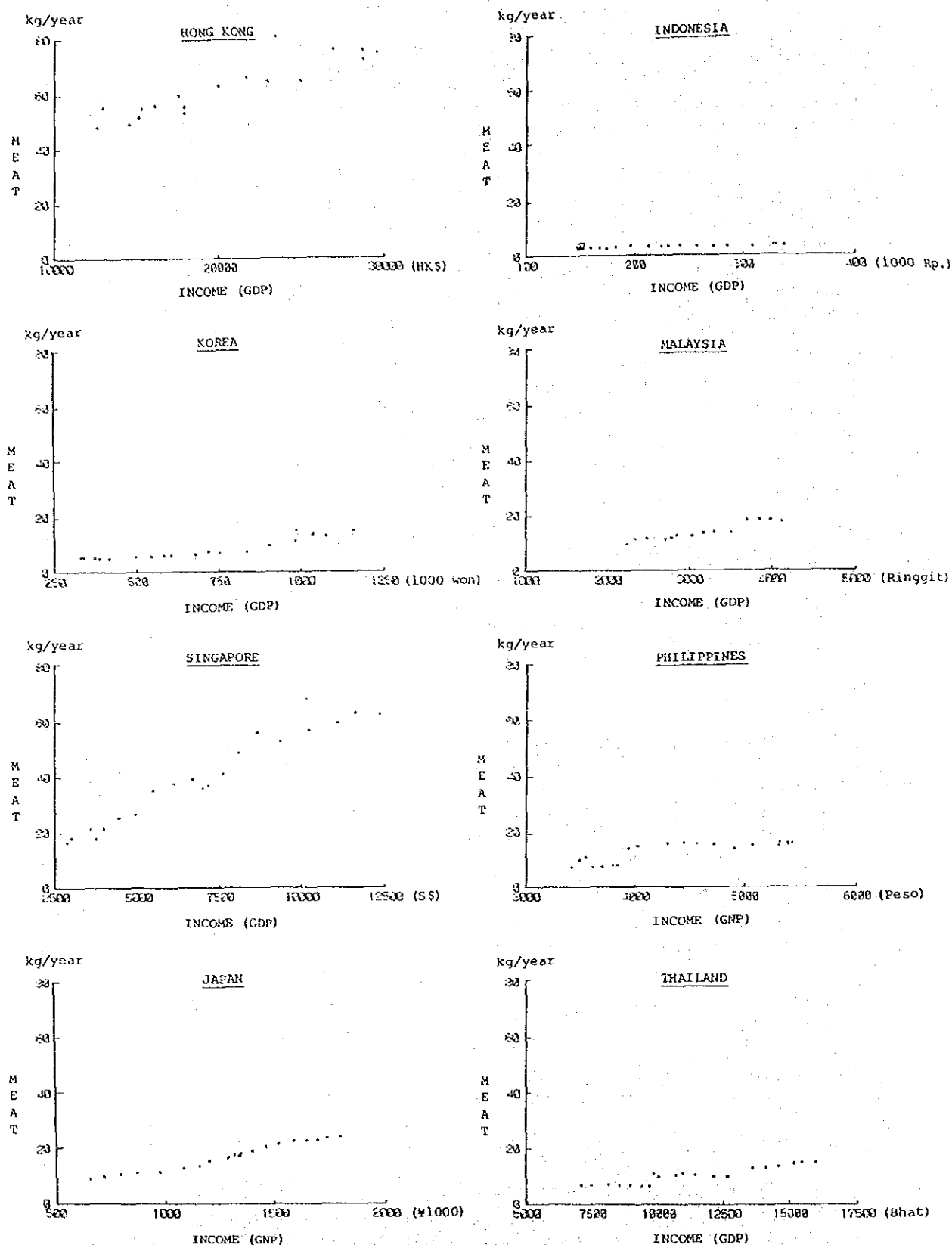
Compared with pork and poultry meat, beef consumption is generally low in Selected Asia. Its percentage in total meat consumption is relatively high in Thailand (21%) and Korea (25%), but the level of meat consumption itself remains low in the two countries. In countries with higher meat consumption, the percentage of beef ranges from 7% in Singapore to 14% - 16% in Hong Kong and Japan.

(b) Per capita income and consumption of meat in Selected Asia

Figure II-2-10 shows the relationships between per capita annual consumption of total meat (in this case, the total of beef, pork, poultry meat and mutton) and per capita income in the eight selected countries for the period of 1963-1983 (1967-1983 for Hong Kong, and 1970-1983 for Malaysia). For Japan, consumption figures are taken from Food Balance Sheets of FY 1983 and includes processed meat and changes in stock. For other countries, figures of apparent consumption are obtained in the same manner as in the case of cereals and soybean from FAO production and trade statistics and UN population estimates (Cf. 1-3-3, (3), (b)). Export and import figures only pertain to fresh, chilled and frozen meat due to statistical limitations. Because of the lack of realistic extraction rates for the entire period, domestic production in dressed carcass weight is simply added to net import to obtain total apparent consumption, but per capita consumption figures thus obtained do not differ much from those shown in Table II-2-14. For ASEAN countries, domestic production of beef and mutton respectively contain buffalo meat and goat meat (FAO data combined them for 1971-1973).

As was the case with cereals, per capita consumption of total meat in absolute terms shows substantial cross-country differences (Table II-2-15). But its relationship with per capita income during the 1970s has been on the whole linear in every country, indicating that meat consumption is strongly influenced by the level of income.

Figure II-2-10 Per Capita Income and Per Capita Consumption of Meat in Selected Countries



Source: FAO, Production Yearbook and Trade Yearbook, various issues.
 IMF, International Financial Statistics: Yearbook 1985.
 For Japan, Ministry of Agriculture, Forestry and Fisheries,
Food Balance Sheets FY1983, and Economic Planning Agency,
Annual Report on National Accounts 1985.

The characteristic pattern observed in the eight selected countries is that pork and poultry meat account for a greater part of meat consumption, while the shares of beef and mutton are relatively small.

Excluding Hong Kong where meat consumption had been already high in the earlier 1960s and Indonesia which has the lowest per capita income among the eight countries, the demand for meat expanded rapidly during the 1970s. The rapid growth largely came from increased consumption of poultry meat and pork. This characteristic is no doubt closely related with the rapid expansion of maize consumption during the same period as already discussed in 1-3-3. Productivity improvements and cost and price reductions made possible by technological innovations and the shorter periods of production cycles seem to have expanded consumption of poultry meat and pork earlier than that of beef, although it is necessary to pay due attention to different food habits among the countries, such as high consumption of pork among people of Chinese backgrounds, and the religious taboo on pork consumption among Muslims in Malaysia and Indonesia. The exception is Korea, where per capita consumption of poultry meat is lower than those of pork and beef. However, considering the country's low level of meat consumption by comparison with other NICs and some ASEAN countries, and the rapid rise in meat consumption in recent years, Korea is likely to follow a similar pattern in the future.

Beef is generally considered as superior to other meat in many developed countries' markets. For instance, the demand for beef in Japan has continued to increase steadily, while consumption of poultry meat and pork has recently begun to show some slowdown in growth rate. A similar pattern is observed in Hong Kong, which has the highest per capita consumption of meat among the eight countries.

Figures of per capita beef consumption for ASEAN countries include buffalo meat due to the change in aggregation in FAO statistics during 1971-1973 and after. In 1979/81 average, for example, the percentage of buffalo meat in total bovine meat consumption was 27% in Indonesia, 31% in Malaysia, 36% in the Philippines and 34% in Thailand. Nonetheless, per capita consumption of beef including buffalo meat in these countries, except for Malaysia, is lower than the NICs, and its growth has been moderate in the 1970s. The annual growth rates of 4.6% in the Philippines and 8.3% in Thailand have been due to some anomalies in data observed between before and after 1971. After 1971, per capita consumption of bovine meat in the two countries practically did not increase. In Indonesia, per capita consumption even decreased slightly during the 1970s. It might be said that per capita income in ASEAN countries is yet to reach the level where consumption of beef begins to expand appreciably.

(c) Prospects in consumption of meat in Selected Asia

Estimation of demand for meat in the year 1990 in each country is done in the same manner as explained in the section 1-3-3 on cereals and soybean. For Japan and the NICs where the level of per capita consumption is already high and/or the pattern of diet is stabilizing, it is assumed that the income elasticity of per capita demand for meat

Table II-2-15 Self-Sufficiency and Per Capita Consumption of Meat in Selected Asia

	Rate of Self-Sufficiency (%)					Per Capita Consumption (kg/year)				
	Total Meat	Beef	Pork	Poultry	Other Meat	Total Meat	Beef	Pork	Poultry	Other Meat
Japan										
1963/65	88.8	95.7	99.0	97.4	23.5	9.0	2.2	3.5	2.2	1.1
1969/71	85.1	87.6	96.5	96.1	6.7	17.4	3.1	7.4	5.0	1.9
1974/76	78.9	78.2	88.7	96.6	1.6	21.8	3.8	10.8	7.2	3.0
1979/81	80.4	72.4	87.6	93.2	1.7	31.7	5.1	14.0	10.2	2.4
1982/83	80.0	70.3	85.9	92.3	2.0	33.2	5.9	14.0	11.2	2.1
Annual Growth (69/71-79/81)						6.2	5.1	6.6	7.4	2.1
Hong Kong										
1963/65	89.6	82.4	95.6	11.1	0.0	52.2	1.7	44.6	2.6	0.3
1969/71	76.2	80.0	89.7	16.1	0.0	51.5	6.4	36.8	7.9	0.4
1974/76	75.3	72.5	92.8	31.9	0.0	58.0	9.0	34.1	11.2	0.4
1979/81	71.3	66.7	88.6	60.7	0.0	70.7	10.0	41.2	19.0	0.5
1982/83	64.8	59.7	78.5	39.0	0.0	71.9	11.4	43.7	19.4	0.6
Annual Growth (69/71-79/81)						3.2	4.5	1.1	9.2	2.2
Korea										
1963/65	100.0	100.0	100.0	100.0	-	4.5	1.4	2.4	0.7	0.0
1969/71	99.8	97.8	100.0	100.0	-	5.4	1.3	2.5	1.6	0.0
1974/76	98.9	98.5	105.1	100.0	11.1	6.8	1.9	2.8	1.9	0.3
1979/81	92.1	78.1	96.6	100.0	20.0	13.6	3.6	6.8	3.0	0.2
1982/83	86.2	56.2	100.0	100.0	33.3	13.5	4.0	6.6	2.7	0.0
Annual Growth (69/71-79/81)						9.7	10.7	10.6	6.4	
Singapore										
1963/65	71.3	33.3	91.1	60.0	0.0	17.2	3.1	9.1	2.6	2.4
1969/71	79.2	42.9	92.6	80.0	0.0	28.7	3.2	12.9	9.5	3.1
1974/76	76.0	0.0	100.0	71.4	0.0	37.7	2.7	16.6	15.7	2.7
1979/81	76.4	0.0	93.0	71.4	0.0	55.1	3.2	21.3	29.3	2.1
1982/83	67.9	0.0	94.4	62.7	0.0	62.4	4.1	21.9	33.4	3.0
Annual Growth (69/71-79/81)						6.9	0.0	5.2	11.9	-2.5
Indonesia										
1963/65	100.0	96.8	100.0	100.0	100.0	1.9	1.3	0.3	0.2	0.1
1969/71	100.0	90.2	100.0	100.0	100.0	2.4	1.3	0.4	0.5	0.2
1974/76	99.8	99.1	100.0	100.0	100.0	4.7	1.1	0.7	0.6	0.3
1979/81	99.7	99.4	100.0	99.3	100.0	3.0	1.1	0.6	0.9	0.4
1982/83	99.6	99.4	100.0	99.5	100.0	3.8	1.4	0.6	1.3	0.4
Annual Growth (69/71-79/81)						2.0	-1.8	3.2	6.3	5.2
Malaysia										
1963/65	96.2	81.3	100.0	94.1	50.0	8.7	1.5	5.0	1.8	0.4
1969/71	96.2	78.9	100.0	100.0	40.0	9.7	1.5	5.0	2.8	0.5
1974/76	95.9	78.9	100.0	100.0	50.0	11.7	1.5	4.3	5.6	0.3
1979/81	94.4	63.4	100.0	96.0	20.0	16.2	1.9	5.1	8.9	0.4
1982/83	94.5	63.0	100.0	96.7	20.0	17.3	1.8	5.0	10.1	0.3
Annual Growth (69/71-79/81)						5.2	2.3	0.2	12.3	-1.9
Philippines										
1963/65	99.2	92.9	100.0	100.0	100.0	7.8	0.9	5.8	1.0	0.1
1969/71	99.4	96.9	100.0	100.0	100.0	9.6	1.7	6.2	1.6	0.1
1974/76	99.0	95.7	100.0	100.0	100.0	15.2	3.3	8.8	3.0	0.1
1979/81	99.0	93.9	99.8	100.0	100.0	16.9	2.7	10.4	3.7	0.1
1982/83	99.2	95.5	99.8	100.0	100.0	15.4	2.5	9.2	3.6	0.1
Annual Growth (69/71-79/81)						5.8	4.6	5.2	8.8	7.2
Thailand										
1963/65	100.0	100.0	100.0	100.0	-	7.9	1.3	4.0	2.6	0.0
1969/71	100.0	100.0	100.0	100.0	-	8.0	2.0	4.1	1.8	0.0
1974/76	100.2	100.0	100.0	101.3	-	12.4	4.3	4.1	4.0	0.0
1979/81	103.2	100.0	100.0	111.2	-	15.0	4.5	5.0	5.4	0.0
1982/83	103.7	100.0	100.0	110.0	-	10.4	4.4	5.0	1.0	0.0
Annual Growth (69/71-79/81)						6.5	8.3	1.9	11.4	

Source: FAO, Production Yearbook and Trade Yearbook, various issues. For Japan, Association of Agricultural Statistics, Food Balance Sheets FY1983, Tokyo, 1985.

- Notes:
- 1) For ASEAN countries, beef includes buffalo meat.
 - 2) Other meat in this table consists of mutton and goat meat for NICs-3 and ASEAN-4. Japan's other meat consists of mutton and other meat, excluding whale meat.
 - 3) Total meat in this table consists of beef, pork, poultry meat and other meat as defined in 2) above.
 - 4) For countries other than Japan, import and export cover only fresh, chilled and frozen meat, and consumption is apparent consumption.

would gradually decline. The exception is beef, which is assumed to grow following the past trend, even in those countries where per capita consumption of total meat is already high. With respect to Korea where per capita consumption of meat remains relatively small compared with the other NICs, it is assumed that the consumption of all types of meat would increase following the past trend, and the same assumption is made for ASEAN countries. For Indonesia where per capita consumption of bovine meat has been decreasing from the 1970s to the early 1980s, the average figure of 1.1 kg in the last 5 years is used for the later 1980s as well.

The results of estimation based on the past trends are shown in Table II-2-16. Selected Asia's total demand for meat is estimated to increase to 10.0 million tons in 1990, which comprises 2.0 million tons of beef, 4.0 million tons of pork, 3.3 million tons of poultry meat and the rest. The region's demand would grow at an annual rate of 4.1% during 1980-1990, which is substantially lower than 7.8% recorded between 1970-1980. This slowdown of growth in total demand would be especially pronounced in Japan and Hong Kong, where per capita consumption would increase much more slowly than in other countries. The rate of increase in total demand would be more rapid in ASEAN-4, growing at 5.3% per annum compared with 4.7% in NICs-3 and 3.1% in Japan. Among the eight countries, the increase in total demand would be higher in Korea, Malaysia and Thailand. Japan would remain the largest consumer, but its percentage in Selected Asia's total demand would decline from 54% in 1980 to 49% in 1990.

Among different types of meat, consumption of both beef and poultry meat would increase at a higher annual rate of 4.4% than pork which would grow by 2.7%. The increase of total demand for beef would be highest in NICs-3, growing 6.3% per annum compared with 4.3% in Japan and 3.7% in ASEAN-4, and this is primarily due to a near doubling of beef consumption estimated for Korea. With regard to pork, the demand would also grow more rapidly in the NICs than in Japan and ASEAN-4, again chiefly due to the increased consumption in Korea. As for poultry meat, the largest increase in demand would be found in ASEAN countries, growing at an annual rate of 7.8% compared with 5.0% in NICs-3 and 2.0% in Japan. Among the ASEAN countries, Malaysia, Thailand and Indonesia would have especially high growth rates. Among the NICs, Korea would have the highest growth rate in poultry meat demand of 5.8%.

The share of import in the respective country's demand for meat would be influenced by various factors, such as government policies on domestic production and trade of agricultural products, international price movements, balance of payments positions, and so forth. Table II-2-17 simply applied the actual self-sufficiency rate in 1982/83 average respectively for total meat, beef, pork and poultry meat in each country to obtain a rough proportion of the supply and demand gap in 1990. Therefore, the figures shown in the table should be treated with due caution, especially by noting the emphases of current agricultural policies in the respective countries, as described briefly below.

As already mentioned in the section 1-3-3 on selected grains, the countries in Selected Asia have been trying to improve nutritional standards of their respective diet by promoting increased consumption of livestock and fishery products, protein-rich beans and pulses, vegetables and fruits. The consumption of animal products has risen to adequate levels in the last decade in more developed countries like Japan, Hong Kong and Singapore, while the pace of dietary improvement has been considerable in the rest of the countries. Such achieved and/or on-going increases in the consumption of animal products have been largely dependent on the development of domestic livestock industry (and fishery industry as well) in the respective countries. Especially among the ASEAN countries, current government policies emphasize the promotion of domestic livestock production for the purpose of increasing meat consumption.

According to the Indonesia's current Fourth Development Plan (1984-1988), the total demand for meat (beef, buffalo meat, pork, mutton, goat meat, horse meat, chicken and other poultry meat, etc.) is expected to grow annually by 6.1% to reach 891,200 tons in 1988, and per capita annual consumption by 3.9% to 5.2 kg. These figures are substantially higher than the estimates for 1990 based on the past trends in Table II-2-16, although it must be noted that the plan's coverage of meat types is a little wider. Moreover, domestic production is expected in the plan to grow at the same rate as the demand, reaching 893,000 tons in 1988. In other words, the country aims to be more than 100% self-sufficient in meat by the end of the plan. The thrust of the programs indicated in the plan is in developing "nucleus farms" of various sizes as centers for breeding and dissemination of information, from which a large number of smallholder farmers are expected to learn technical aspects of animal husbandry as well as obtain necessary inputs.

The growth of smallholder animal husbandry usually needs a variety of government support services and incentives, and takes longer than that of large-scale commercial undertakings. Considering the fact that the targetted annual increase rate for meat production is considerably higher than the actual rate of 4.1% achieved during 1974/76 - 1981/83 in the production of total meat (all types of meat), the growth of meat production during the plan period may turn out to be lower than expected. In such cases, however, it is less likely for Indonesia to increase its imports than to maintain the current near-100% self-sufficiency by allowing the demand to increase apace with the growth of domestic production.

The government of Malaysia announced in the mid-1970s its long-term livestock development plan (1975-1990) to attain self-sufficiency by 1990, and the Dept. of Veterinary Services in the Ministry of Agriculture and other government agencies have been promoting domestic production of beef, milk and mutton by introducing better breeds from abroad, providing artificial insemination services and distributing animals for farmers. Although domestic production of meat (all types) increased substantially by 8.1% per annum during 1974/76 - 1981/83 through such efforts, the rate of self-sufficiency did not improve, or rather declined except for pork, during the later 1970s and the early 1980s. Imports of beef and poultry meat (fresh,

Table II-2-16 Estimated Per Capita Consumption and Total Demand of Meat in Selected Asia in 1990

	T o t a l M e a t				B e e f			
	1980	1990	Annual Increase (%)		1980	1990	Annual Increase (%)	
			1970-80	1980-90			1970-80	1980-90
Per Capita Consumption (kg/year) :								
ASEAN-4								
Indonesia	3.0	4.1	2.3	3.2	1.1	1.1	-1.3	-0.2
Malaysia	16.2	24.3	5.0	4.1	1.9	2.2	2.3	1.7
Philippines	14.9	19.4	4.5	2.7	2.7	3.7	4.6	3.3
Thailand	13.5	21.4	5.9	4.7	4.5	5.3	8.3	1.6
NICs-3								
Hong Kong	10.6	82.7	3.2	1.6	10.0	14.2	4.5	3.6
Korea	13.5	20.2	9.8	4.1	3.6	5.8	10.7	5.0
Singapore	56.0	74.6	7.0	2.9	3.2	4.3	0.0	3.0
Japan	31.6	40.6	6.3	2.5	5.1	7.4	5.4	3.8
Total Demand (1,000 tons)								
ASEAN-4	2,146	3,606	7.5	5.3	537	769	5.6	3.7
Indonesia	448	720	4.2	4.9	165	191	0.6	1.5
Malaysia	229	429	8.1	6.5	26	39	5.0	4.1
Philippines	832	1,220	8.7	3.9	132	235	7.5	5.9
Thailand	637	1,237	8.6	6.9	211	304	11.2	3.6
NICs-3	1,028	1,630	9.0	4.7	136	362	10.4	6.3
Hong Kong	369	517	6.2	3.4	51	89	7.4	5.7
Korea	522	912	11.8	5.7	137	262	12.8	6.7
Singapore	137	202	8.6	4.0	8	12	1.3	3.8
Japan	3,695	4,995	7.6	3.1	597	909	6.6	4.3
Total	6,869	10,232	7.8	4.1	1,330	2,041	6.7	4.4
	P o r k				P o u l t r y			
	1980	1990	Annual Increase (%)		1980	1990	Annual Increase (%)	
			1970-80	1980-90			1970-80	1980-90
Per Capita Consumption (kg/year) :								
ASEAN-4								
Indonesia	0.6	0.9	3.9	4.3	0.9	1.7	6.3	6.3
Malaysia	5.1	5.0	0.2	-0.2	8.9	16.8	12.3	6.5
Philippines	10.4	10.2	5.2	-0.2	3.7	5.3	8.8	3.5
Thailand	5.0	5.6	1.9	1.2	4.0	7.3	10.3	6.2
NICs-3								
Hong Kong	41.2	42.4	1.1	0.3	19.0	25.8	9.2	3.1
Korea	6.8	9.5	10.6	3.4	3.0	4.4	6.4	4.1
Singapore	21.3	25.9	5.2	2.0	29.2	39.9	11.9	3.2
Japan	14.1	16.1	6.2	1.5	10.2	12.2	7.6	1.8
Total Demand (1,000 tons)								
ASEAN-4	901	1,208	6.4	2.9	635	1,340	11.9	7.8
Indonesia	87	158	5.7	6.1	137	288	8.4	7.7
Malaysia	72	89	2.9	2.1	126	298	15.4	9.0
Philippines	510	640	8.1	2.3	181	331	11.9	6.1
Thailand	235	321	4.6	3.2	188	423	13.1	8.4
NICs-3	523	764	7.6	3.9	288	468	10.9	5.0
Hong Kong	210	265	3.8	2.4	105	161	13.0	4.4
Korea	262	429	12.7	5.0	113	199	8.3	5.8
Singapore	51	70	6.6	3.3	70	108	13.3	4.5
Japan	1,646	2,022	7.5	2.1	1,194	1,450	8.9	2.0
Total	3,073	3,994	7.2	2.7	2,117	3,258	10.0	4.4

Sources: FAO, Production Yearbook and Trade Yearbook, various issues.
For Japan, Association of Agricultural Statistics, Food Balance Sheets FY1983, Tokyo, 1985

- Notes: (1) Figures for 1980 in countries other than Japan are average for 1979.81.
(2) Total meat for countries other than Japan includes mutton in addition to beef, pork and poultry. Total meat for Japan includes mutton and other meat.
(3) For ASEAN countries, beef includes buffalo meat, and mutton includes goat meat.

Table II-2-17 Estimated Supply and Demand Gaps of Meat in Selected Asia in 1990

	T o t a l M e a t					B e e f					P o r k					P o u l t r y				
	1982/83 Average					1990					1982/83 Average					1990				
	(actuals)					(estimates)					(actuals)					(estimates)				
	Self-	Sup-Dem	Sup-Dem	Gap		Self-	Sup-Dem	Sup-Dem	Gap		Self-	Sup-Dem	Sup-Dem	Gap		Self-	Sup-Dem	Sup-Dem	Gap	
	ciency	Gap	Gap		(%)	ciency	Gap	Gap		(%)	ciency	Gap	Gap		(%)	ciency	Gap	Gap		(%)
ASEAN-4		1			-1		16		34			1		1			-21		-31	
Indonesia	99.6	2			3	99.4	1		1	100.0		0		0	99.5	1		1		
Malaysia	92.6	19			32	37.4	10		23	100.0		0		0	96.7	5		10		
Philippines	99.2	7			10	55.5	6		11	99.8		1		1	100.0	0		0		
Thailand	103.7	-27			-46	100.0	0		0	100.0		0		0	110.0	-27		-42		
NICS-3		268			374		108		163			55		61		102		138		
Hong Kong	64.8	143			182	59.7	25		36	78.5		51		57	39.0	66		98		
Korea	86.1	75			127	56.2	71		115	100.0		0		0	100.0	0		0		
Singapore	67.9	50			65	0.0	12		12	94.4		4		4	62.7	36		40		
Japan	80.0	765			999	70.3	203		270	85.9		235		285	92.3	104		112		
Total		1,033			1,371		327		467			291		347		185		219		

Source : FAO, Production Yearbook and Trade Yearbook, various issues.
For Japan, Association of Agricultural Statistics, Food Balance Sheets FY1983, 1985.

Note : (1) Total meat for countries other than Japan includes mutton in addition to beef, pork and poultry.
Total meat for Japan includes mutton and other meat.
(2) For ASEAN countries, beef includes buffalo meat and mutton includes goat meat.
(3) Negative figures indicate surplus.

chilled and frozen) increased along with the growth in per capita consumption. In addition, Malaysia is the only country among the ASEAN countries to have sizable imports of processed meat, which doubled from 5,000 tons in 1974/76 to 10,000 tons in 1981/83.

The recently announced Fifth Malaysia Plan (1986-1990) states, as did the preceding Fourth Plan (1981-1985), that the country will continue to promote its beef and dairy programs, and establish a unit within the Dept. of Veterinary Services to monitor and promote the development of the poultry industry. The policy stance indicates more involvement of the government in beef and dairy production, on the one hand, and the encouragement of the private sector efforts for poultry production, on the other. The recent worsening of the balance of payments situation may lead to possible tightening of import policies, but it is likely for Malaysia to continue to depend on some imports of meat to satisfy the domestic demand which is the highest among the four ASEAN countries.

With respect to feedstuffs for animals, the emphasis of the current Malaysia Plan seems to be placed, as was the case with the preceding national development plans, on the development of pastures and fodder and the encouragement of increased utilization of agricultural by-products such as palm kernel cake and oil palm sludge for ruminants. As mentioned earlier in the preceding section, there is no explicit program to promote the production of feed grains like maize. Thus, a success in the development of livestock industry would involve increased imports of feed grains.

The policy emphasis of the Philippines, as indicated in the current Development Plan (1983-1987) and the Long-Term Philippine Development Plan up to the year 2000 as well, is clearly on raising the level of self-sufficiency in meat. The long-term plan states that the country aims to raise the rate of self-sufficiency in beef (not including buffalo meat) to 85% by the year 2000. The country has been to date virtually self-sufficient in pork and poultry meat, and the current development plan expects to produce an exportable surplus of pork and poultry meat. The Maisagana program for increasing maize production mentioned in 1-3-3 is partly meant to serve this objective. The combined output of livestock, fish and poultry is expected in the plan to increase in value terms at an annual rate of 7.3% during 1982 - 1987, compared with the rate of 5.3% expected for the crop sector. In order to generate such growth, the plan is to encourage the development of commercial undertakings rather than traditional backyard-type efforts, by promoting the involvement of the business sector in large-scale undertakings. However, it must be noted that the recent change in the government is expected to involve some basic reorientation in the country's policy for economic management, including agricultural development. In any case, considering the current balance of payments constraint, it appears unlikely for the country to increase its meat imports, which have so far been largely restricted to beef, in the immediate future.

The production of total meat (all types) in Thailand has been moderate compared with the other ASEAN countries, growing at an annual rate of 2.1% from 1974/76 to 1981/83. However, the production of

poultry meat increased rapidly by 20.3% per annum over the same period, and moreover, the country is now an exporter of poultry meat, which rose from 2,000 tons in 1976 to 27,000 tons in 1981/83. Compared with poultry meat, the production of bovine meat and pork grew more slowly, at the rate of 2.7% and 5.3% respectively, but the country has been to date self-sufficient in them. In the current development plan (1982-1986), the livestock sector is expected to grow annually by 4.2%, compared with 4.7% for the crop sector and 5.4% for the fishery sector. The policy emphasis is to promote dairy production in selected regions of the country and to encourage private investment in the export of meat, in addition to upgrading slaughter facilities and such services as disease prevention and artificial insemination. Considering the past success in diversifying agricultural exports including meat, Thailand is not likely to become a sizable net importer of meat in the remaining 1980s.

In contrast to the ASEAN countries which are on the whole unlikely to increase meat imports to any sizable degree with a possible exception of Malaysia, NICs-3 and Japan would continue to depend on some imports. For Hong Kong and Singapore where agriculture is insignificant as economic activity due to the limitations of land and per capita consumption of meat is already considerably high, the improvement in the level of self-sufficiency would not be a primary policy issue as in the other countries, although the larger part of pork and poultry meat consumption would continue to be met by domestic production. If their consumption of meat continues to shift from pork to beef or to poultry meat, as seen in the last decade, the level of self-sufficiency might decline with respect to beef, or might rise with respect to poultry meat for which space-saving production technologies are available.

Although the level of per capita consumption is yet low by comparison, Korea attained the highest growth in meat consumption in the last decade or so. As shown in Table II-2-16, per capita consumption increased annually by 9.8%, and total demand by 11.8% from 1969/71 to 1979/81, and the growth has been more rapid for beef and pork than for poultry meat. In the process, the country's dependence on imports rose for beef, while maintaining self-sufficiency in pork and poultry meat.

According to Korea's Second 10-Year Comprehensive Land Development Plan (1982-1991), per capita annual consumption of meat is expected to rise from 11.3 kg in 1980 to 20.5 kg in 1991, or at an annual rate of 5.5%, while total demand increasing at an annual rate of 7.3% from 433,000 tons to 938,000 tons over the same period. The per capita consumption and total demand projected for 1991 at least do not differ much from the figures obtained for 1990 (20.2 kg and 912,000 tons) in the present study. With regard to beef, the policy is to restrain the increase in consumption, and per capita consumption is expected to rise from 2.6 kg to 3.9 kg, and total demand from 100,000 tons to 178,000 tons. The figures projected for 1991 are considerably lower than the estimates in the present study, which are 5.8 kg and 262,000 tons. The 10-year Plan also envisages that the rate of self-sufficiency in meat would decline from 98.0% in 1980 to 96% in 1986 and then recover to 98.0% by 1991. The rates estimated for beef are 93.0%, 81.6% and 87.4% for the respective years.

According to the current development plan (1982-1986), Korea's policy is in improving the structure of supply through the promotion of "land-saving" livestock production. In other words, the emphasis is placed on promoting the domestic production of pork and poultry meat, while curbing government supports to beef production of extensive type. The plan at the same time mentions the import liberalization of livestock products as part of the policy for improving the structure of supply. This seems to suggest that the expected growth of demand for meat would be partly met by increased domestic production of pork and poultry meat, and that the country would continue to depend on some imports of beef in the near future.

According to the long-term projection done in 1980 by the Ministry of Agriculture, Forestry and Fisheries, Japan's per capita consumption of meat is estimated to increase from 20.8 kg in 1978 to 26 - 28 kg by 1990, and the total demand from 3,470,000 tons to 4,730,000 - 5,030,000 tons. Domestic production of meat, on the other hand, is expected to rise from 2,760,000 tons to 4,030,000 tons, with the rate of self-sufficiency in 1990 thus ranging from 80% to 85% compared with 80% in 1978. Per capita consumption, total demand and domestic production of all meat types are estimated to increase, but the rate of self-sufficiency for 1990 is expected to vary; rising on the whole from 90% in 1978 to 92% - 99% in 1990 for pork and from 94% to 94% - 99% for poultry meat, while declining from 73% to 68% - 74% for beef. It can be said, therefore, that Japan's policy generally aims to improve the level of self-sufficiency, but that the country would continue to rely on imports of meat to some extent.

As discussed above, ASEAN countries are trying to increase their consumption of meat, but excluding perhaps Malaysia, they are not likely to become sizable importers of meat. Hong Kong and Singapore would depend on imports to an appreciable extent, but the increase of their total demand would not amount to much, with a possible exception of beef, considering the already high level of per capita consumption and the limited size of population. Korea and Japan would be major importers in Selected Asia, mainly with regard to beef. But these two countries, both free of the foot-and-mouth disease, ban the imports of meat, ham and sausages, etc. from the disease-present countries.

3. FISHERY SECTOR

3-1 Structure of Production

3-1-1 Overview

The landings of Argentina's marine fisheries began to grow since 1965 and showed an overall increasing trend during the 1970s, reaching a record 550,000 tons in 1979. During the early 1980s, however, landings began to decline due to the depressed international demand and the destabilization of the Argentine economy.

The domestic consumption of fishery products in Argentina is stable at around 110,000 - 120,000 tons a year, and the growth of Argentina's fishing industry has been structurally export-oriented. Therefore, its production is destined to fluctuate according to the level of international demand. There are secure markets for squid and prawn and their catches from the Argentine waters can be sold relatively easily at international prices. For other species of fish, market prospects are unstable. For example, Merluza, which constitutes the bulk of Argentine fishery exports, faces competition from cod, whiting and hake of the North Atlantic and Merluza of the off-shore of South Africa. Poor catches of these fish strengthen the European and American demand for Argentine Merluza, and conversely good catches weaken the demand.

Moreover, the species of fish caught in Argentine waters are cold water fish which are similar to those in the Northern Hemisphere but not exactly the same. Because most of the importing countries are located in the Northern Hemisphere, it takes some time to establish a stable niche for Argentine products in these markets and the prices they fetch tend to be lower than the similar species in the North Atlantic. In addition, economic situations and policies of the importing countries sometimes directly affect Argentine fishing industry as a whole. For example, Argentina's annual export to Nigeria stayed between 30,000 - 50,000 tons from 1981 to 1983, but the figure dropped to 2,200 tons in 1985 due to the latter country's import restrictions. The Argentine fishing industry faces the continual possibility of receiving a severe blow whenever a large importing country decides to restrict its import.

Until the 1970s, Argentine fisheries were mostly conducted in the Buenos Aires sea area, and based in Mar del Plata. Since the late 1970s, a number of companies began to set up new fishing bases in the Patagonian waters in response to the regional development promotion policy. The Malvinas War in 1982 resulted in the exclusion of Argentine fishing boats from plying the waters around the Malvinas Islands, which meant a loss of fishing grounds with an estimated maximum sustainable yield of some 400,000 tons. This limited the fishing grounds for those companies which had moved into the Patagonian waters, but new companies continued to advance into the area, attracted by the discovery of deep-sea prawn fishing grounds in 1982. Accordingly, the landings from the Patagonian waters have been on the increase, rising to 35% of the national total in 1985.

3-1-2 Trends of Production and Fishery Resources

Argentina has a coast line of over 6,000 km in length and 960,000 km² of territorial waters. The northbound Malvinas current meets the southbound old shelf current along the Brazilian coast and the Brazil current flowing the off-shore of Brazil, causing an upwelling off the Argentine coast.

The area had long been known as rich in fishery resources, although the confirmation had to wait until the 1960s. Table II-3-1 shows the distribution of major fish and seafood species in the Argentine waters. About 50% of the exploitable fish resources are found in the Patagonian waters, but still underexploited. The Patagonian waters, covering approximately 1 million km² of the continental shelf, are difficult for fishing operations because of the rough conditions of the sea, thus delaying the exploitation of the resources.

Table II-3-1 Distribution of Fish Species in Argentine Waters

Fishes		Molluscs	Crustaceans
Bonaerense Area:			
Anchoita	Merluza	Mejillon	Langostino
Castaneta	Escienido	Caracoles	Cangrejos
Caballa	Rayas	Calamarete	Camaron
Tiburones	Mero	Pulpito	Esp. varias
Pez Palo	Bonito	Almeja amarilla	
Atunes	Besugo	Vieyra	
Brotola	Anchoa de Banco	Ostras	
Lenguados	Abadejo	Calamar	
Pejerreyes	Congrio		
Lachas	Pez Gallo		
Pez Limon	Palometa		
Jurel	Rubio		
Patagonia and Fueguina Area:			
Merluza	Merluza Austral	Mejillon	Langostino
Merluza de cola	Granadero	Calamar	Camaron
Pez chanco	Abadejo	Cholga	Esp. varias
Notothenias	Bacalao Austral	Calamarete	Cangrejos
Merluza Negra	Rayas		Centolla
Tiburones	Mero		
Pampanito	Castaneta		
Salmon de Mar	Lenguados		
Pez Gallo	Torito de los		
Pez Palo	Canales		

Source: Direccion Nacional de Pesca Maritima

Argentina's fishing industry is roughly divided into coastal and conventional deep-sea fishery (altura convencional) based in Mar del Plata and the deep-sea fishery by boats with processing and refrigeration equipment in the Patagonian waters. As shown in Table II-3-2, fishery production in Argentina grew steadily since the beginning of the 1960s, but a dramatic surge of fishing efforts was observed after the mid-1970s. Landings increased from the annual average of 230,000 tons during 1971-1975 to a historical high of 550,000 tons in 1979, and the number of fleet engaged in coastal and deep-sea fishing increased accordingly. However, the overvaluation of peso, runaway inflation and other economic destabilization in the early 1980s dampened the growth capability of the fisheries, and the landings averaged 410,000 tons during 1980-1983 and declined further to a little less than 300,000 tons in 1984.

This trend was observed in both deep-sea and coastal fisheries, but the latter was more seriously affected. The total catch of coastal fisheries which had increased to over 137,000 tons in 1978 declined to 46,000 tons in 1984. Both deep-sea and coastal fisheries appreciably recovered in 1985, and their landings increased 33% and 55%, respectively, over the previous year.

Table II-3-2 Catch of Marine Fishes in Argentina

(1,000 tons)			
Year	Deep-sea	Coastal	Total
1960	s/d	s/d	85.2
1961	38.0	39.3	77.5
1962	41.0	41.2	82.2
1963	57.3	53.0	110.3
1964	75.8	67.8	143.6
1965	102.2	69.9	172.1
1966	135.7	75.3	211.1
1967	122.8	75.2	195.1
1968	99.6	87.4	187.1
1969	90.8	78.3	169.1
1970	106.3	79.5	185.8
1971	114.2	87.5	201.7
1972	119.4	92.0	211.4
1973	157.6	112.5	270.1
1974	174.1	92.6	266.7
1975	124.2	74.8	199.1
1976	173.6	82.6	256.2
1977	272.0	97.4	369.4
1978	366.7	137.4	504.1
1979	451.1	99.1	550.3
1980	291.3	85.6	376.9
1981	268.2	83.7	351.8
1982	375.9	83.8	459.6
1983	331.2	70.6	401.8
1984	244.1	45.8	289.9
1985	325.7	71.1	396.9

Source: Direccion Nacional de Pesca Maritima

While the existence of rich fishery resources in the Argentine waters had been known, it was partly confirmed by the West German surveys conducted in 1966 and 1971. According to these surveys, the resources for commercial exploitation in the Patagonian continental shelf area were estimated to be around 2.5 - 3 million tons. Furthermore, the Institute of Marine Biology conducted a survey in 1972 with the assistance of FAO and estimated the resource size of Merluza species at 1 - 2 million tons. The National Institute of Fishery Research and Development (INIDEP) subsequently estimated the Maximum Sustainable Yields (MSY) of demersal fish species in the Argentine waters to be about 1.4 million tons based on a series of surveys (Table II-3-3). Of the total, 179,000 tons are without commercial value. 446,000 tons are in the waters south of 48° S. Lat, but Argentina at present has no access to the area around the Malvinas Islands. Thus, the total MSYs of fishery resources come to some 754,000 tons. Merluza comprises about 50% of the total demersal fish resources. The actual landings of Merluza in 1984 were 175,000 tons, or 67% of the MSY.

Table II-3-3 MSY of Major Fish Species

I. Demersal Fish

1. Area North of 48°S Lat.	MSY (t)
Merluza	380,493
Squid	186,609
Prawn	18,000
Other Off-Shore Fish Species	56,990
Coastal Fish Species	115,021
2. Area South of 48° S Lat. (including Malvinas Area)	446,000
3. Fish without Commercial Value	179,040
<u>Total</u>	1,379,047

II. Pelagic Fish

1. Anchovy	451,234
2. Mackerels ¹⁾	16,130
3. Bonito ¹⁾	4,190
4. Tuna ¹⁾	1,546

Source: INIDEP

Note : 1) The largest recorded landings.

With regard to pelagic fish species, accurate estimation of the resources is not available because their utilization is still limited. The study by Ciechomski et al. in 1979 gives an estimated resource size of 4.3 million tons for anchovy. The INIDEP currently estimates an MSY of 451,234 tons. Due to the limited demand, an estimate of mackerel species is also not available. However, a catch of some 20,000 tons is considered to be possible. Estimation of such migrating species as bonito and tuna is more difficult, and no adequate survey has yet been conducted.

Good deep-sea prawn fishing grounds were discovered in 1982 near San Jorge Bay, and the landing quickly rose to 20,000 tons in 1983. The prawn has a high international commercial value because it is a cold water species. Intensified fishing efforts, however, just as quickly brought down the landing. In view of the possibility of overfishing and resource exhaustion, the INIDEP has been conducting a resource survey to clarify the life cycle of the prawn.

Adequate surveys have been carried out in the Argentine waters with regard to such species as Merluza, squid and prawn which have more or less established international marketability. However, fishery resources in the Argentine waters are yet not entirely known. With the introduction of new fishing methods and/or surveys in the area south of 50° South Latitude, it is possible to increase the commercial exploitation of fishery resources.

3-1-3 Research and Development Efforts

Experimental research relating to fisheries is carried out by governmental and private organizations and universities. Among the governmental organizations, the INIDEP belonging to the Subsecretariat of Fisheries of the Secretariat of Agriculture, Livestock and Fisheries and the Fishery Technology Research Center (CITEP) belonging to the INTI of the Secretariat of Foreign Trade and Industry are the major research organizations. With regard to the private sector, some large fishing companies have their own laboratories, but their main activities largely consist of quality control, and research efforts for product development are yet limited. Research efforts at universities center on biological studies on fish resources.

The activities of the two major governmental research organizations are summarised below.

(1) INIDEP

The National Institute of Fishery Research and Development (INIDEP) was founded in 1977 for the purpose of conducting basic and applied research for the promotion of the Argentine fishing industry. The Institute also conducts basic studies on fishery resources to offer policy suggestions for the rational development of the fishery sector in the interest of the national economy. The Institute has laboratories for different scientific disciplines, such as biology, bio-chemistry, oceanology and ecology. In addition, it has a separate laboratory to conduct research on fish catches, such as quality

control, development of new products and processing methods, and microbes and parasites. The Institute also conducts surveys on fishing resources using its two research vessels.

The Institute's current research topics are as follows.

(i) Programs on Demersal Fish

- Merluza and other fish (evaluation of resources, Merluza parasites, and selective fishing of Merluza)
- Squid (monitoring of changes in landings, and drying of squid)
- Fish in the South (collection and interpretation of data)

(ii) Programs on Pelagic Fish

- Anchovy (expansion of fishing grounds and fishing seasons, development of optimal fishing methods, processing on board, bio-chemical composition of anchovy, and fish meal and fish oil production)
- Mackerels and bonito (monitoring of catches)
- Whale (census)

(iii) Programs on Coastal Fish

- Prawns (evaluation of resources, fishing grounds and fishing seasons, survey in Bahia Blanca waters, general research, and prawn culture)
- Mussels (culture)
- Crabs (surveys in the Beagle Channel and the Patagonian waters)
- Fishery resources in Buenos Aires Area (resource evaluation, study on corvina and pescadilla (Gadidae), biochemical compositions of corvina and pescadilla, organization and functions of coastal fishing fleet, selective fishing methods for corvina and pescadilla, monitoring of Bahia Sanborombon, and improvement of fishing methods)
- Study on penguins (census)

(iv) Marine Environment

- Ecology of Patagonian waters
- Mercury and other metals (La Plata River and the area shared with Uruguay, rivermouth of Bahia Blanca River, and Patagonian coastal waters)
- Production loss and others (product damages in cold storage, and width of fishing boats and fuel supply)

(v) Industrial Development

- Fish paste products (fish with high fat content, fish with low fat content, and residues after filleting)
- Fish oil (application for pharmaceuticals, industrial use such as paint, resin, leather tanning, and application for cosmetics)
- Unloading at ports (safety measures)
- Analysis of related services
- System for quality improvement
- Economic planning and opportunities (domestic consumption, export incentives and production costs, capabilities of fishing industry and processing industry, and research and information system)

(vi) Fresh Water Fishing

- Fishing potentials of rivers, lakes and lagoons (potential of entire Argentina and lakes in Chubut Province)
- Effects of embankments and dams (Santo Grande and the midstream of Parana River)
- Evaluation of resources (Uruguay River and La Plata River)
- Culture

As the above list shows, the Institute's research activities cover all the major fields of the Argentine fishing industry. Among these, the task of long-term importance is the evaluation of resources. Resource surveys are currently carried out by two research vessels. Notable achievements were made in 1984 in connection with the resource evaluation of deep-sea prawn and the discovery of their life cycle.

The Institute's on-going research and development efforts to change the fishing methods from the traditional trawling to other selective fishing methods are attracting a great deal of attention. In the field of processing, a study on fish paste (surimi) is in progress and fish sausage has been developed on an experimental basis.

The Institute is currently constrained by budgetary limitations and finds it difficult to conduct needed resource surveys. The delay in the construction of new laboratories is slowing down experimental research. The Institute is therefore trying to find external financing and research cooperation and to accept commissioned projects from the private fishing companies.

(2) CITEP

The Fishery Technology Research Center (CITEP) of the INTI is responsible for fishery-related industrial research. The main work is on the processing technology of marine products and the market development for processed products. On-going research topics are as follows.

- Salted and smoked products of anchovy and Merluza
- Development of fish preservation methods by heat treatment
- Development of new fish products from unutilized raw materials
- Economic engineering methods of equipment (freezers and refrigerators)
- Quality improvement of frozen fish (experiments at a pilot plant)

Several patents have already been obtained through the research activities described above. The Center carries out various research projects in cooperation with private companies and the INIDEP. The Center, for example, conducts joint research on the development and utilization of surimi with INIDEP, while Camara Argentina de Processadores de Pescado, an organization formed by the canning industry, cooperates with the Center as a promoter of the Center's activities in canning technology.

At present, the research staff of 40 are using a congested laboratory awaiting the completion of a new facility. Nevertheless, the research conducted by the Center has made notable contributions to the processing and marketing of marine products.

3-1-4 Fishing Fleet and Infrastructure

(1) Current state of fishing fleet

(a) Coastal fishing boats

Coastal fishing boats are divided into two types, i.e., small boats called rada or ria with a length of 8 - 14 m and medium-size boats called costera with a length of 20 - 26 m. Both types of boats bring back their catches packed in ice.

The fishing methods employed by rada and ria boats are cage fishing for sea bream, lampara net fishing for mackerels, cornalito and anchovy, palanza fishing for prawns, hook fishing, and so forth. These smaller boats do not use any fishing methods developed for mid-water pelagic fish. In general, the crew consists of 5 - 6 members, but 9 - 10 members are on board in the case of catching upper-water pelagic fish. The fish hold generally has a capacity of 120 - 130 fish boxes of 40 kg each, or 5 - 13 tons. The average age of the boats is 30 years, some even as old as 40 years. The fishing operation usually ends within a day at a fishing range of less than 12 miles from the base.

Coastal fishing boats called costera are over 16 m in length and have a fish hold capacity of 800 - 1,200 fish boxes, or 32 - 48 tons. In the case of trawling, some 7 crew members are on board and one operation lasts up to 72 hours. The main fishing method employed is trawling, and round haul nets are used for bonito.

Table III-3-4 shows the distribution of coastal fishing boats. As most of these coastal fishing boats are based at Mar del Plata, the share of those based in Patagonian ports is less than 20% of the total. The total landings by coastal fisheries averaged a little over 100,000 tons during 1977-1980, but it began to decrease in the early 1980s down to 46,000 tons in 1984, and recovered somewhat to 68,000 tons in 1985. 15 - 20% of the landings consist of Merluza, followed by anchovy.

Table II-3-4 Distribution of Coastal Fishing Fleet (1985)

Base Ports	Number	% Distribution
Mar del Plata	202	61.8
Quequen-Necochea	27	8.3
Bahia Blanca	36	11.0
S. Antonio Oeste	11	3.4
Puerto Madryn	1	0.3
Puerto Deseado	2	0.6
Caleta Cordova	6	1.8
Ushuaia	21	6.4
Rawson	12	3.7
Gral. Lavalle	4	1.2
Bs. Aires Prov.	5	1.5
Total	327	100.0

Source: INIDEP

(b) Conventional deep-sea fishing boats

Conventional deep-sea fishing boats (Altura Convencional) are capable of operating for more than 72 hours. They are 25 - 36 m in length and have the refrigerated hold with a temperature of 0 - -5°C. Their age is relatively old, averaging 19 years. These boats were first introduced to Argentina in the beginning of the 1960s and the fishing method is trawling for Merluza in the waters off Buenos Aires Province or around 46°S Lat.

Because most of the owners of these boats have processing factories, the catch is delivered directly to processing plants. There are currently 143 vessels in the fleet, of which 123 are based at Mar del Plata (Table II-3-5). The total landings by conventional deep-sea fisheries in 1982 were 280,000 tons, but subsequently declined to 190,000 tons in 1984. Roughly 50% of Argentina's total landings are made by these boats (Table II-3-5).

Table II-3-5 Distribution of Deep-Sea Conventional Boats (1985)

Base Ports	Number	% Distribution
Mar del Plata	123	86.0
Quequen-Necochea	12	8.4
S. Antonio Oeste	1	0.7
Puerto Madryn	5	3.5
Puerto Deseado	1	0.7
Caleta Cordova	1	0.7
Total	143	100.0

Source: INIDEP

(c) Refrigerator and processing boats

These types of boats are equipped with freezing facilities and refrigerators capable of maintaining -25°C. They are classified as refrigerator boats and processing boats with on-board filleting facilities. They are some 100 m in length with more than 40 crew members, and a single operation lasts 50 - 60 days. These boats were introduced to Argentina after 1976 and are mainly based at ports south of 40°S Lat.

The distribution of the refrigerator and processing boats by port is shown in Table II-3-7. The major marine products caught by processing boats are Merluza and squid. The number of boats engaged in prawn fishing in the San Jorge Bay has been increasing since 1982.

Table II-3-6 Landings by Type of Boats

	(tons)			
	1978	1979	1980	1981
Deep-sea Boats	366,730	451,148	291,274	268,177
Deep-Sea Conventional Boats	259,551	336,573	222,596	199,235
Refrigerator/Processing Boats	107,179	114,576	68,678	68,942
Coastal Boats	137,406	99,115	85,591	83,679
Total	504,136	550,263	376,865	351,856
	1982	1983	1984	1985
Deep-sea Boats	375,883	331,201	244,063	325,729
Deep-Sea Conventional Boats	279,496	262,917	189,879	245,283
Refrigerator/Processing Boats	96,386	68,285	54,184	80,446
Coastal Boats	83,766	70,569	45,829	72,145
Total	459,648	401,771	289,892	396,874

Source: Direccion Nacional de Pesca Maritima

Table II-3-7 Distribution of Refrigerator/Processing Boats (1985)

Base Ports	Number		% Distribution	
	Refrigerator Boats	Processing Boats	Refrigerator Boats	Processing Boats
Mar del Plata	6	-	22	-
Quequen-Necochea	4	1	14	6
S. Antonio Oeste	-	2	-	12
Puerto Madryn	15	11	54	65
Puerto Deseado	3	3	10	17
Total	28	17	100	100

Source: INIDEP

(2) Fishing capacity

The average age and the total physical capacity of the fishing boats currently in use are shown in Table II-3-8.

Because the total physical fishing capacity exceeds the total estimated MSYs of the Argentine waters, marine resources would be in theory endangered by the full operation of all the boats. As shown by the high average age, the existing boats are generally old with reduced operational capabilities, precluding the possibility of full operation. In the case of deep-sea conventional and refrigerator and processing boats, the annual operation days are often less than 250 days. Thus, the annual landings of some 400,000 tons are possibly the maximum figure for the existing fleet.

Table II-3-8 Average Age and Physical Capacity of Fishing Fleet

	Number	Age (Years)	(tons) Fishing Capacity
Coastal Boats	322	30	137,406
Conventional Deep-sea Boats	136	19	515,270
Refrigerator and Processing Boats	44	13	498,478
Total			1,151,154

Source: M.I. Bertolotti, G.V. Piergentili and D.A. Cabut, "El Sector Pesquero Argentino," Realidad Economica, No. 65, 1985.

When the physical fishing capacity is compared with the actual landings, 20% of deep-sea conventional boats were, for example, out of operation in 1984, and the actual landings were only 46% of the possible catch.

In the trawl fishing, only target fish species, i.e., those having commercial values, are sorted out for refrigeration or processing on board and hauled back to ports. However, various other fish are caught by trawlers in the Argentine waters. Unless equipped with processing facilities for fish meal, boats discard those fish with no commercial value after mincing. The actual catches are therefore considered to be 10 - 20% higher than the figures of reported landings.

The existing fishing fleet will require the replacement of the older coastal and deep-sea conventional boats with modern, safer and efficient boats. The replacement is also necessary for fishing equipment, engines, sailing instruments and fishing gear in order to decrease the production costs. Although the fleet of refrigerator and

processing boats does not have any specific functional problems due to its relative newness, it is important that its maximum fishing capability be maintained by replacing or repairing equipment.

(3) Fishing ports

Only the Mar del Plata port is currently established as a standard fishing port with necessary facilities. Because other ports were originally built as commercial ports, most of them lack the necessary infrastructure to function as fishing ports.

The Mar del Plata port has separate commercial piers and fishing piers protected by two breakwaters. While the draft at the port entrance is 5 - 6 m, the sand deposition is fast due to the topographical characteristics of the area, requiring frequent dredging. Because the port is the main fishing port in the Buenos Aires sea area, 62% of the coastal fishing boats, 86% of the deep-sea conventional boats and 22% of the refrigerator boats use it as their base port. It has transport and handling facilities, and the adequate space for unloaded fish. The central fish market is established adjacent to the port, while a number of shops located near the port sell navigation equipment, fishing gear and various types of supplies, providing an adequate back-up system for fishing operation. However, there are three sunken boats and many inoperable old fishing boats left moored in the port, obstructing efficient utilization of the port. The operating rates of the two existing repair facilities are not high, and one of them was out of operation for some time until 1985.

In addition to the Mar del Plata port, ports at Necochea, Quequen and Bahia Blanca are used by fishing boats operating in the Buenos Aires sea area. These ports lack necessary infrastructure as fishing ports, and the utilization by fishing boats is of secondary importance.

Many of the ports in Patagonia were originally built for shipping wool or transporting the equipment required to exploit the inland oil resources. Some of them have recently been expanded or newly built for aluminium import and export, oil shipment or the development of regional industries. Because of the generally difficult coastal topography and the tidal range as high as 4 - 6 m, the construction of special fishing ports will be expensive, and does not appear economically feasible for the time being, given the present situation of the fishing industry in the Patagonian waters.

At Puerto Madryn where the fishing activities are larger than in other Patagonian ports, processing boats use the piers originally constructed for the import of alumina, while coastal fishing boats use the antiquated commercial piers. Since neither of these piers are meant for fishing boats, unloaded fish must be transported at least 2 - 3 km by truck to processing factories on the land. The same inconvenience also applies to the loading of ice, fishing gear, and other supplies. In short, the smooth flow of the various materials which are essential in a fishing port has not been secured.

Puerto Deseado was originally built for the shipment of wool, but currently almost exclusively used by fishing boats. However, its power, water and fuel supply capacities are inadequate and the adjoining space is small. Fishing companies which have newly come to the area have been required to built processing plants far from the port, and therefore must use trucks for transporting unloaded fish. In addition, power and water supply for processing plants are often unstable.

The fishing companies which have come to Patagonia receive various fiscal incentives, but are required to build on-shore facilities. As a result, a number of cold storages, processing and canning plants have been constructed around the ports. Moreover, they are required to unload a certain volume of the catch and process it at processing facilities which are inadequately serviced with power and water as mentioned above. Inconvenience exists in connection with the fishing operation, because the area lacks suppliers of sailing or fishing gear. Furthermore, the absence of repair facilities in the area forces the boats operating in the area to be taken to either the Mar del Plata or the Buenos Aires port for regular maintenance or repairs, or repair engineers must be sent to the area. The lack of adequate port facilities in Patagonia, therefore, results in the high operational costs of the fishing boats in comparison with other areas.

3-2 External and Domestic Demand for Fishery Products

3-2-1 Export Trends of Major Marine Products

(1) General trend

Argentina's exports of marine products roughly correspond to the difference between production and stationary domestic consumption of about 110,000 - 120,000 tons, multiplied by the extraction rate of 40 - 45%. In other words, most of the increase in production observed during the 1970s was destined for exportation. As shown in Tables II-3-9 and II-3-10, the total exports of fishery products peaked in 1979 both in terms of value and quantity, at US\$213 million and 248,000 tons. In the early 1980s, the exports continued to drop substantially due to the slump of fishing efforts caused by the destabilization of the economy. The exports were only 124,000 tons in 1984, amounting to US\$150,000. Although the export volume recovered somewhat in 1985, because of the considerable decrease of high-valued prawn, the export value stayed the same as the preceding year.

Among fisheries products, frozen products have the largest export volume, increasing from 7,700 tons in 1970 to 215,000 tons in 1982. However, they decreased thereafter down to 115,000 tons in 1984. In terms of fish species, Merluza has the largest share, while squid, another major export item, shows wide fluctuations in its export, and was affected in recent years by the loss of access to the waters around Malvinas Islands. On the other hand, the export of prawn picked up remarkably since 1982 when its fishing grounds were discovered in San Jorge Bay. But the export shows a significant drop in 1985.

(2) Major destinations of the exports

Major destinations of Argentina's fishery exports are Spain, Japan, USA, Italy, Brazil and Nigeria. Since 1978, some 10 countries have accounted for 80% of Argentina's exports of marine products, and the levels of exports are influenced by the economic situations of these importing countries. The evolution of Argentina's exports to major countries is shown in Table II-3-11.

(a) Spain

Spain is one of the most important export destinations for Argentine products, and has been constantly importing large quantities of both chilled and frozen fishes. In 1973, approximately 12.5% of Spain's total imports of frozen fishes were from Argentina, and the share increased to 29.4% in 1980. One of the causes of this increase is the decline in Spain's catch of whiting in the Atlantic fishing grounds. The import of frozen Merluza from Argentina increased its importance as a substitute to meet the domestic demand. Another important reason is that many Argentine fishing companies have the participation of Spanish capital so that their increased catches are meant to be brought back to the domestic market of Spain.

Table II-3-9 Export Volume of Fishery Products (1970-1985)

	Frozen Products				Air-cargo				Salted/				Others				(tons)
	Fish round	Fillet	Squid	Prawn	Others	Total	Refrigerated	Directly landed	Other refrigerated	dried/smoked	/bottled	Seaweed	Fish meal	Fish	Others	Grand total	
1970						7,723				1,285	194	2,607	156	855		12,890	
1971			- breakdown not available -			9,888				1,246	49	2,030	67	773		14,063	
1972						22,999				2,097	103	2,610	122	109		28,040	
1973						24,544				7,614	484	322	5,349	605		38,921	
1974	13,677	20,561	-	-	2,861	37,099		15,922		7,900	1,134	188	2,494	130		64,867	
1975	11,497	11,611	-	-	466	23,574		29,772		3,071	336	879	805	-		58,467	
1976	14,831	30,612	-	-	18,657	64,100	972	42,100		1,449	542	830	3,082	-		113,075	
1977	49,597	58,444	826	-	3,438	112,305	1,962	30,453		4,289	1,348	982	6,596	103		158,250	
1978	59,139	66,852	49,879	-	1,436	177,306	2,400	25,417	10,950	1,895	812	1,665	6,148	317		216,076	
1979	67,681	76,605	66,055	-	3,939	214,280	2,740	26,087	5,607	2,553	698	587	1,605	163		248,715	
1980	68,140	53,380	9,735	-	1,881	133,136	2,079	20,912	5,212	3,648	669	894	-	-		161,338	
1981	89,490	32,602	5,699	-	3,386	131,177	1,655	9,563	4,891	2,487	299	527	1,577	12		147,298	
1982	127,836	49,118	30,819	7,365	2,160	215,178	1,438	6,481	6,765	3,136	272	681	2,596	-		232,035	
1983	102,921	42,721	22,235	19,498	1,945	189,320	1,549	467	7,074	3,796	262	704	2,113	200		198,411	
1984	50,778	23,479	19,809	20,212	992	115,271	1,418	2,801	5,274	3,647	303	431	906	-		124,764	
1985	55,483	52,183	14,555	12,370	2,209	136,800	1,701	4,662	4,572	2,840	694	371	644	-		154,197	

Source : Secretaria de Agricultura, Ganaderia y Pesca, Subsecretaria de Pesca

Table II-3-10 Export Value of Fishery Products (1978-1985)

(US\$1,000)

	1978	1979	1980	1981	1982	1983	1984	1985
Frozen Products	140,713	194,660	122,981	123,013	173,555	168,441	141,070	141,598
Fish Round	37,480	49,122	48,626	68,635	77,737	53,330	24,580	32,981
Fish Fillet	59,736	83,776	64,462	36,887	48,031	37,399	19,653	47,279
Squid	42,283	48,515	7,397	5,756	22,034	15,183	14,383	9,937
Others					1,667	2,105	1,850	2,315
Prawn	1,214	3,247	2,497	11,744	24,087	61,424	80,606	49,026
Refrigerated Products	8,741	10,692	9,190	5,379	4,192	2,203	2,303	3,505
Air-cargo	2,701	2,849	2,433	2,764	2,444	2,046	1,584	2,332
Directly landed	6,040	7,843	6,756	2,604	1,737	157	719	1,173
Others	9,622	8,440	10,826	6,023	7,149	6,651	5,735	5,172
Salted, Dried, Smoked	2,114	3,193	4,872	3,237	4,133	4,430	4,035	3,440
Canned, Bottled	2,512	2,693	2,779	1,279	1,301	977	1,092	1,240
Seaweed	2,436	1,956	3,172	1,121	1,051	592	356	354
Fish Meal	2,404	524		394	643	572	253	136
Fish Oil	111	74	2					3
Others	45				21	78		
Total	159,076	213,791	142,997	134,414	184,896	177,295	149,109	150,275

Source: Secretaria de Agricultura, Ganaderia y Pesca, Subsecretaria de Pesca

(b) Japan

Japan, the largest fishing country in the world, imported only 541 tons of marine products from Argentina in 1974, but by 1979 its imports increased to 39,900 tons in terms of quantity and US\$35 million in terms of value. The main items imported by Japan are frozen Merluza, prawn and squid. Japan's total imports of marine products have been increasing as a consequence of the institution of 200-mile exclusive zones of territorial waters, and this tendency is expected to remain unchanged in the future.

(c) USA

In the USA, total annual imports of marine products amount to some US\$2,500 million, and the annual growth rate has been of the order of approximately 10% in recent years. The imports of the USA totaled a little over 1 million tons in 1981, which was in fact the largest in the world. The exports of marine products from Argentina to this country consist mostly of high-priced commodities. In particular, fillet blocks of Merluza are the main export item, and they are used as raw materials for fish sticks, fish steak, fishburger, etc. The competitors of Argentine products in the market of the USA are small-sized Merluza from Peru and Chile and high-quality Merluza from South Africa.

(d) Brazil

Among the South American countries, Brazil is the largest importer of Argentine marine products. Thanks to an agreement between the two countries, Argentine fishing boats are authorized to export their catches by directly landing them in Brazilian ports. In the beginning, the exports were mainly ice-packed fishes, but the quantity of frozen products has been increasing in recent years. Major export items from Argentina to Brazil are Merluza fillet, whole Merluza and eviscerated Merluza in that order. The imports by Brazil have conspicuously declined since 1983 as a consequence of the economic recession in the country.

(e) Italy

Per capita fish consumption in Italy is of the order of 12 to 13 kg. Argentine Merluza is one of the popular fishes among Italian consumers. High-grade fishes like red sea bream are airlifted to Italy in the form of fresh fish besides the exports of frozen products. Moreover, the export of prawn has also been increasing since 1984. In fact, Italy was the largest importer of Argentine marine products in terms of value in 1984 due to the increased prawn import.

(f) Nigeria

Nigeria has a large demand for marine products, but it depends on foreign countries for most of the supply, because the country has a short coastal line, and moreover, the domestic production has reached the ceiling as a consequence of overfishing by trawlers. Nigeria's imports of Argentine marine products started in 1977, and at one time

the country was the largest importer when its economy was booming. After 1984, however, the exports to this country have declined as a consequence of import restrictions due to the shortage of foreign currency and other adverse conditions. The main export item to Nigeria consists of whole-frozen merluza blocks.

Table II-3-11 Exports to Major Countries

		(tons; US\$ 1,000)				
Country		1981	1982	1983	1984	1985
Spain						
Quantity		23,986	34,979	24,362	15,743	23,295
Value		31,942	40,863	34,150	26,178	27,063
Japan						
Quantity		17,103	22,701	18,897	15,884	17,944
Value		18,700	19,732	20,510	26,995	15,891
USA						
Quantity		9,249	15,569	18,036	17,040	17,944
Value		12,632	18,908	24,280	27,795	30,089
Brazil						
Quantity		14,882	15,862	6,987	9,310	6,218
Value		7,956	11,126	6,231	4,408	2,603
Italy						
Quantity		17,261	10,264	11,559	15,690	22,289
Value		15,041	9,888	19,904	28,827	16,743
Nigeria						
Quantity		31,932	41,461	51,747	7,642	2,226
Value		17,055	19,522	22,899	3,153	939

Source: Subsecretaria de Pesca

3-2-2 Fish Processing Industry

The processing industry of marine products in Argentina is broadly classified into two groups, that is, processing on board and processing on the shore. Some part of such products such as whole frozen fish, fillets, beheaded and eviscerated products of Merluza processed on board are temporarily stored in cold storage on the shore, but most of them are directly exported to overseas by means of loading-on-stream ships. On the other hand, shore processing facilities turn out such products as fillets, frozen fish, dried, salted and smoked fish, canned products, fish meal and fish oil. The capacities of the processing facilities on the shore as of 1986 are shown in Table II-3-12.

Table II-3-12 Shore Processing Capacity (1986)

Products	(ton/year)
	Processing capacity (in terms of raw materials)
Filleting and Related Processing, Freezing and storage	995,000
Salted and Dried	16,000
Smoked	15,900
Canned (anchovy)	12,700
Canned (mackerel)	65,000
Canned (bonito)	18,000
Fish meal	556,000

Source: INIDEP

As can be seen in the table, the capacity of filleting and related processing on the shore alone exceeds the estimated total MSYs (maximum sustainable yields) (742,000 tons) in the waters north of 48° S. Lat. As a matter of fact, only 30 to 40% of the existing capacity of shore processing facilities was operating during the 1978-1984 period. The number of these plants totals 251, of which 212 are located in the Buenos Aires area, mainly concentrated in Mar del Plata. Most of the plants in this area were built in the early 1970s. Particularly in connection with the state of mechanical equipment in use, conspicuous differences are observed between plants operating profitably in recent years and those that are not. The gap between companies which are operating efficiently with some renovated equipment and the others which are not has been widening in recent years. Some companies have their operations suspended, some others are rumored to go bankrupt during 1986 unless fish prices and exports pick up soon.

There are 39 processing plants located ashore in the Patagonian region. Most of these plants were constructed in the 1980s to obtain fishing licenses in the Patagonian waters and to take the advantage of fiscal incentive measures, and thus they have modern facilities and mechanical equipment. All of these plants are large in scale of operation, because they belong to companies with better financial conditions compared with those in the Buenos Aires area. Moreover, they are equipped not only with facilities for the production of Merluza fillets, but also with machinery for sorting and processing of prawn thanks to the prawn boom since 1982. It must be borne in mind, however, that all of these companies have large-sized factory ships, and on-shore processing plays a minor role in terms of quantity compared with processing on board.

Of the various processed products, some of fresh fish are exported by air to Italy, but most of them are bound for domestic market. Fillets of Merluza are sold in some domestic supermarkets, but the quantity is limited, and they are mostly destined for export. Whole, eviscerated and beheaded Merluza is also for export. As for canned products, they are not competitive in international markets because of the high production costs, and are thus largely for domestic consumption. The quality of canned products is adequate for domestic consumption, but they lag behind the international standards in terms of tin plates for canning, quality and seasoning of the contents. Frozen products account for 92 - 95% of the total quantity of exports.

It is necessary to increase the supply of fresh fish in order to raise the operating rate of the facilities, but the fundamental requirement is the need to increase the external demand. It is also necessary to carry out the secondary processing of ship-frozen products at shore facilities, as is being done by some processing plants, in order to increase the value added of the products.

Moreover, it is necessary to develop products in accordance with the manners of preparation and the tastes favored in importing countries. For example, some companies have attained notable successes in the export market by developing frozen products in which each piece of fillets can be easily separated or products with pieces conforming to the consumption standards of the importing countries. Some other companies have succeeded in expanding their export market by improving the quality of their products through technical assistance of the experts from the importing countries.

As things now stand, the processing industry of Argentina does not have sufficient information about the quality and standards of fishery products required and favored in overseas markets, and moreover their ability to develop products in accordance with such requirements and preferences are limited. Development of new products, such as the production of fish paste (surimi) of Merluza, is being attempted by some companies, but it has not led so far to the development of marketable final products using fish paste. Produced surimi is being exported merely in the form of frozen paste. In fact, the production of fish paste has not yet attained a satisfactory commercial scale, partly because it is made from frozen fish, partly because the quantity of the produced paste is yet small. There is still a possibility of developing

new products in this field if research and developments efforts are carried out further.

3-2-3 Domestic Demand for Fishery Products

The domestic demand for fishery products in Argentina is very small, with per capita consumption of only 4.4 kg per year in 1982. The reasons for low consumption are cheaply available beef and the inadequate development of cold chains in the country. Most of the distribution of fishery products in Argentina is in the form of fresh fish, and consumption is concentrated mostly in Buenos Aires and Mar del Plata. Means for transporting fresh fish is undeveloped in other areas, and the distribution is limited to canned, dried and salted products. In recent years, frozen fish began to be sold at some supermarkets of the capital, but the quantity is still small. One of the reasons for the slow pace of frozen fish consumption in Argentina is the low diffusion of household freezers. Refrigerators with freezing compartments have been marketed in recent years, but their diffusion is still very limited.

Fresh fish, which roughly account for 40% of the fishery products marketed inside the country, are transported by fish brokers from the fish market at Mar del Plata to the Central Market at Matanza in Buenos Aires. At the Central Market, fresh fish are sold either directly to retailers or to secondary wholesalers and then distributed to retailers of the capital city and its environs. The high costs of transportation and commercialization raise the consumer prices of fish. The consumption of fish increases temporarily at Easter due to the religious reason, but on average fish are eaten once a week in ordinary households. This unpopularity of fish is attributable to its high price compared with meat products, and also to the insufficient knowledge of fish preparation and cooking methods.

Various actions were once taken for the purpose of increasing domestic consumption. For example, the use of fish products was encouraged in armed forces, large factories, schools, hospitals and so on, while demonstrations of fish cooking methods were attempted through women's associations and unions to popularize fish consumption. At present, it is being considered to institute a system of price adjustment in accordance with the supply and demand for the purpose of reducing distribution costs. It must be pointed out, however, that no substantial increase in consumption can be expected as long as meat is available at low prices.