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PLASTICS IN COLOMBIA^{1/}

ACOPLASTICOS

by

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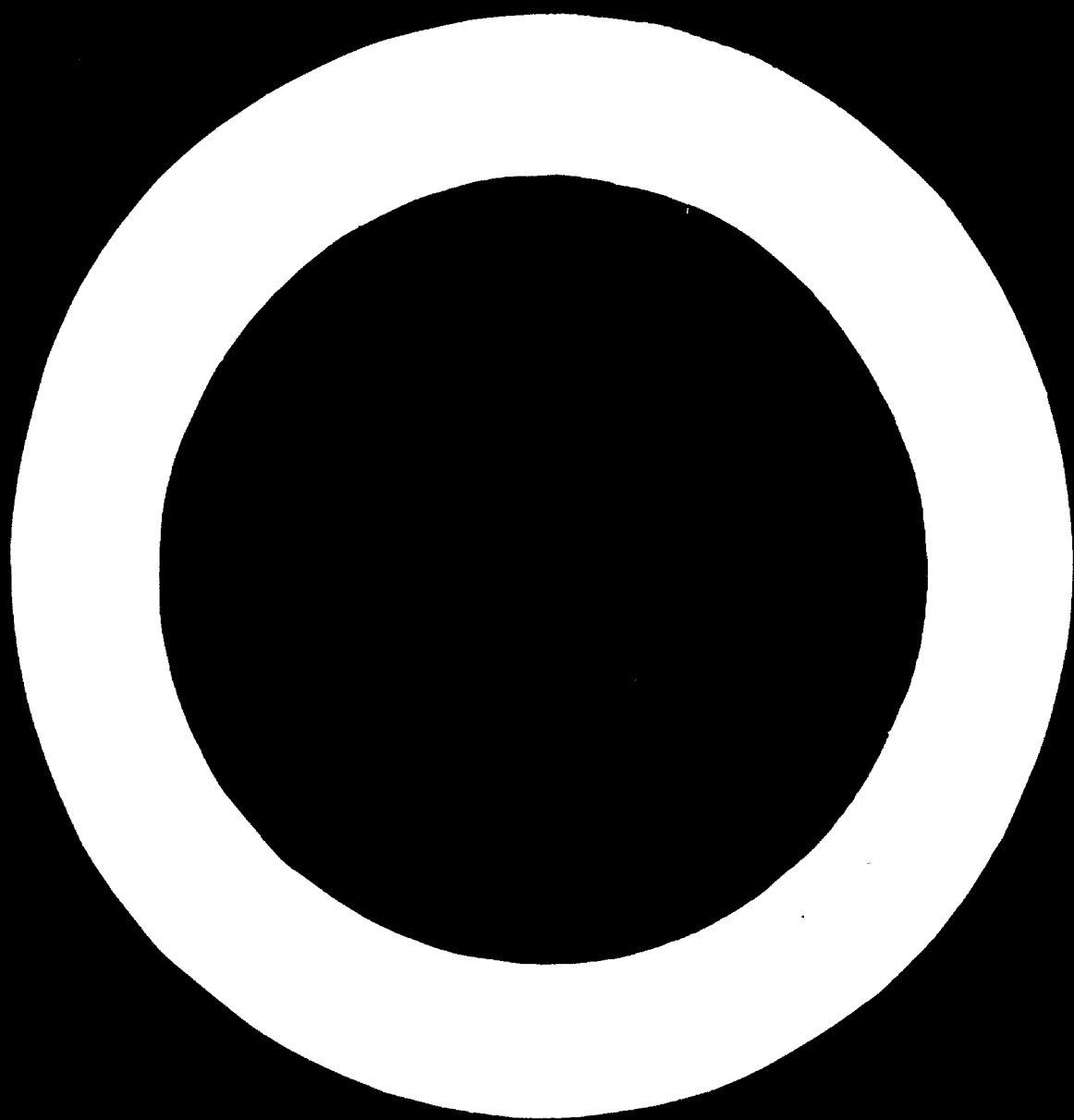
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^{1/} The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the secretariat of UNIDO.

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As is commonly known, an unprecedented international situation has arisen as a result of the energy crisis, some aspects of which go beyond production problems caused by a decrease in natural resources or the critical circumstances arising out of a demand exceeding supply capacity. Recently, in addition to the above, there have been phenomena of speculation and a reappearance of shortfalls in supply owing to demand for raw materials in the sector by purchasers opting for acquiring stocks of plastics materials with some durability in view of the great uncertainty in the parities of currencies in international capital markets.

The first consequence of this phenomenon was a shift in the prices of basic and raw materials to an extent which surpassed initial calculations. Increases in prices sometimes exceeded 1,000 per cent, and these were of course reflected in production costs and, in the end, in the final prices of products, with the result that sales of some declined owing to the impossibility of sustaining these high prices.

Of course, the general situation of price increases, irregular supply of raw materials and difficulty in obtaining these did not affect all countries equally. The production of the plants in Colombia, although affected by adverse circumstances, helped to mitigate the consequences of the world crisis.

In Colombia, there are plants producing low-density polyethylene, PVC suspension, polystyrene, polyester resin, urea and melamine formaldehyde and phthalic plasticizers. Of these raw materials, supplies were relatively normal only for polystyrene, polyester resin, urea and melamine formaldehyde and plasticizers. The others, as well as products not manufactured in the country, were at times unobtainable at any price.

The attempt was made in the country to adopt measures worked out jointly by the Government, producers of raw materials and processors to counteract the effects of the world situation and deficiencies in local production. It was sought to render existing machinery more flexible in order to facilitate imports and achieve an equitable distribution among processors of the resins whose domestic production is inadequate, in order to share out the advantages of purchasing them.]

Consumption of raw materials

A series of relative figures is given below showing the growth in consumption of the main raw materials over recent years. The data are the result of studies carried out jointly by the Colombian Plastics Association (ACOPLASTICOS) and the Plastics Sectoral Committee in the Colombian Ministry of Economic Development.

In some cases, the totals require adjustment because they are the result of a survey carried out among processing enterprises. Since the sample was fairly representative, the analyses concerning growth are in general valid for total consumption.

Low-density polyethylene

This thermoplastic resin is the most important one in terms of consumption in tonnes and the number of processing enterprises.

The percentage growth for the period 1971-1974 is as follows:

- 1972, as compared with 1971 - 56.3 per cent,
- 1973, as compared with 1972 - 27.6 per cent,
- 1974,* as compared with 1973 - 48.8 per cent.

If the estimate for 1974 is fulfilled, cumulative annual growth for the period 1970-1974 will be 20.8 per cent.

The figures on production for the period 1970-1973 reflect the situation in the only producing plant in Colombia, which it is hoped will increase its service factor in the future (table 1).

High-density polyethylene

The consumption of this raw material in the country is met in full by imported materials, since there is no production in Colombia. Consumption figures for the period 1970-1974 show one of the highest growth rates, primarily as a result of the development of new productions, such as the manufacture of plastic crates for packing beer and soft drink bottles.

The percentage growth for the period 1970-1974 is as follows:

- 1971, as compared with 1970 - 3.0 per cent,
- 1972, as compared with 1971 - 53.5 per cent,
- 1973, as compared with 1972 - 117.7 per cent,
- 1974,* as compared with 1973 - 117.5 per cent.

Polypropylene

Owing to the similarity of properties of this raw material and high-density polyethylene, there is a tendency to use it as an alternative for certain applications, but consumption of polypropylene is lower than that of polyethylene.

* Estimated data for 1974.

The percentage increases for the period in question are as follows:

- 1971, as compared with 1970 - 80.8 per cent,
- 1972, as compared with 1971 - 142.0 per cent,
- 1973, as compared with 1972 - 19.7 per cent,
- 1974,* as compared with 1973 - 29.7 per cent.

Polystyrene

In terms of the number of plants using this raw material, it is the second most widely used resin in Colombia. Almost all the amounts consumed are domestically produced.

It should be noted that the existing plant for the production of polystyrene (general-use and high-impact types) in Colombia recently started up an expansion raising its production capacity to 13,000 tonnes/year.

The percentage increases with respect to this resin for the period considered are as follows:

- 1971, as compared with 1970 - 32.2 per cent,
- 1972, as compared with 1971 - 63.2 per cent,
- 1973, as compared with 1972 - 17.5 per cent,
- 1974,* as compared with 1973 - 82.9 per cent.

PVC suspension

In terms of volume of consumption, this is the second most important thermoplastic resin. There are two producing plants in Colombia whose installed capacity could meet total domestic demand, but for various reasons it has been necessary to resort to imports.

The percentage increases in respect of this resin for the period considered are as follows:

- 1971, as compared with 1970 - 32.2 per cent,
- 1972, as compared with 1971 - 63.2 per cent,
- 1973, as compared with 1972 - 17.5 per cent,
- 1974,* as compared with 1973 - 82.9 per cent.

* Estimated data for 1974.

PVC emulsion

Total consumption of PVC emulsion in Colombia is met by imports.

The percentage increases for the period 1971-1974 are as follows:

1972, as compared with 1971 - 26.6 per cent,

1973, as compared with 1972 - 28.7 per cent,

1974, * as compared with 1973 - 8.4 per cent.

Phthalic plasticizers

This is an intermediate product which has undergone a growth similar to that of PVC resin.

The annual increase for the period considered is as follows:

1971, as compared with 1970 - 18.0 per cent,

1972, as compared with 1971 - 22.3 per cent,

1973, as compared with 1972 - 3.9 per cent,

1974, * as compared with 1973 - 50.4 per cent.

Polyester resins

The production of polyester resins in Colombia is satisfactory. This was one of the few raw materials for which regular supplies were maintained during the critical period.

Consumption in tonnes for the period 1970-1974 has increased from year to year. The increases are shown below:

1971, as compared with 1970 - 46.5 per cent,

1972, as compared with 1971 - 46.7 per cent,

1973, as compared with 1972 - 31.3 per cent,

1974, * as compared with 1973 - 14.1 per cent.

The percentage shares in total consumption of raw materials accounting as a group for approximately 88 per cent, 85 per cent and 87 per cent of consumption in the years 1970, 1972 and 1974, respectively, are given below:

* Estimated data for 1974.

	<u>1970</u>	<u>1972</u>	<u>1974*</u>
Low-density polyethylene	45.6	37.7	33.2
PVC suspension	19.8	19.6	21.0
Polystyrene	7.0	10.8	12.3
Phthalic plasticizers	12.3	12.8	10.8
High-density polyethylene	3.3	3.7	9.6
Total:	<u>88.0</u>	<u>84.6</u>	<u>86.9</u>

In general, consumption estimates for 1974 indicate expected increases for this year, as compared with 1973, which considerably exceed those in previous years, perhaps as a result of the anomalous supply situation.

DEVELOPMENT OF THE PROCESSING INDUSTRY

The number of processors has increased sharply from year to year, and this partly explains the dynamism of the sector and the annual increases in its consumption.

In terms of number of processing enterprises, the main raw materials, in order, are low-density polyethylene, polystyrene, PVC suspension, high-density polyethylene, phthalic plasticizers, polypropylene and polyester resins. However, there are plastics in respect of which the number of processing industries has not changed although consumption has increased sharply. Examples of these are PVC emulsion, phenolic resins and methyl methacrylate.

Lastly, it should be noted that some plastics which are not so important in terms of volume of consumption as those mentioned, are becoming very widespread. This is the case with ABS resins, cellulose acetate and nylon.

SHARES OF CITIES IN PLASTICS CONSUMPTION

The cities in Colombia in which the highest consumptions of plastics were concentrated in 1972, 1973 and 1974, with indication of the percentages of the total which they account for, are shown below:

* Estimated figures.

	<u>1972</u>	<u>1973</u>	<u>1974</u>
Bogotá	52.8	53.0	53.9
Medellín	29.5	24.6	19.3
Cali	4.4	7.0	8.3
Barranquilla	8.3	10.0	9.9
Cartagena	1.0	0.8	1.4
Bucarananga	-	-	0.2
Cúcuta	-	0.5	1.0
Armenia	0.1	0.2	0.1
Pereira	0.9	1.4	1.4
Manizales	3.0	2.5	4.5
Total:	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

The share accounted for by Bogotá exceeds 50 per cent of total plastics consumption in the country and shows an upward trend during the period under consideration. The share accounted for by the city of Medellín, on the other hand, shows a decrease in comparison with the total, in contrast with the increase in the share of the city of Cali (4.4 per cent 1972 and 8.3 per cent in 1974) and a stabilization in that of the city of Barranquilla at approximately 10 per cent of plastics consumption.

The other six cities considered account for a very small percentage of the total. Outstanding among these is the city of Manizales, which in 1974 accounts for approximately half as much consumption as the city of Barranquilla. The four main cities of the country together account for 95.0 per cent, 94.6 per cent and 91.4 per cent for the years 1972, 1973 and 1974, respectively. The concentrations of both consumption and number of enterprises are correlated with the number of inhabitants in the town.

PLASTICS CONSUMPTION, 1970-1974

The growth index for plastics consumption in the period 1970-1974 is as follows (base year = 1970):

<u>Year</u>	<u>Index</u>
1970	100.0
1971	97.6
1972	140.4
1973	173.7
*1974	286.2

* Estimated data.

The drop in 1971 is accounted for primarily by the consumption of low-density polyethylene, which declined considerably in that year. In this connexion, the larger imports in 1970 owing to the expectations raised by the starting up of the Polioolsa plant at Barrancabermeja are relevant.

The growth observed for total consumption of raw materials is as follows:

1971, as compared with 1970 - 15.5 per cent,^{*}
1972, as compared with 1971 - 43.8 per cent,
1973, as compared with 1972 - 23.8 per cent,
1974, as compared with 1973 - 64.8 per cent.

Furthermore, if the estimated figures for 1974 are realized, the sector will have doubled its consumption in the two years beginning in 1972. However, owing to the worldwide shortage of petrochemical materials for this sector and the restriction, both domestic and worldwide, in the supply of plastics, it is improbable that the sector will achieve the figures indicated.

PROJECTION OF TOTAL CONSUMPTION OF PLASTICS

If we assume a cumulative annual growth of approximately 20 per cent, the projection of total consumption for the period up to 1980, taking as the base year 1973, with a consumption of 60,000 tonnes, would be as follows:

1973	60,000 tonnes
1974	72,000 tonnes
1975	86,400 tonnes
1976	103,700 tonnes
1977	125,000 tonnes
1978	150,000 tonnes
1979	180,000 tonnes
1980	215,000 tonnes

USE OF PLASTICS IN AGRICULTURE

Colombia is a country in which the agricultural and stockbreeding sector accounts for 27 per cent of the Gross Domestic Product. This large share of domestic economic activity affords a wide scope for the development of plastics consumption in the sector.

In Colombia, plastics for use in agriculture have a wide range of applications, from packaging for the farmer's inputs to plastics to increase productivity and packaging for items produced by the sector. The use of plastics products, especially

* Excluding low-density polyethylene.

packagings, in connexion with products which are inputs for the agricultural and stock-breeding sector is constantly increasing owing to the resulting advantages to the producers of those inputs.

One of the major concerns is currently the search for new techniques to produce larger amounts of food to meet the increasing demand of a growing population. In some areas, a relatively concentrated use of the land for the production of agricultural products has been achieved, making it necessary to use machinery and instruments bringing about greater productivity, given the same area set aside for agriculture. In this process, the plastics sector plays a fundamental role, since with its production it has met the requirements laid down by technicians in charge of seeking new processes.

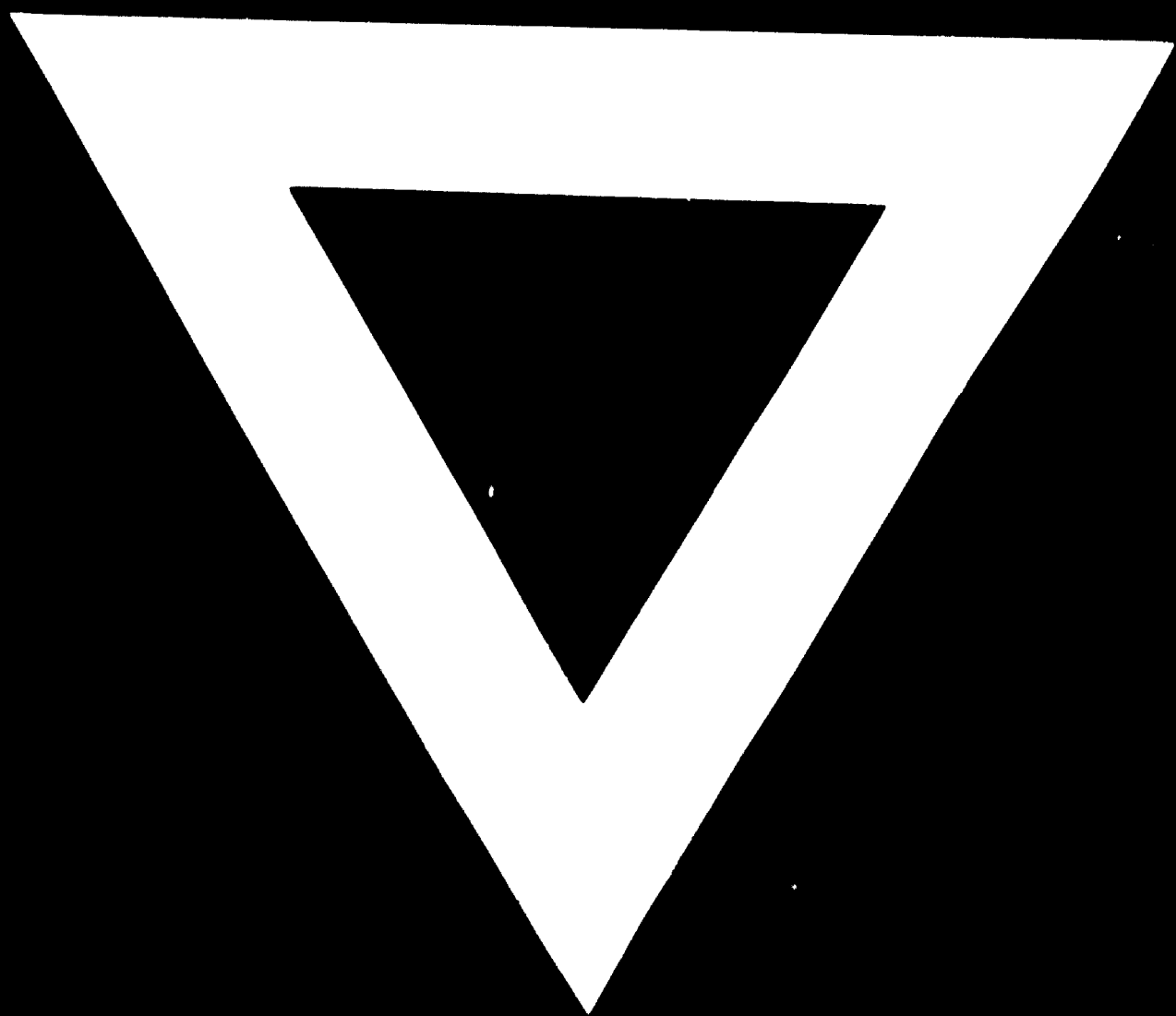
Climatic conditions and unseasonable changes in weather are a basic factor in the quality, timeliness and quantity of harvests. Thus, the wide variety of resins makes it possible to use them for the control of environmental conditions, irrigation, storage and transport.

Plastics products such as bags and sacks are being used in the country for packaging. The materials primarily being used are polyethylene and polypropylene. Bags are made of the former using the film, while a fibre of the latter produced by extrusion is used for manufacturing woven sacks.

There is a large consumption of PVC suspension for the manufacture of both rigid and flexible tubing, which is widely used in the agricultural sector. Recently, there have been increases in consumption of polyethylene and PVC film used for covering greenhouses. These increased consumptions are the result of the boom in the florist industry, which has expanded in Colombia owing to the advantages with respect to both climate and export costs enjoyed by flower cultivation.

Widespread use is being made in Colombia of polyethylene film for the cultivation of strawberries and vegetables. Plastic films are being used in the waterproofing of irrigation ditches and man-made wells.

Despite the wide range of possible uses of plastics in agriculture, consumption is still low in Colombia. In some cases, with the exception of those in which the use of plastics articles has spread to all types of farmers, their use is experimental. It is therefore desired to disseminate more information on technical uses and economically feasible possibilities for broader and better use of plastics in agriculture.



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