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RELATIONSHIP BETWEEN PACKAGING MATERIAL COSTS AND RETAIL PRICES OF PACKAGED CONSUMER PRODUCTS

RELATIONSHIP BETWEEN PACKAGING MATERIAL COSTS AND RETAIL PRICES OF PACKAGED CONSUMER PRODUCTS

A Study of the relationship between packaging material costs and retail prices of packaged consumer products in 1986 in Brazil

Prepared

for

Uni*ed Nations Industrial Development Organization UNIDO

by

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TERMS OF REFERENCE

General Framework

The Government of Brazil, the United Nations Development Programme (UNDP) and the United Nations Industrial Development Organization (UNIDO) have concluded an agreement to co-operate in carrying out a project entitled " Consolidation of the Existing Capacity of the Institute of Food Technology (ITAL) through the creation of a National Food Packaging Centre".

According to the relative project document, among the expected outputs are included market studies on relationship between packaging material costs and retail prices of packaging consumer products, as well as classification of Brazilian packaging material suppliers.

The study under consideration is included in the Mandatory Revision "K", dated 4 June 1984, under "Subcontracts 31-21-00".

The Subcontract is related to the following subjects:

1. Relationship between packaging material costs and retail prices of packaged consumer products

   (which is the subject of this document)

2. Classification of Brazilian packaging material suppliers

   (this is dealt with separately in another document namely "Guia da Industria Brasileira de Embalagens" prepared in Portuguese at the request of CETEA (National Food Packaging Centre))

Objectives of Investigation

The investigation must provide information to satisfy the following research objectives:

a) Identify principal packaged consumer products, both food and non-food, by packaging types and sizes

b) Analyse the cost of packaging relative to the retail prices of these packaged products

c) Identify and classify the principal packaging manufacturers in terms of area of preparation and production capacity

Scope of Investigation

The investigation should examine the following packaging materials and packaging types:

a) Plastic packaging

- films (bags and wrappings)
- bottles
- thin walled containers (tubs, pots/lids and trays)

b) Paper based packaging

- paper bags (prepackaged products)

c) Paperboard packaging

- folding cartons
- composite containers

d) Flexible packaging

- laminated and co-extrudates

e) Metal packaging

- general line containers
- open top containers
- collapsible tubes

f) Glass packaging

- bottles and jars

The investigation should covered the following food and non-food markets:

Food and Drink

* aguardente
* baby food
* beer
* biscuits
* bread
* butter
* cake mixes
* carbonated beverages
* cashew nuts
* cereals - baby
  - breakfast
  - powdered
* cheese and cheese spread
* chewing gum
* chocolate confectionery
* chocolate drinks
* coffee - ground
  - soluble
* condiments/seasonings
* confectionery/candy
* corned beef
* cornflour
* cream (sterilized)
* desserts/jellies (powdered)
* eggs
* flour
* frozen food
* fruit - canned/bottled
  - fresh
* fruit juices - bottled
  - frozen
  - powdered
* ice-cream
* jams
* margarine - hard
  - soft
* mayonnaise
* meat products - canned
  - fresh
* milk - baby
  - caramelized
  - condensed
  - defatted
  - fermented
  - pasteurised
  - powdered
  - UHT
* mineral water
* palm hearts
* panettone
* pasta
* peanut butter
* poultry
* pulses (beans)
* rice
* salt
* sardines
* sausages
* shortening
* snacks
* soups (powdered)
* spirits
* stock cubes
* sugar
* sugar preserves
* tomato - extract
  - ketchup
  - products
  - pures
  - sauce
* vegetables - canned
  - fresh
* vegetable oil
* vinegar
* wine
* yoghourt and desserts

Non Food

* animal feed
* ammoniated liquids
* auto parts
* batteries
* cement
* chemicals
* cigarettes
* consumer durables
* cosmetics
* deodorants
* detergents
* disinfectants
* electrical appliances
* fabric softeners
* fertilizers
* hairspray
* hydrated alcohol
* hydrated lime
* insecticides
* lighters
* lubricating oil
* matches
* paints
* pesticides
* petroleum products
* pharmaceuticals
* plastic resins
* razor blades
* records
* shampoo
* shirts
* shoes
* solvents
* steel wool
* tissue products
* toilet soap
* tools
* toothpaste
* toys
* washing up liquid
* waxes/polishes

INFORMATION PROVIDED

The study followed the official price list published by SUNAB (Secretaria Nacional de Abastecimento) which covers approximately 2,500 product lines classified by size and brand.

The identified products were classified by manufacturer, packaging type, packaging material, size, volume, growth trends, retail price, and packaging material cost.

Relationships were be drawn from the above on a national basis.

Other background information such as major economic indicators, geographic and demographic distribution, disposable income, economically active population and ocupation analysis is provided.

METHODOLOGY

Based on previous studies of the Brazilian packaging market and existing database (reference year 1984) companies were selected for personal interviewing including major packaging users and manufacturers.

The study involved 345 company analyses split:

Food manufacturers	128	37%
Non food manucturers	87	25%
Raw material manufacturers	33	10%
Packaging converters	73	21%
Trade associations	24	7%

The existing database was updated with information on 1986 packaging consumption and includes an historical record of the previous 5 years and a projection for the next 5 years up to 1991. Each product was identified where possible by manufacturer, brand, size, packaging type, packaging material, retail price and packaging cost.

The food and non-food manufacturers were interviewed in terms of both marketing/sales and purchasing.

On completion of the field work the collected data was reconciled, analyzed and compiled into tables using a computerized database system.

The relationship between the unit cost of packaging and the unit retail price of packaged products was obtained using data collected from packaging material users and packaging manufacturers over the period september 1986 to 1987. The unit retail prices were based on the official Secretaria Nacional de Abastecimento SUNAB published price lists as of November 1986 and converted to US dollars at the rate of US$ 1.00 = Cz$ 14.11 prevailing at the end of the month. The unit packaging costs were converted to US dollars at the rate prevailing at the time of data collection.

The estimated total market is based on the identified sample extrapolated to the total market except in the cases, where the packaging is unique to one company. The reliability of the extrapolations is a function of the identified percentage of the market which in most cases is high. The projection up to 1991 are based on the historic performance of the market in which the particular packaging is used and do not allow for substitutions. The technique which was used is known as curve fitting using exponential smoothing and is intended to eliminate the distorting effect of 1986 consequently most projections are fairly conservative.

Food manufacturers

Acucar Uniao	Campineira	Frutesp	Mouran	Sadia Concordia
Adams	Cargill Oleo	Garoto	Nestle	Sanbra
Aguia	CCPL	Gelato	Olvebra	Santa Branca
Anderson Clayton	Cerpasa	Granol	Orion	Santista
Adria	Chambourcy (Nestle)	Heloisa	Otker	Sao Lourenco
Aji-no-moto	Chocolates Vitoria	Heublein	Pan Americano	Sao Luiz (Nestle)
Alcion	Chapeco	Imperador	Pacaembu	Sao Vito
Anglo	Cinzano	Indaia	Paoletti	Sococo
Antarctica	Cisne	Itumirim	Parmalat	Spal
Ariana	Coca Cola	Jack in the Box	Pastitex	Stock
Arosa	Confianca	JB Duarte	Paulista	Sulina
Barbosa & Marques	Conbaque S Joao	Kaioma	Peixe	Tatuzinho
Barra Azul	Comabra	Kelloggs	Pepsico	Teachers
Bauducco	COOMAI	Kibon	Perdigao	Teixeira
Batavo	Copersucar	Kitano	Petybon	Todeschini
Beira Alta	Coqueiro	Lacesa	Piraque	Van Mill
Bela Vista	Cremasco	Lindoya	Pilar	Vigor
Bordon	Crush	Lindoya Vida	Poa	Vinagre Castelo
Brahma	Donat's	M Dias Branco	Polenghi	Visconti
CAC	Duchen	Maggi (Nestle)	Praianinha	Vulcania
Cafe do Centro	Eder	Maguary	Prenda	Warner Lambert
Cafe do Ponto	Elma Chips	Martini & Rossi	Ref.de Milho	Wilson
Cafe Moka	Embare	Melitta	Refinco	Yopa (Nestle)
Cafe Pele	Findus (Nestle)	Minalba	Reimassas	
Cafe Seleto	Fleischmann	Mirabel	Rex	
Cafe Uniao	Flor da Nata	Mococa	Rio Pedrense	

Non food manufacturers

Abbott	Brazaco Mapri	Gillette	Mobil	RCA
Akzo	Caloi	Givaudan	Monange	Rhodia
Alba Quimica	Cargill	Glasurit	Nalco	Rohm & Haas
Alpargatas	Ceralit	Henkel	National	Sao Caetano
Anakol	Chantre Fisher	Hoechst	Niasi	Sardalina
Arno	Christian Gray	Ideal	Ornier	Serpac
Atlantis	Climax	Ipiranga	Oxford	Souza Cruz
Atma	Colgate	J & J Consumer	Petrobras	Squibb Pharma
Avon	Copebras	Johnson & Johnson	Petroil	Texaco
Bayer	Coral Nordeste	Johann Faber	Phebo	Union Carbide
Becton Dickinson	Cyanamid	L'Oreal	Philco	Uniao Fabril
Beecham	Dow	Lalekla	Philip Morris	Vulcabras
Berlimed	Du Pont	Lepetit	Polidura	Warner Lambert
Bic	Elida Gibbs	Lever	Polygram	York
Biogalenica	Eli Lilly	Mecano Pack	Portland Itau	Ypiranga
Bom Bril	Embalarte	Melitta	Primor	
Bozzano	Eveready	Mercedes Benz	Purina	
Brastemp	Fiat Lux	Microlite	R J Reynolds	

Raw material manufacturers

Adere	Cosipa	Monsanto	Polipropileno	Suzano
Alcalis	CSN	Norton	Politeno	Union Carbide
Alcan	Du Pont	Nitrocarbono	PPH	Usiminas
Alcoa	Eletro Cloro	Petroquim Triunfo	Rhodia	Votorantim
BASF	ICI	Polialden	Rionil	Vulcan
CBA	Manville	Polibrasil	Ripasa	
Celcsul	Mazzaferro	Poliolefinas	Shell Quimica	

Packaging converters

Alcan	Dixie	Italplast	Parnaplast	Santa Marina
Ardea	Dover	Itap	Perticamps	Santa Rosa
Arima	Eletro Flex	Klabin Embalagens	Plast. do Parana	Sao Roberto
Aro	Embrasa	Manville	Plastigel	Sarcinelli
Bafema	Enkopo	Matarazzo Emb.	Plasticfoil	Shellmar
Bandeirantes	Empax	Mazza	Plastunion	Spuma-Pac
Brasilata	Flexolit	Met Iguacu	Plavinil	Tapon Corona
Caravellas	Flor de Maio	Met Matarazzo	PMT	Toga
Celucat	Gloria	Met Mococa	Polipel	Tri-Sure
Cisper	Goodyear	Metalma	Polo	Tupy
Columbia	Guarapiranga	Milprint	Poly-Vac	Wheaton
Converbras	Impacta	Neopac	Polyfilm	Wheaton Plasticos
CIV	Indupel	Nicollini	Providencia	
Crown Cork	Industampa	Pan-Brasil	Rebizzi	
Descartavel	Iplasa	Paranaense	Rheem	

Trade associations

ABAL	ABIOVE	AFEMBRA	HORTIMEXIA	SERPA
ABFRM	ABIQUIM	ANFPC	IBGE	SINDIRACOES
BICE	ABPO	Assoc.Bras.de Cal	Inst.do Acucar	SITVESP
ABIEF	ABPO	ATIAV	IRGA	UVIBRA
ABINEE	ABRASSUCOS	DNPM	Sind.Cacau e Balas	

SAMPLE BASIS - Non Flexibles

Material	Packtype (tons)	Total identified	Total estimated	Identified %
Al/LDPE/HDPE/PS	Droppers	3,302	4,434	74.5
Aluminium	Aerosols	1,836	2,014	91.2
	Cans	58	131	44.3
	Collapse tubes	4,915	7,147	68.8
	Crimped caps	739	1,107	66.8
	Pry off caps	7	163	4.0
	Rigid tubes	60	73	81.7
	Ring pull lids	1,688	1,734	97.4
	Roll on caps	20	22	92.0
	Screw caps	22	189	81.9
	Small bottles	8	29	28.0
	Tear off lids	156	558	28.0
	Trays	16	102	15.3
	Wrappers	299	607	49.3
		9,823	13,876	71.6
Black plate	Cans	106,568	119,756	89.0
Coated paper	Labels	7,618	7,802	97.6
	Wrappers	450	532	84.6
		8,068	8,333	96.8
Duplex board	Displays	405	1,755	23.7
	Folding cartons	84,033	140,616	59.8
	Lids	64	157	40.6
	Liner	3,557	3,557	100.0
	Six pack	4	4	100.0
	Sleeves	3,686	6,144	60.0
	Trays	6,402	10,671	60.0
		98,167	162,904	60.3
E flute	Folding cartons	1,402	55,176	2.5
Fibre	Fibre drums	7,640	55,488	13.8
Glass	Ampoules	425	1,517	28.0
	Bottles	111,430	206,441	54.0
	Glass jars	27,180	37,227	73.0
	Pots	689	803	85.9
	Return bottles	181,335	245,487	73.9
	Small bottles	38,437	86,606	44.4
	Tumblers	69,574	97,203	71.6
		429,070	675,283	63.5
HDPE	Bags/pouches	229	643	35.6
	Bottles	5,835	8,216	71.0
	Caps	4	15	28.0
	Indust sacks	0	6	6.0
	Pails	1,076	1,459	73.8
	Plastic drums	1,124	3,060	36.7
	Pots	981	1,067	91.9
	Pots/lids	1,505	1,863	80.8
	Screw caps	1	1	81.0
	Small bottles	1,681	3,014	55.8
	Wrappers	106	107	99.5
		12,543	19,452	64.5

Material	Packtype (tons)	Total identified	Total estimated	Identified %
HDPE rafia	Bags/pouches	5,128	5,128	100.0
	Indust sacks	520	527	98.8
		5,648	5,655	99.9
HDPE/LDPE	Bottles	528	1,814	29.1
	Collapse tubes	86	129	66.2
	Lids	37	37	100.0
	Pots	2	2	100.0
	Pots/lids	14	240	6.0
	Screw caps	26	87	29.5
	Small bottles	175	415	42.3
	Squeeze bottles	676	676	100.0
		1,544	3,400	45.4
LDPE	Bags/pouches	19,183	87,734	21.9
	Bottles	69	93	74.6
	Caps	3,848	34,601	11.1
	Collapse tubes	200	262	76.3
	Droppers	15	357	4.2
	Film	56	715	7.9
	Indust sacks	10,979	37,119	29.6
	Liner	50	500	10.0
	Pots	2	5	31.3
	Pots/lids	98	126	78.2
	Sachets	112	113	99.1
	Screw caps	1,582	1,632	97.0
	Small bottles	186	656	28.3
	Wrappers	2,106	7,501	28.1
		38,486	171,413	22.4
LDPE/HDPE	Bottles	481	1,118	43.0
	Small bottles	253	383	66.1
	Squeeze bottles	6,201	6,297	98.5
		6,935	7,798	88.9
MG Paper	Bags/pouches	7,897	9,313	84.8
	Labels	5,668	6,394	88.6
	Overwrap	4,280	4,342	98.6
	Wrappers	1,130	1,502	75.2
		18,975	21,551	88.0
Multiwall kraft	Bags/pouches	14,492	55,275	26.2
	Indust sacks	280	280	100.0
	Multiwall sacks	38,088	264,022	14.4
	Repackaging	117	133	88.2
		52,978	319,710	16.6
Paper	Bags/pouches	30	865	3.5
	Blisters	94	334	28.0
	Compcans	2,559	2,931	87.3
	Labels	582	970	60.0
	Post mix	30	33	92.0
	Wrappers	517	861	60.0
		3,812	5,994	63.5

Material	Packtype (tons)	Total identified	Total estimated	Identified %
PC	Containers	720	720	100.0
PP	Bags/pouches	1,084	2,056	57.1
	Bottles	2	2	100.0
	Caps	889	1,083	82.1
	Crown caps	40	40	100.0
	Glass jars	30	37	81.0
	Lidding stock	15	16	94.6
	Lids	30	57	59.7
	Overwrap	5	8	60.2
	Pails	68	78	87.2
	Pots	1,902	2,286	84.6
	Pots/lids	7,518	7,522	99.9
	Rigid tubes	23	83	28.0
	Screw caps	11,133	14,219	78.5
	Small bottles	1	1	82.9
	Wrappers	1,987	4,818	41.2
		24,727	32,222	77.1
PP rafia	Indust sacks	4,543	36,282	12.5
PS	Bottles	2,584	2,662	97.1
	Caps	1	1	81.0
	Lids	80	109	73.0
	Pots	9,414	10,924	86.2
	Pots/lids	123	328	31.8
	Rigid tubes	2,475	6,867	38.6
	Screw caps	37	142	26.2
	Spools	90	321	28.0
	Trays	718	1,689	43.5
		15,698	23,303	67.4
PVC	Blisters	2,166	6,422	33.7
	Bottles	18,401	23,411	78.6
	Caps	103	197	52.3
	Closures	5	5	100.0
	Form seal	5	5	93.2
	Lids	69	69	100.0
	Pots	167	243	68.7
	Pots/lids	817	818	100.0
	Sachets	1	1	82.9
	Screw caps	15	15	100.0
	Shrink film	377	1,140	33.1
	Small bottles	6,499	7,523	86.4
	Stretch film	2,181	3,265	66.8
	Trays	140	449	31.2
	Tumblers	22	33	66.8
	Wrappers	171	296	57.5
		31,139	43,892	70.9

Material	Packtype (tons)	Total identified	Total estimated	Identified %
Steel	Draught	107	107	100.0
	Pails	7,688	13,625	56.4
	Recovered drums	1	2	55.5
	Steel drums	50,822	133,797	38.0
		58,617	147,530	39.7
Tin plate	Aerosols	6,185	6,511	95.0
	Cans	284,356	372,318	76.4
	Collapse tubes	3	12	28.0
	Crown caps	37,849	42,402	89.3
	Lids	15	21	73.0
	Lug caps	191	596	32.1
	Pails	1,340	1,869	71.7
	Pry off caps	285	300	94.8
	Rect cans	14,145	16,789	84.3
	Screw caps	334	647	51.6
		344,703	441,466	78.1
		1,265,255	2,351,069	53.8

SAMPLE BASIS - Flexibles

Material	Packtype (tons)	Total identified	Total estimated	Identified %
Al/Lac	Blisters	241	862	28.0
	Lidding stock	995	1,199	83.0
	Membranes	893	1,008	88.5
	Wrappers	292	555	52.5
		2,421	3,[illegible]75	66.8
Al/LDPE	Bags/pouches	12	[illegible]	88.2
	Lidding stock	20	23	90.6
	Lids	36	39	90.6
	Strip	280	998	28.0
		348	1,074	32.4
Al/LDPE/Htslt	Lidding stock	401	444	90.2
Al/LDPE/Paper	Wrappers	290	588	49.3
Al/LDPE/PET	Sachets	2	3	89.4
Al/Paper-full	Liner	581	589	98.6
Al/Paper-strip	Liner	6,177	6,267	98.6
Al/Paper/Htslt	Wrappers	30	30	99.8
Al/Paper/LDPE	Compcans	4,283	7,372	58.1
AL/Paper/Wax	Bags/pouches	5	24	21.2
	Compcans	2,154	2,154	100.0
	Wrappers	1,970	2,958	66.6
		4,129	5,136	80.4
Aluminium	Wrappers	159	219	72.6
Bagvac	Bags/pouches	11	25	45.4
Barrier bag	Bags/pouches	243	597	40.7
BOPP	Bags/pouches	106	192	54.9
	Overwrap	3,022	3,163	95.5
	Tear-strip	72	73	98.6
	Wrappers	45	72	62.1
		3,173	3,428	92.6
BOPP met	Wrappers	168	231	72.6
BOPP met/LDPE	Bags/pouches	277	1,304	21.2
	Wrappers	132	212	62.1
		408	1,515	26.9
BOPP/LDPE	Bags/pouches	188	373	50.4
	Sachets	260	321	81.0
	Wrappers	4	6	62.1
		452	700	64.5
BOPP/LDPE/BOPP	Wrappers	2,040	3,541	57.6
BOPP/PP	Wrappers	204	339	60.2
Cello	Film	3	10	27.5
	Overwrap	583	590	98.9
	Tear-strip	20	20	98.6
	Wrappers	2,173	8,494	25.6
		2,779	9,114	30.5
Cello/LDPE	Bags/pouches	662	2,050	32.3
	Sachets	136	142	95.6
	Wrappers	1,291	2,668	48.4
		2,089	4,861	43.0
Cello/LDPE/Al/Lac	Wrappers	746	1,202	62.1

Material	Packtype	(tons) Total identified	Total estimated	Identified %
Cello/LDPE/Al/LDPE	Bags/pouches	12	14	86.0
	Sachets	194	242	80.1
	Wrappers	62	74	83.2
		268	330	81.0
Cello/LDPE/Cello	Wrappers	1,227	1,977	62.1
Cello/LDPE/Lac	Wrappers	30	48	62.1
Cello/LDPE/PP	Wrappers	564	909	62.1
Cello/PP	Wrappers	265	439	60.3
Cello/PVDC/LDPE	Trays	11	11	100.0
Cellulose	Bags/pouches	17	64	26.6
Cryovac	Bags/pouches	207	589	35.1
HDPE/LDPE/HDPE	Bags/pouches	39	61	63.6
Lac/Coated/Htalt	Wrappers	2,704	3,157	88.2
LDPE/PA6/LDPE	Bags/pouches	6	10	63.6
LDPE/PAPER/LDPE	Wrappers	7	10	73.0
PA11	Bags/pouches	37	78	47.8
	Film	50	130	38.4
		87	208	41.9
PA6	Bags/pouches	16	17	95.0
	Blisters	218	780	28.0
	Film	25	95	26.5
		260	892	29.1
PA6/LDPE	Bags/pouches	253	793	31.9
	Covers	21	28	74.5
	Trays	163	260	62.7
		436	1,081	40.4
Paper met	Labels	126	126	100.0
	Liner	2,244	2,277	98.6
		2,370	2,402	98.6
Paper/Al/LDPE	Sachets	29	36	81.0
Paper/Al/Wax	Wrappers	44	57	77.6
Paper/Lac	Wrappers	1,404	2,002	70.1
Paper/LDPE	Bags/pouches	21	21	100.0
	Compcans	13	13	100.0
	Sachets	312	569	54.8
	Wrappers	587	799	73.4
		932	1,402	66.5
Paper/LDPE/Al/LDPE	Sachets	2,299	3,798	60.5
	Wrappers	139	147	94.8
		2,438	3,945	61.8
Paper/Wax	Bags/pouches	36	577	6.2
	Post mix	792	861	92.0
	Pots	28	38	73.0
	Strip	30	68	44.4
	Wrappers	771	2,339	32.9
		1,657	3,883	42.6

Material	Packtype	(tons) Total identified	Total estimated	Identified %
PET met/LDPE	Bags/pouches	124	584	21.2
	Sachets	44	58	74.9
	Wrappers	50	81	62.1
		217	722	30.1
PET/Al/LDPE	Bags/pouches	333	408	81.6
PET/LDPE	Bags/pouches	80	82	97.7
	Covers	97	164	59.1
	Lids	6	7	94.0
	Sachets	155	311	50.0
	Wrappers	7	8	81.0
		345	571	60.4
PET/LDPE/Al/LDPE	Indust sacks	296	296	99.8
PET/PA6/LDPE	Covers	26	41	63.6
PET/PP	Sachets	36	43	82.9
PET/PVDC	Covers	8	8	100.0
PP/PP	Wrappers	20	26	76.3
Tetra Brik	Tetra Brik	10,446	12,417	84.1
		62,442	116,131	53.7

SUMMARY OF FINDINGS AND CONCLUSIONS

General

The Brazilian packaging industry was valued at US$ 3,397 (3,445,040 tons in total) in 1986, equivalent to 1.25% of the gross national product. The breakdown of the various packaging materials was as follows:

THE BRAZILIAN PACKAGING INDUSTRY 1982/86

	By value			By tonnage		
	1982	1984	1986	1982	1984	1986
Plastics	24.4%	25.8%	18.0%	10.1%	10.6%	9.9%
Paper	6.5%	7.0%	8.5%	11.5%	9.5%	10.3%
Fibreboard	12.4%	13.6%	17.9%	26.4%	29.4%	30.2%
Paperboard	8.2%	9.3%	6.6%	8.3%	7.0%	6.3%
Flexibles	6.8%	7.0%	9.2%	1.9%	1.9%	2.5%
Metal (Al+TP)	27.8%	24.9%	25.6%	18.8%	18.9%	17.0%
Bulk	4.2%	3.7%	4.1%	2.9%	3.2%	4.3%
Glass	7.8%	8.6%	9.5%	20.1%	18.7%	19.6%

INTERNATIONAL CONSUMPTION OF PACKAGING MATERIALS

(kg/capita)	Brazil Tot Pop	Brazil Econ Act	USA	B'lux	France	FDR	Italy	NL	UK
Plastics	2.5	6.2	11	17	11	13	8	11	8
Paper	2.6	6.4	19	21	14	14	15	22	14
Fibreboard	7.6	18.9	70	24	29	23	18	28	24
Paperboard	1.6	4.0	33	7	11	12	7	12	12
Steel	5.2	13.0	30	16	10	8	7	17	18
Aluminium	0.2	0.4	4	1.5	1	1.5	0.7	1.2	1
Glass	4.9	12.3	47	40	39	41	28	34	35

Plastic Packaging

Plastic Polymers

	Total consumption tons 10^3	Packaging tons 10^3	Share used for Packaging	Converter value US$ (millions)
LDPE	424.0	181.4	42.8%	261
HDPE	181.0	29.3	16.2%	57
PS	140.0	23.3	16.6%	66
PVC	406.0	43.9	10.8%	69
PP	185.0	75.7	40.9%	142
PET	110.0	0.8	0.7%	4
PA/PC	4.0	1.8	45.0%	6
Total	1,458.0	356.2	24.4%	605

The principal applications for plastics in 1986 were:

tons 10^3	Applications	LDPE	HDPE	PS	PVC	PP	PET	PA	PC
Extrusion	54%	139*	1	12	13	24	1	1	
Blowmolding	17%	10	20	1	31				1
Rafia	11%		5			36			
Injection	17%	37	3	10		15			
Total		186	29	23	44	75**	1	1	1

* includes LDPE for flexibles
** includes BOPP

Paper Packaging

The principal types of paper based packaging used in 1986 were:

	tons 10^3	US$ millions
Multiwall kraft	320	264
Other paper	35	24

The principal applications in 1986 were:

Multiwall kraft		Other paper	
Cement	35%	Powdered cereals	47%
Animal feed	16%	Baking powder	14%
Lime	8%	Matches	10%
Chemicals	3%	Flour	6%
Seeds	4%	Carbonated beverages	5%
Sugar	27%	Rice	4%
Flour	3%	Others	14%
Others	4%		

Fibreboard Packaging

The principal types of fibreboard packaging in 1986 were:

	tons 10^3	US$ millions
Fibre drums	55.0	45
Corrugated cases	987.2	364

The principal applications of fibre drums in 1986 were:

Chemicals	85%
Condiments & seasonings	7%
Agricultural chemicals	4%
Ice cream	3%

Paperboard Packaging

The consumption of paperboard for packaging in 1986 was:

tons 10^3	US$ millions
210*	225

* Net of waste

The principal applications in 1986 were:

Duplex/Triplex		E flute	
Washing powder	17%	Shoes	91%
Shoes	11%	Electrical appliances	8%
Toys	6%	Others	1%
Toothbrushes	4%		
Pharmaceuticals	11%		
Matches	10%		
Toothpaste	4%		
Others	37%		

Flexible Packaging

The principal types of flexible packaging in 1986 were:

	tons 10^3	US$ millions
Aluminium based	38	)
Cellophane based	19	)
Paper based	14	)
BOPP based	10	) 304
PET based	2	)
Others	6	)
Total	89	)

The principal applications in 1986 were:

Cigarettes	23%
Boiled sweets	10%
Biscuits	8%
Lubricating oil	6%
UHT milk	6%
Chocolate	4%
Pasta	4%
Petit suisse	4%
Ground coffee	3%
Toilet soap	3%
Beer	2%
Powder cleaners	2%
Ready to drink juice	2%
Others	23%

Metal Packaging

Metal packaging is divided into two materials:

	tons 10^3	US$ millions
Aluminium	21	144
Tin/Black plate	566	729
Steel	148	139

The principal applications in 1986 were:

Aluminium

Sheet	
Toothpaste	36%
Pharmaceuticals	10%
Chemicals	10%
Deodorantes	8%
Beer	8%
Others	28%

Tin plate/Black plate

Vegetable oil	33%
Fruit/vegetables	3%
Milk products & cereals	9%
Paints	9%
Beverages	12%
Tomato products	3%
Fish	1%
Lubricating oil	1%
Batteries	2%
Others	27%

Steel

Chemicals	36%
Orange juices	27%
Lubricating oil	26%
Others	11%

Glass Packaging

The principal types of glass packaging in 1986 were:

	tons
Bottles	451,928
Jars	37,227
Small bottles	86,600
Pots	803
Ampoules	1,517
Tumblers	97,203
Total	675,283

The total market was valued at US$ 324 million.

The principal applications in 1986 were:

	units 106	% by weight
Bottles		
Aguardente	121	15%
Carbonated beverages	304	30%
Wine	59	7%
Beer	167	12%
Disinfectant	85	5%
Spirits	124	15%
Fruit juices	94	6%
Others	125	10%
Small bottles		
Pharmaceuticals	1,050	66%
Toilet water	170	22%
Nail polish	95	2%
Others	176	10%

	units 106	% by weight
Jars		
Mayonnaise	57	40%
Jam	32	18%
Baby food	41	10%
Tomato products	7	9%
others	47	23%
Pots		
Skin cream		4%
Tomato sauce	2	96%
Tumblers		
Instant coffee	119	31%
Tomato extract	142	22%
Mayonnaise	113	18%
Caramelized milk	86	17%
Cheese spread	46	3%

PACKAGING APPLICATIONS BY PACKTYPE

Packtype	Est total units (millions)	tons	Packtype	Est total units (millions)	tons
Aerosols	111.0	8,525	Plastic drums	5.2	3,060
Ampoules	632.6	1,517	Post mix	893.3	893
Bags/pouches	139,069.0	163,424	Pots	2,595.6	15,331
Blisters	7,675.3	8,444	Pots/lids	1,023.1	10,957
Bottles	2,077.6	243,755	Pry off caps	117.4	464
Cans	5,097.1	492,206	Recovered drums	1.5	2
Caps	2,396.7	35,896	Rect cans	56.1	16,709
Closures	5.7	5	Repackaging	1.3	133
Collapse tubes	1,246.1	8,008	Return bottles	528.6	245,487
Compcans	308.4	12,469	Rigid tubes	264.9	6,565
Containers	1.5	720	Ring pull lids	526.5	1,734
Covers	76.8	241	Roll on caps	21.8	22
Crimped caps	317.9	1,107	Sachets	3,858.7	5,637
Crown caps	19,240.8	42,442	Screw caps	3,136.1	16,730
Displays	342.5	1,709	Shrink film	1,117.5	1,140
Droppers	531.9	4,790	Six pack	4.0	4
Fibre drums	29.9	55,488	Sleeves	3,233.5	6,144
Film	47.1	950	Small bottles	2,352.2	98,627
Folding cartons	8,356.6	195,792	Spools	321.4	321
Glass jars	188.1	37,264	Squeeze bottles	362.7	7,673
Indust sacks	564.2	70,128	Steel drums	8.8	133,797
Labels	18,121.7	15,292	Stretch film	3,265.2	3,265
Lidding stock	3,211.4	1,682	Strip	585.1	1,066
Lids	115.6	490	Tear off lids	1,479.9	558
Liner	8,248.0	13,190	Tear-strip	93.3	93
Lug caps	67.2	596	Tetra Brik	721.2	12,417
Membranes	478.6	1,008	Trays	7,345.8	13,116
Multiwall sacks	1,674.3	267,826	Tumblers	523.5	97,236
Overwrap	16,280.9	8,103	Wrappers	89,221.2	49,413
Pails	13.8	17,030		360,401.9	2,459,148 *

* Excludes corrugated cases (987,200 tons)

CHANGE IN PACKAGING DEMAND

The demand for packaging materials in Brazil has developed considerably over the past 9 years as demonstrated below.

	tons(000)1986	% increase 1978/86
Plastics		
Low density polyethylene	181.4	+35.1%
High density polyethylene	29.3	+44.9%
Polystyrene	23.3	+66.7%
Polyvinyl Chloride	43.9	+63.9%
Polypropylene	75.7	+78.6%
Polyester	0.8	-14.5%
Polyamide	0.7	+51.5%
Polycarbonate	0.9	+81.8%
Paper & board		
MG paper bags	35.0	+37.0%
Multiwall Kraft sacks	320.0	+13.6%
Folding cartons	218.0	+37.0%
E flute cartons	87.5	+37.0%
Flexible packaging		
Metal packaging		
Aluminium	21.0	+63.9%
Tin plate	441.5	+33.3%
Black plate	119.8	+49.3%
Steel drums/pail	147.5	+49.3%
Glass packaging		
Glass packaging	675.3	+38.8%

COST/PRICE RELATIONSHIP

The relationship between the unit cost of packaging and the unit retail price of packaged products was obtained using data collected from packaging material users and packaging manufacturers over the period september 1986 to 1987. The unit retail prices were based on the official Secretaria Nacional de Abastecimento SUNAB published price lists as of November 1986 and converted to US dollars at the rate of US$ 1.00 = Cz$ 14.11 prevailing at the end of the month. The unit packaging costs were converted to US dollars at the rate prevailing at the time of data collection. The range of cost/price relationships may be summarized for each product as follows:

Food & Drink	Cost/Price %
Aguardente	14.5
Alcohol	19.5
Bacon	1.7 - 2.4
Butter	2.4 - 5.2
Canned feijoada	10.2 - 12.9
Canned fruit	9.1 - 9.6
Canned meat	16.4
Canned pate	15.8
Canned sardines	10.7
Canned sausages	15.5 - 19.0
Canned vegetables	5.0 - 20.6
Caramelized milk	10.3 - 50.1
Carbonated beverages	38.4 - 62.1*
Cheese spread	8.0 - 40.5
Concentrated juice	4.2 - 6.1
Corned beef	9.2 - 18.8
Defatted milk	2.9 - 5.9
Drinking chocolate	11.1 - 58.9
Flour	5.0
Fruit juice	7.0 - 15.2
Ground coffee	0.1 - 1.5
Ham	1.0 - 2.6
Ham 2nd quality	1.6 - 1.8
Hard margarine	6.0 - 21.1
Ice cream	4.6 - 9.7
Linguica sausages	0.6 - 5.2
Low fat margarine	13.1 - 13.6
Mayonnaise	4.6 - 12.8
Meat products	2.6
Milk powder	5.9 - 10.8
Minas cheese	1.9
Mineral water	65.1 - 123.0*
Morcela sausages	3.5 - 4.2
Washing up liquid	28.3 - 29.1

Food & Drink	Cost/Price %
Mortadela sausages	2.8
Muzzarela cheese	1.6 - 4.1
Panettone	1.1 - 2.1
Pasta	0.9 - 2.3
Powdered cereals	7.7 - 48.7
Prato cheese	1.5 - 4.6
Rice	3.3
Salt	2.7
Sausages	0.6 - 4.2
Soft margarine	7.3 - 15.0
Spirits	0.8 - 7.3
Sterilized cream	9.5
Sugar	1.3 - 4.5
Sugar preserves	13.8 - 22.8
Tomato extract	18.4 - 25.5
Tomato puree	19.3
Tomato sauce	17.2
Vegetable oil	3.4 - 12.6
Vinegar	31.4 - 58.1
Wine	3.1 - 22.6
Yoghourt	8.8

Non Food	Cost/Price %
Ammoniated liquids	6.4 - 7.9
Disinfectants	12.3 - 22.3
Floor polish	14.5 - 16.7
Furniture polish	7.8 - 13.7
Insecticides	9.6 - 21.4
Powder cleaners	15.9 - 16.8
Toilet soap	4.6 - 4.9
Toilet water	1.8 - 5.1
Washing powder	7.8 - 15.8

* returnable bottles

Generally the rule of thumb for packaging material costs is 10% of the retail price, however in Brazil where packaging materials are relatively more expensive and packaged products are relatively cheaper than in most developed countries due to price controls this often extends to 20%. Values over 20% may be considered due to the distorting effect of increased packaging costs not being passed on due to retail price controls in 1986.

PROJECTIONS

	1982	1984	1986	1991
Total Population				
Growth factor	92.4	96.6	100.0	112.6
Millions	126.8	132.5	137.2	154.5
Urban Population				
Growth factor	88.2	96.2	100.0	122.0
Millions	87.2	95.0	98.8	120.5
Gross National Product				
Growth factor	118.9	79.8	100.0	133.8
US$ 10^9	283.1	211.0	264.5	353.9
All Packaging				
Growth factor (volume)	80.8	81.8	100.0	94.1
US$ millions	3,759	3,492	3,397	3,232

Sources: FIBGE, FGV

SUBSTITUTIONS

The following areas where sustitutions have occurred or are likely to occur were identified:

New Material	Old Material	Market
BOPP met/LDPE	Cello/LDPE	Coffee
BOPP/LDPE/BOPP	Cello/LDPE/Celo	Biscuits
HDPE (HMWPE)	Single wall Kraft	Counter bags
	Tetrabrick	Sterilized milk
LDPE	MW Kraft	Thermoplastics
	Single wall Kraft	Carrier bags
		Counter bags
LDPE/HDPE	Comp.cans	Lubeoil
	Tin plate cans	Lubeoil
Paper met	Al/Paper	Cigarette liner
		Labels
PC	Glass	Mineral water
PET met	Cello/LDPE	Coffee
PET met/LDPE	BOPP met/LDPE	Coffee
PET/Al/LDPE	Tin plate cans	Cashew nuts
Post mix	Glass bottles	Carb. beverages
PP	PS	Mineral water
	PS	Yoghourt
	Tin plate lids	Mayonnaise
	Celo/LDPE	Pasta
PP Rafia	MW Kraft	Animal feed
	MW Kraft	Thermoplastics
	LDPE	Fertilizers
	MW Kraft	Seeds
PVC	Glass bottles	Disinfectants
	Tin plate cans	Veg. oil
	Al/LDPE strip	Pharmaceuticals
	Cellophane	Boiled sweets
	Small bottles	Pharmaceuticals
	Bottles	Aguardente
	Glass	Mayonnaise
Tetrabrick	Glass	Juice
	Tin plate cans	Cream
	Tin plate cans	Condensed milk

GROWTH FACTORS

Non Flexibles

Material	(tons)	1982	1983	1984	1985	1986	1987	1991
Al/LDPE/HDPE/PS	4,434	88.8	87.6	81.4	78.8	100.0	87.9	89.4
Aluminium	13,713	70.5	69.8	74.9	78.3	100.0	80.6	93.5
Black plate	119,756	76.6	72.6	87.3	81.5	100.0	85.9	93.9
BOPP	73	78.4	76.5	75.7	86.7	100.0	85.3	89.3
Coated paper	8,333	78.5	76.8	76.1	86.6	100.0	85.4	89.7
Duplex board	162,904	78.7	76.1	77.8	82.1	100.0	84.6	91.6
E flute	55,176	78.7	71.1	74.9	80.9	100.0	82.9	90.3
Fibre	55,488	81.6	76.4	88.8	92.0	100.0	89.0	99.5
Glass	675,283	74.6	71.4	74.8	79.4	100.0	81.8	89.9
HDPE	19,453	73.1	72.2	75.5	79.0	100.0	81.7	91.7
HDPE rafia	5,655	92.9	93.2	79.5	92.5	100.0	91.1	102.7
HDPE/LDPE	3,400	78.9	78.6	81.8	82.9	100.0	85.6	96.1
LDPE	166,898	89.8	83.3	89.5	91.2	100.0	91.5	100.9
LDPE/HDPE	7,717	75.9	73.2	82.8	85.1	100.0	84.9	97.3
MG Paper	21,551	66.6	68.4	69.1	69.9	100.0	77.6	87.5
Multiwall kraft	319,710	95.7	68.6	87.3	89.6	100.0	93.3	93.1
Paper	5,993	69.9	69.0	72.1	79.5	100.0	80.3	93.0
Paper/Wax	1,445	74.3	66.7	75.7	81.0	100.0	81.3	89.2
PC	720	73.7	79.2	87.5	76.9	100.0	85.0	99.5
PP	32,222	69.0	70.5	72.3	78.9	100.0	80.2	95.1
PP rafia	36,282	79.9	78.4	80.9	84.8	100.0	86.7	91.8
PS	23,303	65.2	66.3	64.6	71.4	100.0	75.9	87.4
PVC	43,892	72.4	73.7	75.3	79.1	100.0	81.8	94.8
Steel	147,530	80.7	77.5	92.5	84.3	100.0	88.2	100.1
Tin plate	441,466	82.2	83.3	86.2	88.4	100.0	89.0	98.0
Overall	2,372,397	80.9	77.9	82.0	84.3	100.0	86.5	94.1

Flexibles

Material	(tons)	1982	1983	1984	1985	1986	1987	1991
Al/Lac	3,625	72.1	75.5	73.4	78.6	100.0	81.7	95.7
Al/LDPE	1,074	70.3	66.0	68.0	76.8	100.0	79.0	92.3
Al/LDPE/Htmlt	444	52.1	57.2	59.1	68.7	100.0	70.3	91.7
Al/LDPE/Paper	588	86.5	88.5	71.0	69.1	100.0	82.6	84.9
Al/LDPE/PET	3	66.1	68.7	72.6	72.6	100.0	77.9	96.9
Al/Paper-full	589	78.4	76.5	75.7	86.7	100.0	85.3	89.3
Al/Paper-strip	6,267	78.4	76.5	75.7	86.7	100.0	85.3	89.3
Al/Paper/Htmlt	30	147.9	141.1	119.2	113.7	100.0	120.8	117.5
Al/Paper/LDPE	7,372	86.3	81.0	89.2	87.9	100.0	89.3	94.2
Al/Paper/Wax	5,136	85.6	88.9	85.5	85.9	100.0	90.3	95.6
Aluminium	219	82.8	80.7	85.3	92.3	100.0	89.8	99.2
Bagvac	25	77.9	84.5	77.7	87.9	100.0	86.9	98.0
Barrier bag	597	95.9	119.3	117.2	142.2	100.0	112.2	160.7
BOPP	3,428	79.7	78.2	76.7	86.7	100.0	86.0	89.5
BOPP met	231	82.8	80.7	85.3	92.3	100.0	89.8	99.2
BOPP met/LDPE	1,515	131.8	129.2	121.9	114.1	100.0	117.8	108.3
BOPP/LDPE	700	67.0	69.7	73.2	76.9	100.0	79.4	91.6

Material	(tons)	1982	1983	1984	1985	1986	1987	1991
BOPP/LDPE/BOPP	3,541	72.8	76.1	79.1	90.6	100.0	86.1	89.5
BOPP/PP	339	79.2	71.3	71.3	79.2	100.0	82.9	85.0
Cello	9,114	80.2	76.7	72.5	71.0	100.0	81.5	83.4
Cello/LDPE	4,861	100.7	95.4	93.6	92.9	100.0	97.1	96.8
Cello/LDPE/Al/Lac	1,202	72.4	76.5	80.0	93.2	100.0	86.9	90.4
Cello/LDPE/Al/LDPE	330	86.5	86.5	87.2	87.4	100.0	90.3	97.9
Cello/LDPE/Cello	1,977	72.4	76.5	80.0	93.2	100.0	86.9	90.4
Cello/LDPE/Lac	48	72.4	76.5	80.0	93.2	100.0	86.9	90.4
Cello/LDPE/PP	909	72.4	76.5	80.0	93.2	100.0	86.9	90.4
Cello/PP	439	78.6	71.8	72.1	80.5	100.0	83.3	85.5
Cello/PVDC/LDPE	11	104.8	100.6	107.1	122.0	100.0	106.9	109.3
Cellulose	64	81.9	84.9	77.6	84.2	100.0	86.3	100.3
Cryovac	589	87.5	89.5	89.3	95.0	100.0	92.9	99.0
HDPE/LDPE/HDPE	61	72.9	77.2	78.9	85.9	100.0	83.7	109.2
Lac/Coated/Hmalt	3,157	82.2	82.2	82.2	91.9	100.0	89.0	98.5
LDPE/PA6/LDPE	10	72.9	77.2	78.9	85.9	100.0	83.7	109.2
LDPE/PAPER/LDPE	10	76.8	74.4	76.0	80.0	100.0	83.9	80.7
PA11	208	79.3	79.2	74.7	84.7	100.0	84.6	101.1
PA6	892	72.4	68.1	69.2	77.9	100.0	80.1	93.3
PA6/LDPE	1,081	84.7	82.3	79.5	92.7	100.0	88.6	103.4
Paper met	2,402	78.0	76.4	75.8	86.7	100.0	85.3	89.3
Paper/Al/LDPE	36	50.0	54.8	62.9	63.0	100.0	68.6	93.2
Paper/Al/Wax	57	81.3	80.5	84.3	94.0	100.0	89.4	100.8
Paper/Lac	2,002	96.6	90.7	80.6	79.4	100.0	89.5	89.4
Paper/LDPE	1,402	82.9	82.7	83.2	86.4	100.0	86.4	92.5
Paper/LDPE/Al/LDPE	3,945	60.3	57.7	60.9	65.8	100.0	72.3	79.5
Paper/Wax	3,682	77.5	73.3	72.5	72.0	100.0	80.9	84.3
PET met/LDPE	722	128.5	126.1	119.4	111.8	100.0	115.7	107.9
PET/Al/LDPE	409	141.3	137.7	118.8	100.0	100.0	116.1	104.3
PET/LDPE	571	78.5	82.6	81.1	84.6	100.0	86.4	96.1
PET/LDPE/Al/LDPE	296	51.1	52.8	54.1	121.2	100.0	80.3	109.1
PET/PA6/LDPE	41	72.9	77.2	78.9	85.9	100.0	83.7	109.2
PET/PP	43	66.4	74.7	77.1	77.1	100.0	80.8	96.7
PET/PVDC	8	104.8	100.6	107.1	122.0	100.0	106.9	109.3
PP/PP	26	73.8	73.5	79.8	88.3	100.0	84.7	100.2
Tetra Brik	12,417	51.0	73.4	66.5	77.9	100.0	75.8	107.2
Overall	88,945	77.7	78.9	77.7	84.0	100.0	85.2	93.1

PACKAGING CONSUMPTION

Volume

Non Flexibles (tons)

Material	1982	1983	1984	1985	1986	1987	1991
Al/LDPE/HDPE/PS	3,937	3,884	3,609	3,450	4,434	3,897	3,963
Aluminium	9,668	9,572	10,271	10,737	13,713	11,053	12,822
Black plate	91,733	86,943	104,547	97,601	119,756	102,870	112,451
Coated paper	6,541	6,400	6,341	7,216	8,333	7,116	7,475
Duplex board	128,205	123,970	126,739	133,744	162,904	137,817	149,220
E flute	43,423	39,230	41,327	44,637	55,176	45,741	49,824
Fibre	45,278	42,393	49,273	51,049	55,488	49,384	55,210
Glass	503,761	482,152	505,112	536,175	675,283	552,381	607,079
HDPE	14,220	14,045	1,687	15,368	19,453	15,893	17,030
HDPE rafia	5,253	5,270	4,496	5,231	5,655	5,152	5,808
HDPE/LDPE	2,683	2,672	2,781	2,819	3,400	2,917	3,267
LDPE	149.425	138,610	148,926	151,755	166,398	152,254	167,896
LDPE/HDPE	5,857	5,649	6,390	6,567	7,717	6,552	7,509
MG Paper	14,353	14,741	14,892	15,064	21,551	16,594	18,857
Multiwall kraft	305,962	283,263	279,107	286,460	319,710	298,289	297,650
Paper	4,190	4,135	4,322	4,765	5,994	4,813	5,574
PC	531	570	630	554	720	612	716
PP	22,125	22,606	23,183	25,299	32,222	25,716	30,494
PP rafia	28,989	28,445	29,352	30,767	36,282	31,456	33,307
PS	15,194	15,450	15,054	16,638	23,303	17,687	20,367
PVC	31,778	32,348	33,051	34,718	43,892	35,904	41,610
Steel	119,057	114,336	136,465	124,368	147,550	130,121	147,678
Tin plate	362,869	367,724	380,526	390,238	441,446	392,887	432,617
Overall	1,915,032	1,844,408	1,941,081	1,995,220	2,372,397	2,047,106	2,229,232

Flexibles (tons)

Material	1982	1983	1984	1985	1986	1987	1991
Al/Lac	2,614	2,737	2,661	2,849	3,625	2,962	3,469
Al/LDPE	755	709	730	825	1,074	848	991
Al/LDPE/Htslt	231	254	262	305	444	312	407
Al/LDPE/Paper	509	520	417	406	588	486	499
Al/LDPE/PET	2	2	2	2	3	2	3
Al/Paper-full	462	450	446	511	589	502	526
Al/Paper-strip	4,913	4,794	4,744	5,433	6,267	5,346	5,596
Al/Paper/Htslt	44	42	36	34	30	36	35
Al/Paper/LDPE	6,362	5,971	6,576	6,480	7,372	6,583	6,207
Al/Paper/Wax	4,396	4,566	4,391	4,412	5,136	4,638	4,910

Material	1982	1983	1984	1985	1986	1967	1991
Aluminium	181	177	187	202	219	197	212
Bagvac	19	21	19	22	25	22	24
Barrier bag	572	425	700	849	597	670	959
BOPP	2,732	2,600	2,629	2,972	3,428	2,948	3,068
BOPP met	191	186	197	213	231	207	229
BOPP met/LDPE	1,997	2,965	1,846	1,728	1,515	1,784	2,486
BOPP/LDPE	469	488	512	538	700	556	641
BOPP/LDPE/BOPP	2,578	2,695	2,801	3,208	3,541	3,049	3,169
BOPP/PP	268	242	242	268	339	281	288
Cello	7,309	6,990	6,608	6,471	9,114	7,428	7,601
Cello/LDPE	4,895	4,637	4,550	4,516	4,861	4,720	4,705
Cello/LDPE/Al/Lac	870	920	962	1,120	1,202	1,044	1,087
Cello/LDPE/Al/LDPE	285	285	288	288	330	298	323
Cello/LDPE/Cello	1,431	1,512	1,582	1,842	1,977	1,718	1,787
Cello/LDPE/Lac	35	37	38	45	48	42	43
Cello/LDPE/PP	658	695	727	847	909	798	822
Cello/PP	345	315	316	353	439	366	375
Cello/PVDC/LDPE	12	11	12	13	11	12	12
Cellulose	52	54	50	54	64	55	64
Cryovac	515	527	526	560	589	547	583
HDPE/LDPE/HDPE	44	47	48	52	61	51	67
Lac/Coated/Htmlt	2,595	2,595	2,595	2,901	3,157	2,810	3,110
LDPE/PA6/LDPE	7	8	8	9	10	8	11
LDPE/PAPER/LDPE	8	7	8	8	10	8	8
PA11	165	165	155	176	208	176	210
PA6	646	607	617	695	892	714	832
PA6/LDPE	916	890	859	1,002	1,081	958	1,118
Paper met	1,873	1,835	1,821	2,082	2,402	2,049	2,145
Paper/Al/LDPE	18	20	23	23	36	25	33
Paper/Al/Wax	46	46	48	54	57	51	57
Paper/Lac	1,934	1,816	1,614	1,590	2,002	1,792	1,790
Paper/LDPE	1,162	1,159	1,166	1,211	1,402	1,239	1,297
Paper/LDPE/Al/LDPE	2,379	2,276	2,402	2,596	3,945	2,852	3,136
Paper/Wax	3,008	2,846	2,814	2,795	3,882	3,140	3,272
PET met/LDPE	928	910	862	807	722	835	779
PET/Al/LDPE	578	563	486	409	409	475	426
PET/LDPE	448	472	463	483	571	493	549
PET/LDPE/Al/LDPE	151	156	160	359	296	238	323
PET/PA6/LDPE	30	32	32	35	41	34	45
PET/PP	28	32	30	30	43	35	42
PET/PVDC	8	8	8	10	8	8	9
PP/PP	19	19	21	23	26	22	26
Tetra Brik	6,333	9,114	8,257	9,673	12,417	9,412	13,311
Overall	69,026	71,530	69,554	74,389	88,945	75,874	83,717

CONVERTED PRODUCTS VALUE

(US$ 10⁶)	1982	1984	1986	1987	1991
Plastic packaging					
LDPE	480	349	261	239	263
HDPE	72	92	57	47	54
PS	54	41	66	50	58
PVC	135	158	69	56	65
PP	160	246	142	113	131
Others (1)	16	16	10	8	9
Total	917	902	605	513	580
Paper based packaging					
Multiwall sacks	145	138	264	246	246
Other paper	100	108	24	18	21
Total	245	246	288	264	267
Fibreboard packaging	465	476	609	542	606
Paperboard packaging	310	324	225	189	206
Flexible packaging	255	244	314	268	292
Metal packaging					
Aluminium	240	240	144	116	135
Steel (tin plate)	880	631	729	649	714
Steel drums	157	129	139	122	139
Total	1277	1000	1012	887	988
Glass packaging	290	300	324	265	291
Total	3759	3492	3397	2928	3232

ECONOMIC OVERVIEW AND PROSPECTS

THE NATION

Brazil, with an area of 8.5 million square kilometres, is the fifth largest country in the world. The nation comprises of 22 states, 3 territories and the Federal District. The country extends from the Equator in the north to latitude 30' in the south.

The country is divided into 5 regions:

North
North-East
South-East
South
Central-West

North		North-East		South-East	
Amazonas	AM	Maranhao	MA	Minas Gerais	MG
Para	PA	Ceara	CE	Espirito Santo	ES
Rondonia	RO	Piaui	PI	Sao Paulo	SP
Acre	AC	Rio Grande do Norte	RN	Rio de Janeiro	RJ
Roraima	RR	Paraiba	PB		
Amapa	AP	Pernambuco	PE		
		Alagoas	AL		
		Sergipe	SE		
		Bahia	BA		

Central-West		South	
Mato Grosso	MT	Parana	PR
Mato Grosso do Sul	MS	Santa Catarina	SC
Goias	GO	Rio Grande do Sul	RS
Distrito Federal	DF		

The most economically important region is the South-East where 43% of the total population live and most of the industry is concentrated.

In 1986 the population was estimated at 137.2 million, 72% of which live in towns and cities. The total population is expected to grow by 10% up to 1991, while the urban population will grow by 22%.

Another aspect of Brazil's population, which bears on the purchase of added value products, is the number of economically active people.

The 1985 estimates showed that of the economically active population of 55.0 million, 66% were men. The breakdown of annual income was:

Less than US$ 600	41%
US$ 600-1,200	23%
US$ 1,200-1,700	11%
US$ 1,700-3,000	11%
US$ 3,000-6,000	8%
Over US$ 6,000	5%

The average annual salary for the population over 10 years of age in 1985 was:

	Economically active population
Urban	US$ 1,857
Rural	US$ 655
Overall	US$ 1,521

The income was divided:

	Economically active population	Total population
Urban	88%	73%
Rural	12%	27%

From these figures it can be inferred that 88% of national spending power is concentrated in the urban areas.

Other indications of the economy are (1985):

	million	urban	rural
Total families	32	75%	25%
Total houses	30.3	76%	24%

The percentage of houses with the following:

	Urban	Rural
Telephone	18%	1%
Electric power	95%	39%
Radio	79%	68%
Refrigerator	75%	25%
Television	73%	15%
Car	28%	9%

Analysis of Income by Occupation

US$/Year	<600	600 /1,200	1,200 /3,000	3,000 /6,000	>6,000	Total
Farming/fishing	19.6%	5.6%	2.7%	0.8%	0.4%	29.1%
Industry	3.5%	4.2%	5.3%	2.1%	1.2%	16.3%
Construction	1.4%	2.3%	1.7%	0.3%	0.1%	5.8%
Commerce	3.5%	2.8%	2.8%	1.1%	0.6%	10.8%
Transport/Commun.	0.4%	0.7%	1.6%	0.6%	0.3%	3.6%
Services	10.3%	3.2%	2.2%	0.7%	0.2%	16.6%
Social work	2.0%	2.0%	2.7%	0.9%	0.6%	8.2%
Government service	0.8%	0.8%	1.5%	0.7%	0.5%	4.3%
Other	0.4%	0.5%	1.2%	0.6%	0.6%	3.3%
Total	41.9%	22.1%	21.7%	7.8%	4.5%	100.0%

THE ECONOMY

Brazil ranks eighth in the non COMECON world economies in terms of GDP at US$ 264,500 millions.

Growth rates over the past six years have been very variable:

1980	+9.1%
1981	-3.4%
1982	+2.5%
1983	-3.2%
1984	+5.7%
1985	+8.3%
1986	+8.3%

Despite the recovery in 1984-1985 many industrial sectors have not returned to the level of 1980.

Industrial production increased by only 22% in the period 1980-1986 while the population grew some 18%.

The Brazilian economy is facing fundamental problems:

* monetary and fiscal reform
* excessive external debt, estimated at approximately US$ 100,000 million which adversely affects the balance of payments by US$ 9-10,000 million in interest payments
* excessive internal debt, particularly in the public sector but also affecting the private sector
* price/wage spiral
* scarcity of many goods
* external restraints due to falling exchange reserves, trade deficits and moratorium

In an attempt to reduce the level of inflation the Federal Government adopted a policy of freezing prices, salaries and exchange rates which appears to have produced satisfactory results in March and April 1986 when inflation was near zero. The indexation of the economy has been practically eliminated, but returned in the first months of 1987.

In 1986, Brazil achieved a negative balance of payments, but the trade balance was a positive US$ 12,440 million. For 1987 the expectation is a positive trade balance of US$ 8,000 million.

Selected indicators of the balance of payments:

	1982	1983	1984	1985	1986
Exports	20,213	21,900	27,005	25,639	22,393
Imports	19,396	15,428	13,937	13,189	12,866
Trade Balance	+817	+6,472	+13,068	+12,470	+9,527

The average urban income measured by the industrial income index grew in real terms in 1986 which suggests a real increase in income for the urban population.

Principal economic indicators:

	1982	1983	1984	1985	1986
Population (millions)	124.5	127.6	130.7	134.0	137.3
GDP (US$ billions)	203.1	204.7	211.0	221.6	264.5
GDP variation (%)	+0.9	-2.5	+5.7	+8.3	8.3
Sectorial variation (%)					
Primary	-2.5	-2.2	+4.3	+8.8	-5.0
Industry	+1.2	-7.0	+6.0	+8.4	+12.0
Services	+2.6	-2.4	+3.6	+7.7	+8.3
Per capita income US$	2,156	1,608	1,645	1,663	1,926
Minimum wage US$/month	90	60	55	67	58
Inflation (%)	99.7	211.0	223.8	235.0	65.0
Consumer prices (%)	97.9	172.9	208.9	233.6	75.5
Exchange rate Cr$/US$	251.4	979.0	1.845.3	6.205.0	13.84

Industrial production indicators:

	1982	1983	1984	1985	1986
Crude oil (m3 000)	15,082	19,140	26,832	31,709	33,201
Steel (tons 000)	12,924	14,603	18,306	20,356	21,240
Vehicles (units 000)	860	896	865	966	1,056
Fridges (units 000)	1,750	1,675	1,597	1,689	1,963
TV's (units 000)	2,447	1,838	1,820	2,124	2,905

COST/PRICE ANALYSIS

General

The basis for establishing the unit packaging cost and unit retail price is explained in the section on METHODOLOGY.

Glossary

Estimated total market	- in tons or 10^3 (thousands) of litres, refers to all types of packaging whether the unit packaging cost or unit retail price were identified or not
Percentage identified	- similarly refers to all types of packaging
Material	- refers to the packaging material from which the packaging is made
Packtype	- describes the type of packaging
Contents	- refers to the size of the packaging
Units	- grammes (gm) or millilitres (ml)
Units(m)	- millions of unts of packaging
Tons	- tons of packaging material
Product	- refers tp packaged products
Tons	- tons of packaged product
%	- refers to the percentrage that the particular packaged product represents of the total estimated market
Unit Price	- unit retail price of the packtype/contents in US$ based on the SUNAB price list at November 1986 converted to US$ at the rate of exchange at the end of November 1986
Unit Cost	- unit cost of packaging in US$ converted at the exchange rate at the time of data collection
Cost/Price %	- relationship between unit packaging cost and unit retail price expressed as a percentage

In addition the following factors have to be taken into account:

Returnable bottles	- these are reused 75 - 85 times depending on the size and the effective packaging cost has to be consideredin relation to this
Cheap products	- distortions may occur due to packaging costs not being passed on in the retail price, consequently many of these products were temporarily withdrawn from the market

FOOD AND DRINK

Aguardente estimated total market: 1,300,000 x 10^3 litres 26.4% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10^3 litres	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Returnable bottles	1000 ml	56.3	33,052	625,250	48.1	1.174	0.170	14.5

Bacon estimated total market: 2,670 tons 95.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Cryovac	Bags/pouches	1000 gm	0.1	0	53	2.0	4.004	0.069	1.7
PA6/LDPE	Trays	300 gm	0.3	1	95	3.5	1.297	0.031	2.4

Butter estimated total market: 49,905 tons 23.9% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	400 gm	0.1	9	50	0.1	2.809	0.125	4.5
		500 gm	3.7	343	1,846	3.7	4.142	0.100	2.4
		1000 gm	0.7	103	708	1.4	2.551	0.133	5.2
	Total Cans		4.5	454	2,604	5.2	3.167	0.119	3.8

Canned feijoada estimated total market: 14,753 tons 70.1% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	410 gm	3.1	3	1,276	8.6	0.588	0.076	12.9
		500 gm	10.0	1,953	4,995	33.9	0.588	0.069	11.7
		830 gm	1.1	1	919	6.2	0.985	0.100	10.2
	Total Cans		14.2	1,957	7,190	48.7	0.721	0.082	11.3

Canned fruit estimated total market: 14,864 tons 46.4% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	450 gm	30.4	3,885	13,658	91.9	1.354	0.123	9.1
		500 gm	1.7	220	861	5.8	1.042	0 100	9.6
	Total Cans		32.1	4,105	14,519	97.7	1.198	0.112	9.3

Canned meat estimated total market: 29,176 tons 97.1% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	320 gm	49.2	3,607	15,754	54.0	0.752	0.138	18.4

Canned pate estimated total market: 5,583 tons 50.5% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	140 gm	12.7	549	1,777	31.8	0.360	0.057	15.8

Canned sardines estimated total market: 44,346 tons 50.5% identified.

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	250 gm	21.8	1,255	5,446	12.3	0.708	0.076	10.7

Canned sausages estimated total market: 30,807 tons 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	180 gm	90.4	5,397	16,272	52.8	0.420	0.065	15.5
		250 gm	43.0	3,234	10,753	34.9	0.400	0.076	19.0
		500 gm	7.5	1,015	3,740	12.1	0.631	0.098	15.6
	Total Cans		140.9	9,647	30,765	99.9	0.484	0.080	16.5

Canned vegetables estimated total market: 38,000 tons 81.4% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Glass jars	500 gm	1.0	418	522	1.4	2.207	0.110	5.0
Tin plate	Cans	450 gm	0.5	63	221	0.6	0.598	0.123	20.6
		500 gm	10.7	1,372	5,359	14.1	0.641	0.100	15.6
	Total Cans		11.2	1,435	5,580	14.7	0.620	0.112	18.0

Caramelized milk estimated total market 24,300 tons 2.7% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Tumblers	250 gm	53.3	10,497	13,321	54.8	0.677	0.070	10.3
Tin plate	Cans	400 gm	2.9	211	1,164	4.8	0.250	0.125	50.1*

* price distortion

Carbonated beverages estimated total market: 4,950,000 x 10³ litres 92.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10³ litres	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Returnable bottles	290 ml	226.4	94,733	2,989,617	60.4	0.143	0.089	62.1(1)
		1000 ml	31.3	30,861	1,332,280	26.9	0.343	0.132	38.4(2)
	Total Returnable bottles		257.7	125,594	4,321,897	87.3	0.243	0.110	45.4

1.used for c.85 trips 2.used for c.75 trips

Cheese spread estimated total market: 14,931 tons 72.6% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Tumblers	250 gm	36.4	7,075	9,092	60.9	0.875	0.070	8.0
PP	Pots	200 gm	0.4	4	86	0.6	0.044	0.018	40.5

Concentrated juice estimated total market: 20,000 x 10³ litres 37.7% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10³ litres	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	500 ml	3.4	282	1,680	8.4	1.630	0.100	6.1
		1000 ml	15.6	1,916	15,560	77.8	3.189	0.133	4.2
	Total Cans		18.9	2,198	17,240	86.2	2.410	0.117	4.8

Corned beef estimated total market: 94,832 tons 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	340 gm	208.9	15,606	71,029	74.9	0.735	0.138	18.8
		2720 gm	8.0	2,277	21,821	23.0	2.792	0.257	9.2
	Total Cans		216.9	17,882	92,850	97.9	1.764	0.198	11.2

Defatted milk estimated total market: 6,000 tons 70.3% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Duplex board	Folding cartons	300 gm	13.9	293	4,180	69.7	0.985	0.058	5.9
		400 gm	4.5	105	1,820	30.3	1.281	0.037	2.9
	Total Folding cartons		18.5	397	6,000	100.0	1.133	0.048	4.2

Drinking chocolate estimated total market: 60,000 tons 79.7% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Duplex board	Folding cartons	200 gm	1.6	33	319	0.5	0.390	0.058	14.9
		500 gm	0.2	4	80	0.1	0.141	0.083	58.9*
	Total Folding cartons		1.8	37	398	0.7	0.265	0.071	26.[illegible]
Tin plate	Cans	500 gm	69.2	8,182	34,611	57.7	0.862	0.100	11.6
		1000 gm	6.1	1,202	6,148	10.2	1.197	0.133	11.1
	Total Cans		75.4	9,384	40,759	67.9	1.030	0.117	11.3

* price distortion

Flour estimated total market: 7,200,000 tons 20.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Multiwall kraft	Bags/pouches	1000 gm	590.6	6,083	590,622	8.2	0.201	0.010	5.0

Fruit juice estimated total market: 47,143 x 10^3 litres 88.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
Glass	Bottles	500 ml	106.8	36,634	53,407	113.3	0.815	0.057	7.0
		900 ml	0.1	68	102	0.2	1.417	0.215	15.2
	Total Bottles		106.9	36,702	53,509	113.5	1.116	0.136	12.2

Ground coffee estimated total market: 245,440 tons 21.2% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
BOPP met/LDPE	Bags/pouches	250 gm	123.7	664	30,928	12.6	1.636	0.025	1.5
		500 gm	81.7	639	40,834	16.6	3.261	0.036	1.1
	Total Bags/pouches		205.4	1,304	71,762	29.2	2.449	0.031	1.2
LDPE	Bags/pouches	5000 gm	2.1	62	10,361	4.2	32.651	0.071	0.2
Multiwall kraft	Bags/pouches	5000 gm	3.7	56	18,508	7.5	32.651	0.043	0.1

Ham . estimated total market: 28,522 tons 74.5% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Barrier bag	Bags/pouches	1000 gm	0.3	2	322	1.1	4.819	0.117	2.4
Cryovac	Bags/pouches	1000 gm	0.7	4	671	2.4	4.978	0.069	1.4
		3000 gm	3.3	34	9,804	34.4	14.856	0.146	1.0
		4000 gm	0.1	2	591	2.1	19.777	0.501	2.6
	Total Bags/pouches		4.1	40	11,066	38.8	13.037	0.239	1.8
PA6/LDPE	Bags/pouches	3000 gm	1.3	19	4,026	14.1	14.456	0.154	1.1

Ham 2nd quality estimated total market: 24,895 tons 94.6% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Cryovac	Bags/pouches	3000 gm	0.2	2	495	2.0	9.249	0.146	1.6
PA6	Bags/pouches	3000 gm	1.4	16	4,167	16.7	8.930	0.156	1.7
PA6/LDPE	Bags/pouches	3000 gm	1.1	12	3,184	12.8	8.533	0.154	1.8

Hard margarine estimated total market: 73,000 tons 99.8% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Al/Paper/Wtslt	Wrappers	250 gm	9.0	24	2,255	3.1	0.234	0.014	6.0
PP	Pots/lids	250 gm	91.4	915	22,841	31.3	0.241	0.031	12.9
		500 gm	33.8	598	16,893	23.1	0.474	0.054	11.4
	Total Pots/lids		125.2	1,512	39,738	54.4	0.357	0.043	11.9
PVC	Pots/lids	250 gm	13.0	133	3,260	4.5	0.241	0.040	16.6
		500 gm	1.3	24	651	0.9	0.471	0.076	16.2
	Total Pots/lids		14.3	158	3,911	5.4	0.356	0.058	16.3
Tin plate	Cans	500 gm	0.9	117	452	0.6	0.475	0.100	21.1

Ice cream estimated total market: 125,000 x 10^3 litres 73.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10^3 litres	%	Unit Price	Unit Cost	Cost/ Price %
Duplex board	Folding cartons	500 ml	14.7	284	7,341	5.9	0.855	0.083	9.7
		1000 ml	3.1	125	3,095	2.5	1.709	0.079	4.6
	Total Folding cartons		17.8	409	10,437	8.3	1.282	0.081	6.3
PP	Pots	200 ml	0.1	1	27	0.0	0.342	0.018	5.3

Linguica sausages estimated total market: 86,230 tons 63.6% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Barrier bag	Bags/pouches	500 gm	0.3	1	126	0.1	1.612	0.084	5.2
		1000 gm	0.2	1	203	0.2	3.225	0.117	3.6
	Total Bags/pouches		0.5	3	328	0.4	2.418	0.101	4.2
Cryovac	Bags/pouches	1000 gm	0.8	6	773	0.9	3.225	0.069	2.1
		3000 gm	0.5	4	1,584	1.8	10.418	0.146	1.4
	Total Bags/pouches		1.3	11	2,357	2.7	6.821	0.108	1.6
LDPE	Bags/pouches	5000 gm	6.4	206	31,941	37.0	11.871	0.071	0.6
PA6/LDPE	Bags/pouches	3000 gm	1.1	13	3,394	3.9	10.418	0.154	1.5
		5000 gm	0.0	2	196	0.2	12.757	0.342	2.7
	Total Bags/pouches		1.2	14	3,591	4.2	11.588	0.248	2.1
	Trays	300 gm	0.5	2	151	0.2	1.031	0.031	3.0
		350 gm	6.3	35	2,200	2.6	0.926	0.031	3.3
	Total Trays		6.8	36	2,351	2.7	0.979	0.031	3.2
Total PA6/LDPE			8.0	51	5,942	6.9	6.283	0.140	2.2

Low fat margarine estimated total market: 51,940 tons 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
PP	Pots/lids	250 gm	112.2	1,111	28,045	54.0	0.228	0.031	13.6
		500 gm	47.8	848	23,895	46.0	0.413	0.054	13.1
	Total Pots/lids		160.0	1,959	51,940	100.0	0.321	0.043	13.3

Mayonnaise estimated total market: 59,876 tons 87.2% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Glass jars	500 gm	35.7	9,434	17,840	29.8	0.933	0.110	11.8
		1000 gm	6.5	3,087	6,491	10.8	1.771	0.167	9.4
	Total Glass jars		42.2	12,521	24,331	40.6	1.352	0.139	10.2
	Tumblers	250 gm	112.8	17,070	28,191	47.1	0.545	0.070	12.8
Total Glass			154.9	29,591	52,522	87.7	0.948	0.104	11.0
PP	Pots	250 gm	6.3	126	1,577	2.6	0.411	0.024	5.8
		500 gm	2.5	76	1,262	2.1	0.893	0.041	4.6
	Total Pots		8.8	202	2,839	4.7	0.652	0.033	5.0

Meat products estimated total market: 6,661 tons 58.9% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
PA6/LDPE	Bags/pouches	3000 gm	0.4	5	1,221	18.3	6.017	0.154	2.6

Milk powder estimated total market: 93,274 tons 88.2% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	400 gm	100.8	11,918	40,330	43.2	1.156	0.125	10.8
		1000 gm	2.9	570	2,914	3.1	2.250	0.133	5.9
	Total Cans		103.7	12,487	43,244	46.4	1.703	0.129	7.6

Minas cheese estimated total market: 3,559 tons 30.7% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Cryovac	Bags/pouches	1000 gm	0.2	2	230	6.5	3.685	0.069	1.9

Mineral water estimated total market: 700,000 x 10^3 litres 67.7% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10^3 litres	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Bottles	500 ml	0.8	412	19,052	2.7	0.069	0.057	82.5(1)
	Return bottles	1000 ml	0.0	3	253	0.0	0.138	0.170	123.0(2)
Total Glass			0.8	414	19,305	2.8	0.104	0.114	109.5
PP	Pots	200 ml	94.5	545	18,898	2.7	0.028	0.018	65.1(3)
PVC	Bottles	500 ml	29.5	687	14,766	2.1	0.069	0.079	114.4(3)

1. used for c.85 trips 2. used for c.75 trips 3. cheap product

Morcela sausages estimated total market: 1,348 tons 54.6% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Cryovac	Bags/pouches	300 gm	0.6	3	176	13.0	0.600	0.025	4.2
		1000 gm	0.3	2	293	21.7	1.999	0.069	3.5
	Total Bags/pouches		0.9	5	469	34.8	1.299	0.047	3.6

Mortadela sausages estimated total market: 81,538 tons 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
PA6/LDPE	Bags/pouches	5000 gm	0.4	17	2,245	2.8	12.048	0.342	2.8

Muzzarela cheese estimated total market: 40,058 tons 16.2% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Crywvac	Bags/pouches	1000 gm	1.4	10	1,436	3.6	3.047	0.069	2.3
		2000 gm	2.1	18	4,293	10.7	6.095	0.137	2.2
		3000 gm	8.3	91	24,802	61.9	9.142	0.146	1.6
		4000 gm	0.8	11	3,346	8.4	12.190	0.501	4.1
	Total Bags/pouches		12.7	130	33,877	84.6	7.619	0.213	2.8

Panettone estimated total market: 7,447 tons 67.8% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Duplex board	Folding cartons	500 gm	8.5	466	4,240	56.9	3.969	0.083	2.1
		1000 gm	2.5	231	2,544	34.2	7.016	0.079	1.1
	Total Folding cartons		11.0	697	6,783	91.1	5.493	0.081	1.5

Pasta estimated total market: 568,000 tons 60.2% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
LDPE	Bags/pouches	5000 gm	0.2	6	1,166	0.2	3.151	0.071	2.3
	Wrappers	500 gm	250.2	1,642	125,081	22.0	0.338	0.003	0.9
Total LDPE			250.4	1,648	126,245	22.2	1.744	0.037	2.1

Powdered cereals estimated total market: 108,331 tons 94.9% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Duplex board	Folding cartons	200 gm	120.1	2,341	24,013	22.2	0.119	0.058	48.7*
		500 gm	28.8	723	14,408	13.3	0.270	0.083	30.7*
		1000 gm	9.6	336	9,605	8.9	0.496	0.079	15.9
	Total Folding cartons		158.5	3,401	48,025	44.3	0.295	0.073	24.9
MG Paper	Bags/pouches	500 gm	70.6	5,669	35,282	32.6	0.492	0.038	7.7
Tin plate	Cans	400 gm	49.9	5,901	19,968	18.4	0.659	0.125	19.0
		500 gm	6.0	1,174	3,002	2.8	1.091	0.100	9.2
		1000 gm	2.1	402	2,054	1.9	0.984	0.133	13.5
	Total Cans		58.0	7,476	25,024	23.1	0.911	0.119	13.1

* cheap product

Prato cheese estimated total market: 49,202 tons 41.6% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Barrier bag	Bags/pouches	500 gm	0.5	2	240	0.5	1.843	0.084	4.6
		1000 gm	0.8	6	817	1.7	3.685	0.117	3.2
	Total Bags/pouches		1.3	8	1,053	2.2	2.764	0.101	3.6
Cryovac	Bags/pouches	1000 gm	4.7	32	4,707	9.6	3.679	0.069	1.9
		2000 gm	6.6	54	13,105	26.6	6.378	0.137	2.1
		3000 gm	3.4	38	10,133	20.6	9.568	0.146	1.5
		4000 gm	0.3	4	1,243	2.5	12.757	0.501	3.9
	Total Bags/pouches		14.9	128	29,186	59.3	8.096	0.213	2.6

Rice estimated total market: 5,355,327 tons 3.6% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
LDPE	Bags/pouches	5000 gm	191.7	4,045	958,585	17.[illegible]	2.126	0.071	3.3

Salt estimated total market: 423,000 tons 60.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Multiwall kraft	Multiwall sacks	30000 gm	7.2	1,576	214,970	50.8	4.805	0.128	2.7

Sausages estimated total market: 48,417 tons 60.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
Barrier bag	Bags/pouches	1000 gm	0.2	1	180	0.4	2.799	0.117	4.2
LDPE	Bags/pouches	5000 gm	4.8	144	23,904	49.5	11.552	0.071	0.6
PA6/LDPE	Bags/pouches	3000 gm	0.1	1	315	0.7	7.388	0.154	2.1
	Trays	350 gm	1.2	4	431	0.9	0.819	0.031	3.8
Total PA6/LDPE			1.3	5	746	1.5	4.103	0.093	2.3

Soft margarine estimated total market: 131,000 tons 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product tons	%	Unit Price	Unit Cost	Cost/ Price %
PP	Pots	250 gm	12.0	84	3,000	2.3	0.296	0.024	8.1
		500 gm	6.0	81	3,000	2.3	0.560	0.041	7.3
	Total Pots		18.0	165	6,000	4.6	0.428	0.033	7.6
	Pots/lids	250 gm	155.3	1,537	38,815	29.6	0.260	0.031	11.9
		500 gm	103.9	1,861	51,945	39.7	0.501	0.054	10.7
		1000 gm	18.7	605	18,700	14.3	0.955	0.089	9.3
	Total Pots/lids		277.8	4,003	109,460	83.6	0.572	0.058	10.1
Total PP			295.8	4,168	115,460	88.1	0.500	0.045	9.0
PVC	Pots/lids	250 gm	31.9	316	7,965	6.1	0.278	0.042	15.0
		500 gm	16.0	298	8,000	6.1	0.503	0.072	14.4
	Total Pots/lids		47.9	615	15,965	12.2	0.391	0.057	14.6

Spirits estimated total market: 171,200 x 10^3 litres 34.9% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 103 litres	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Bottles	500 ml	0.3	184	171	0.1	6.846	0.057	0.8
		700 ml	0.4	247	269	0.2	9.585	0.239	2.5
		750 ml	5.7	2,907	4,262	2.5	10.269	0.177	1.7
		900 ml	34.7	19,975	31,202	18.2	2.042	0.149	7.3
		980 ml	4.2	2,476	4,084	2.4	13.419	0.232	1.7
		1000 ml	63.2	35,423	63,216	36.9	16.757	0.232	1.4
	Total Bottles		108.5	61,212	103,224	60.3	9.820	0.181	1.8
	Returnable bottles	1000 ml	6.5	3,819	33,829	19.8	13.693	0.170	1.2
Total Glass			115.0	65,031	137,053	80.1	11.756	0.175	1.5

Sterilized cream estimated total market: 34,856 tons 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Tetra Brik	Tetra Brik	500 gm	18.0	355	9,000	25.8	0.908	0.086	9.5

Sugar estimated total market: 8,610,000 tons 26.9% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
LDPE	Bags/pouches	5000 gm	169.1	3,136	845,398	9.8	1.504	0.071	4.5
Multiwall kraft	Bags/pouches	1000 gm	2,845.7	24,671	2,845,682	33.1	0.325	0.010	3.1
		5000 gm	556.9	20,304	2,784,629	32.3	1.504	0.043	2.7
	Total Bags/pouches		3,402.6	44,975	5,630,311	65.4	0.955	0.027	2.8
	Multiwall sacks	30000 gm	5.4	1,163	160,823	1.9	9.504	0.128	1.3
Total Multiwall kraft			3,408.0	46,138	5,791,135	67.3	5.229	0.077	1.5

Sugar preserves estimated total market: 37,700 tons 93.2% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Duplex board	Folding cartons	500 gm	1.7	39	849	2.3	0.603	0.083	13.8
Tin plate	Cans	400 gm	3.3	224	1,301	3.4	0.549	0.125	22.8
		450 gm	3.7	255	1,666	4.4	0.543	0.123	22.7
	Total Cans		7.0	480	2,967	7.9	0.546	0.124	22.7

Tomato extract estimated total market: 98,000 tons 72.4% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	140 gm	162.1	5,957	22,700	23.2	0.243	0.062	25.5
		250 gm	5.2	232	1,291	1.3	0.414	0.076	18.4
	Total Cans		167.3	6,190	23,991	24.5	0.329	0.069	21.0

Tomato puree estimated total market: 38,000 tons 94.8% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Tetra Brik	Tetra Brik	500 gm	22.8	456	11,404	30.0	0.446	0.086	19.3

Tomato sauce estimated total market: 32,650 tons 30.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	400 gm	0.2	16	91	0.3	0.727	0.125	17.2

Vegetable oil estimated total market: 1,501,000 x 10^3 litres 89.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
Black plate	Cans	500 ml	16.9	1,438	8,427	0.6	1.131	0.090	8.0
		900 ml	916.5	116,568	824,808	55.0	0.928	0.114	12.3
	Total Cans		933.3	118,005	833,234	55.5	1.030	0.102	9.9
PVC	Bottles	500 ml	7.4	211	3,708	0.2	0.755	0.079	10.5
Steel	Recovered drums	200000 ml	0.0	0	4,120	0.3	301.959	10.407	3.4
	Steel drums	200000 ml	0.0	72	899	0.1	301.959	12.885	4.3
Total Steel			0.0	72	5,018	0.3	301.959	11.646	3.9
Tin plate	Cans	500 ml	19.7	1,541	9,831	0.7	1.683	0.100	5.9
		900 ml	396.2	47,578	356,544	23.3	1.497	0.189	12.6
	Total Cans		415.8	49,119	366,375	24.4	1.590	0.145	9.1

Vinegar estimated total market: 60,000 x 10^3 litres 52.3% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
Glass	Bottles	1000 ml	9.6	5,737	9,561	15.9	0.496	0.288	58.1*
PVC	Bottles	500 ml	21.6	691	10,804	18.0	0.252	0.079	31.4*
		750 ml	47.7	1,958	35,811	59.7	0.376	0.122	32.5
		1000 ml	2.9	141	2,868	4.8	0.496	0.165	33.3
	Total Bottles		72.2	2,790	49,483	82.5	0.374	0.122	32.6

* cheap product

Wine estimated total market: 45,000 x 10^3 litres 4.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
Glass	Bottles	720 ml	27.0	13,446	19,440	43.2	1.595	0.361	22.6*
		750 ml	32.0	16,960	24,000	53.3	5.448	0.171	3.1*
	Total Bottles		59.0	30,406	43,440	96.5	3.521	0.266	7.6

* varying qualities

Yoghourt estimated total market: 178,977 x 10^3 litres 90.6% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
HDPE	Bottles	750 gm	3.1	126	2,337	1.3	1.304	0.115	8.8

NON FOOD

Alcohol estimated total market: 56,600 x 10^3 litres 29.5% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10^3 litres	%	Unit Price	Unit Cost	Cost/ Price %
HDPE	Bottles	500 ml	3.8	120	1,916	3.4	0.384	0.075	19.5

Ammoniated liquids estimated total market: 34,816 x 10^3 litres 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10^3 litres	%	Unit Price	Unit Cost	Cost/ Price %
HDPE	Bottles	500 ml	37.5	1,484	18,760	53.9	1.100	0.075	6.8
		750 ml	8.7	442	6,503	18.7	1.452	0.115	7.9
	Total Bottles		46.2	1,926	25,263	72.6	1.276	0.095	7.4
PVC	Bottles	500 ml	3.0	138	1,500	4.3	1.244	0.079	6.4

Disinfectants estimated total market: 57,621 x 10^3 litres 83.1% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10^3 litres	%	Unit Price	Unit Cost	Cost/ Price %
Glass	Bottles	500 ml	40.4	14,618	20,223	35.1	0.464	0.057	12.3
		750 ml	6.0	3,009	4,514	7.8	0.801	0.177	22.1
	Total Bottles		46.5	17,627	24,737	42.9	0.633	0.117	18.5
HDPE	Bottles	500 ml	7.5	328	3,732	6.5	0.383	0.075	19.6
		750 ml	8.7	358	6,500	11.3	0.515	0.115	22.3
	Total Bottles		16.1	686	10,232	17.8	0.449	0.095	21.2
PVC	Bottles	500 ml	16.6	477	8,276	14.4	0.493	0.079	16.0
		750 ml	4.3	191	3,250	5.6	0.712	0.122	17.1
	Total Bottles		20.9	667	11,526	20.0	0.603	0.101	16.7

Floor polish estimated total market: 44,200 x 10^3 litres 98.3% identified

Material	Packtype	Contents	Est total packaging units(m)	tons	Product 10^3 litres	%	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Cans	450 gm	35.9	4,350	16,165	36.6	0.812	0.123	15.1
		500 gm	12.3	1,342	6,127	13.9	0.687	0.100	14.5
		900 ml	17.1	1,962	15,357	34.7	1.134	0.189	16.7
	Total Cans		65.2	7,654	37,649	85.2	0.878	0.137	15.6

Furniture polish estimated total market: 13,000 x 10^3 litres 84.3% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
PVC	Bottles	500 ml	1.1	50	534	4.1	1.010	0.079	7.8
Tin plate	Aerosols	300 ml	0.7	84	213	1.6	1.375	0.189	13.7
	Cans	500 ml	1.4	111	711	5.5	1.116	0.100	9.0
Total Tin plate			2.1	195	925	7.1	1.246	0.145	11.6

Insecticides estimated total market: 27,601 x 10^3 litres 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
Tin plate	Aerosols	300 ml	33.7	3,651	10,113	36.6	0.885	0.189	21.4
	Cans	450 ml	24.4	3,321	10,959	39.8	0.683	0.123	18.0
		500 ml	2.5	494	1,250	4.5	0.836	0.100	12.0
		900 ml	1.9	270	1,692	6.1	1.962	0.189	9.6
	Total Cans		28.8	4,065	13,922	50.4	1.160	0.137	11.8
Total Tin plate			62.5	7,736	24,032	87.1	1.023	0.163	16.0

Powder cleaners estimated total market: 16,030 tons 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
AL/Paper/Wax	Compcans	300 gm	23.2	1,253	6,960	43.4	0.155	0.026	16.8
		500 gm	11.7	901	5,850	36.5	0.227	0.036	15.9
	Total Compcans		34.9	2,154	12,810	79.9	0.191	0.031	16.3

Toilet soap estimated total market: 135,000 tons 88.2% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Lac/Coated/[illegible]	Wrappers	90 gm	953.4	2,094	85,809	63.6	0.194	0.009	4.6
		130 gm	341.4	962	44,777	33.2	0.2[illegible]	0.310	4.9
	Total Wrappers		1,297.9	3,055	130,586	96.7	0.198	0.010	4.8

Toilet water estimated total market: 16,300 x 10^3 litres 81.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
Glass	Small bottles	30 ml	0.3	18	9	0.1	0.409	0.021	5.1
		120 ml	12.7	1,597	1,520	9.3	1.690	0.030	1.8
	Total Small bottles		13.0	1,614	1,529	9.4	1.050	0.026	2.4

Washing powder estimated total market: 265,000 tons 100.0% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product tons	Product %	Unit Price	Unit Cost	Cost/ Price %
Duplex board	Folding cartons	300 gm	377.1	12,146	113,139	42.7	0.317	0.050	15.8
		600 gm	209.0	13,898	125,430	47.3	0.614	0.052	8.5
		1000 gm	25.7	2,330	25,677	9.7	1.017	0.079	7.8
	Total Folding cartons		611.9	28,373	264,246	99.7	0.649	0.060	9.3

Washing up liquid estimated total market: 166,000 x 10^3 litres 99.7% identified

Material	Packtype	Contents	Est total packaging units(m)	Est total packaging tons	Product 10^3 litres	Product %	Unit Price	Unit Cost	Cost/ Price %
PVC	Bottles	500 ml	169.6	4,570	84,811	51.1	0.279	0.079	28.3
		750 ml	33.7	1,328	25,297	15.2	0.419	0.122	29.1
	Total Bottles		203.4	5,898	110,108	66.3	0.349	0.101	28.8

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