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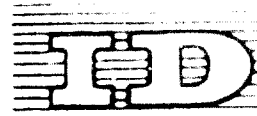
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COUNTRY STUDY REPORT

STATUS OF AGRICULTURAL MACHINERY INDUSTRY IN COLOMBIA<sup>1/</sup>

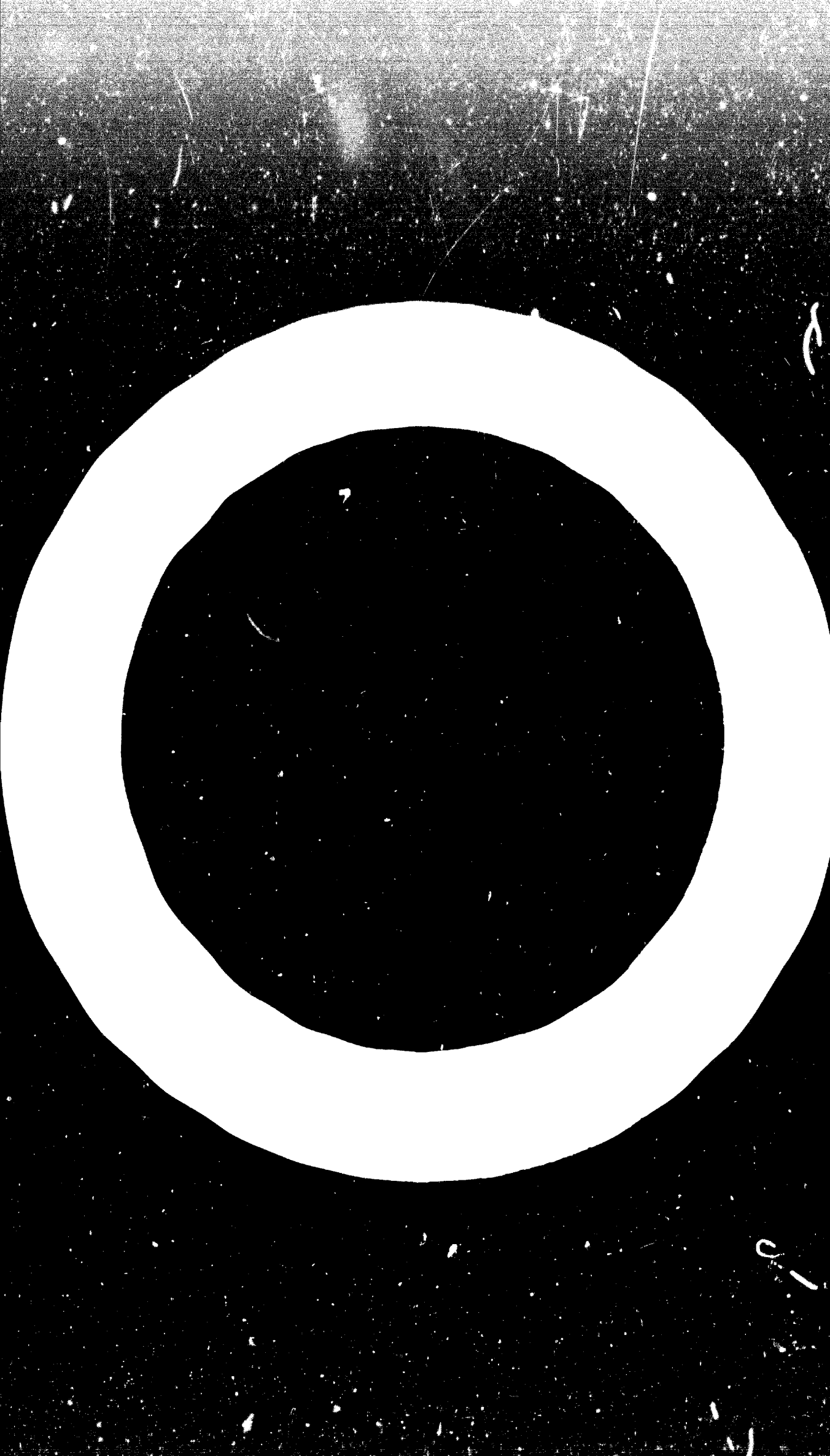
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## STATUS OF AGRICULTURE AND AGRICULTURAL MACHINERY INDUSTRY IN COLOMBIA

### I. GENERAL STATUS OF AGRICULTURE

#### A. Geographical position and characteristics of terrain

Colombia has an area of 1,131,914 km<sup>2</sup> and 17.5 million inhabitants. It is situated in the north-west of South America and has extensive coastal belts on the Atlantic and Pacific Oceans. Entering the country from the south, the great Cordillera of the Andes divides into three branches - the Eastern, Central and Western cordilleras - which give the country a somewhat irregular topography, with altitudes, and the corresponding temperature zones, varying from sea level to over 4,500 metres. The following classification of temperature zones gives an idea of the temperatures prevailing at the various altitudes:

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| From 0 to 1000 m above sea level    | 23°C and over (hot zone)             |
| From 1000 to 2000 m above sea level | 17.5°C to 23°C (warm temperate zone) |
| From 2000 to 3000 m above sea level | 12°C to 17.5°C (cool temperate zone) |
| Over 3000 m above sea level         | below 12°C (cold zone or "páramos")  |

The territory of Colombia may be divided into four types of terrain, namely:

- (a) the Atlantic and Pacific coastal plains,
- (b) the Andean mountain zone with its three cordilleras,
- (c) the Inter-Andean valleys, and
- (d) the Eastern plains (llanos).

For agricultural purposes, 28% of the soils can be regarded as mountain soils, and 72% plainland soils.

Studies carried out by various bodies in 1964 and covering an area of 690,000 km<sup>2</sup>, including the whole populated area of the country, showed that:

- (a) 9607 km<sup>2</sup>, or 1.4% of the area studied, are suitable for intensive agriculture and stockraising, with slopes of 0-3%, free from erosion, floods and salts harmful to plants.

- (b) 41,157 km<sup>2</sup>, or 6.0% of the area studied, consist of soils potentially suitable for agriculture and stockraising, with slopes of 0-3%, subject to occasional flooding, but not liable to erosion, and which need to be rendered fit for cultivation.
- (c) 72,235 km<sup>2</sup>, or 10.5% of the area studied, consist of soils potentially suitable for agriculture and stockraising, with slopes of 0-1%, not liable to erosion, with periodic flooding and salts harmful to plants, which must therefore be rendered fit for cultivation.
- (d) 156,670 km<sup>2</sup>, or 22.7% of the area studied, consist of soils liable to moderate erosion, with slopes of 1-25% and needing to be rendered fit for cultivation.
- (e) 160,765 km<sup>2</sup>, or 23.8% of the area studied, consist of soils liable to erosion, with slopes of 25-50%.
- (f) 205,362 km<sup>2</sup>, or 29.8% of the area studied, with slopes of over 50%, are liable to erosion and suitable for afforestation.
- (g) 15,462 km<sup>2</sup>, or 2.2% of the area studied, with slopes of over 60%, are liable to erosion and suitable only for afforestation.
- (h) Some 28,000 km<sup>2</sup>, or 4.1% of the area studied, consist of unproductive soils at heights of over 4000 m.

B. Land distribution by products

The following table shows the distribution of land by principal crops, production and yield per hectare in 1965:

PRINCIPAL CROPS: AREA SOWN, PRODUCTION  
AND YIELD IN 1945

| PRODUCT | HECTARES  | PROD. IN TONNES | YIELD kg/ha |
|---------|-----------|-----------------|-------------|
| Sesame  | 151,141   | 11,000          | 72          |
| Cotton  | 15,007    | 15,000          | 1,000       |
| Vetch   | 150,000   | 15,000          | 100         |
| Rice    | 150,000   | 15,000          | 1,000       |
| Barley  | 15,000    | 15,000          | 1,000       |
| Beans   | 15,000    | 15,000          | 1,000       |
| Maize   | 1,070,000 | 10,700,000      | 10,000      |
| Millet  | 1,000     | 10,000          | 1,000       |
| Copra   | 111,922   | 11,192,200      | 100,000     |
| Tobacco | 15,000    | 15,000          | 1,000       |
| Wheat   | 110,000   | 11,000,000      | 100,000     |
| Yucca   | 20,000    | 2,000,000       | 100,000     |
| TOTAL   | 2,555,510 |                 |             |

| PERMANENT CROPS |              |                |                      |             |
|-----------------|--------------|----------------|----------------------|-------------|
|                 | Area planted | Area harvested | Production in tonnes | Yield kg/ha |
| Bananas         | 70,125       | 41,247         | 10,222,475 bunches   | 772 bunches |
| Cocoa           | 44,100       | 4,770          | 9,272                | 267         |
| Coffee          | 901,161      | 900,229        | 451,600              | 509         |
| Sugar cane      | 401,100      | 301,121        | 12,720,453           | 41,727      |
| Plantains       | 355,541      | 301,120        | 201,317,167 bunches  | 354 bunches |
| TOTAL           | 1,842,027    | 1,611,230      |                      |             |

### C. Land distribution

In 1961, the Colombian Congress passed Act No. 125, dealing with Land Reform. The object of the Act was to revolutionize land tenure and to stimulate the mechanization of agriculture. It was intended, by its means, to redistribute the land more fairly and to bring into production vast hitherto unworked latifundia, which were classified into three main groups:

- (a) uncultivated land,
- (b) insufficiently cultivated land, and
- (c) land not included in either of the above groups.

The following table shows the forms of land tenure in Colombia in 1965:



| LAND TENURE                    | HECTARES   | %    |
|--------------------------------|------------|------|
| Private property               | 13,231,913 | 75.2 |
| Total area leased              | 1,752,121  | 8.1  |
| Against money rents            | 100,807    |      |
| With share-cropping            | 929,436    |      |
| Against provision of services  | 70,535     |      |
| Under other forms of agreement | 61,102     |      |
| Occupied without title deeds   | 2,061,001  | 9.6  |
| Other forms of tenure          | 263,951    | 1.9  |
| Mixed tenure                   | 1,510,007  | 6.7  |
| TOTAL                          | 24,229,712 | 100% |

D. Population and current agricultural practices

The following table shows the population changes which occurred between 1938, 1951 and 1960:

| LOCALITIES                                   | % OF TOTAL POPULATION |      |      |
|--|-----------------------|------|------|
|  | 1938                  | 1951 | 1960 |
| URBAN (over 20,000 inhabitants)              | 12.6                  | 22.5 | 32.6 |
| SEMI-URBAN (from 1500 to 19,999 inhabitants) | 16.3                  | 15.7 | 15.1 |
| RURAL (less than 1500 inhabitants)           | 70.9                  | 61.8 | 52.3 |
| TOTAL  | 100%                  | 100% | 100% |

From this table can be seen the movement of the rural population into urban areas, although large areas of the country are still unpopulated.

About 20 million hectares are used for agriculture and stockraising (4 million arable and 16 million of sown pasture-land). About 24% of the arable land is mechanized and the rest worked with oxen, mules or by hand.

11. MECHANIZATION OF AGRICULTURE

A. Stock of machines

There are estimated to be some 24,800 tractors in Colombia, of which about 2,000 are used in stockraising, 21,000 in agriculture and the rest for other purposes. Of this total, some 17,400 have been used for less than 10 years and the remainder for between 10 and 30 years.

Of the tractors used in agriculture, 78% are between 40 and 60 hp, 4% less than 40 hp, and 20% more than 60 hp.

The National Planning Office has estimated that, for every 100 tractors, there are some 66 ploughs, 59 harrows, 38 seed drills and 47 cultivators.

Mechanization is applied in the cultivation of cotton, maize, sesame and sugar cane.

B. Equipment used

We give below a list of the machines, implements and tools used in Colombia:

| AGRICULTURAL MACHINES AND TOOLS IN USE |               |           |
|--|---------------|-----------|
| MAKES OF TRACTOR                       | MAXIMUM POWER |           |
|  | Horsepower    | Kilowatts |
| Ford Dexta 2.000                       | 2.000         | 1.472     |
| Ford Super Dexta 3.000                 | 3.000         | 2.207     |
| Ford Major 4.000                       | 4.000         | 2.942     |
| Ford Super Major                       | 4.000         | 2.942     |
| Oliver 550                             | 550 H.P.      | 404,5     |
| Oliver 770                             | 770 H.P.      | 569,7     |
| Oliver 780                             | 780 H.P.      | 576,3     |
| Oliver 1.650                           | 1.650 H.P.    | 1.220,7   |
| Oliver 1.850                           | 1.850 H.P.    | 1.371,5   |
| Oliver 1.750                           | 1.750 H.P.    | 1.290,5   |
| Bolinder Munktell 450                  | 450 H.P.      | 333,7     |
| Bolinder Munktell 470                  | 470 H.P.      | 348,7     |
| Mc.Cormin International 450            | 450 H.P.      | 333,7     |
| Allis Chalmers E.L. 40                 | 40 H.P.       | 29,4      |
| Nuffield 10/42                         | 42 H.P.       | 31,0      |
| Nuffield 10/50                         | 50 H.P.       | 36,8      |
| Massey Ferguson 150                    | 150 H.P.      | 110,3     |
| Massey Ferguson 160                    | 160 H.P.      | 117,7     |
| Massey Ferguson 170                    | 170 H.P.      | 125,1     |
| John Deere 2010 G                      | 10 H.P.       | 7,35      |
| Deutz D-550                            | 550 H.P.      | 404,5     |
| Caterpillar D7                         | 7 H.P.        | 5,14      |
| Caterpillar D4                         | 4 H.P.        | 2,94      |
| Caterpillar D6 Series B                | 6 H.P.        | 4,45      |
| Caterpillar D6 Series G                | 6 H.P.        | 4,45      |

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2. (continued on reverse)

| MAKES OF TRACTOR                    | MAXIMUM POWER |          |
|-------------------------------------|---------------|----------|
|                                     | Petrol        | Diesel   |
| Caterpillar 37 Series C             |               | 120 HP   |
| Caterpillar 37 Series C             |               | 120 HP   |
| Allis Chalmers D-17                 | 27.5 HP       |          |
| Deere 10120                         | 27.5 HP       |          |
| Fiat Diamond 217                    | 27.5 HP       |          |
| Fiat Diamond 417                    | 27.5 HP       |          |
| Fiat Diamond 517                    | 27.5 HP       |          |
| Fiat ADT Astorillar                 | 27.5 HP       |          |
| Case 731                            |               | 70.00 HP |
| Case 730                            |               | 80.00 HP |
| Hassler Ferguson Harvester 3100     |               | 70 HP    |
| Hassler Ferguson Harvester Super 32 |               | 74 HP    |
| Hassler Ferguson Harvester 400      |               | 72 HP    |

AGRICULTURAL IMPLEMENTS

| IMPLEMENT                  | TYPE  |
|----------------------------|---|
| Mounted ploughs            | 1 or 2 disc harrows                                       |
| Mounted cultivators        | disc harrows  |
| Rice tiller                | disc harrows  |
| Mounted disc harrows       | disc harrows with teeth                                   |
| California harrow          | disc harrows with or without teeth                        |
| Ploughs                    | disc harrows with hydraulic lift control                  |
| Cultivator                 | disc harrows, 14" disc                                    |
| Mounted cultivator         | disc harrows, 4 supports, double 14" discs                |
| California harrow          | disc harrows  |
| Seed drill                 | disc harrows, 4 supports                                  |
| Plough                     | disc harrows with or without harrow wheel                 |
| Cultivator                 | disc harrows, 4 or 6 supports, 14" disc                   |
| "Victoria" disc harrow     | disc harrows, 14" disc <b>smooth or toothed</b> 14" discs |
| "Tarzan" California harrow | disc harrows with or without teeth 14" discs              |
| "Atlas" Californian harrow | disc harrows with or without teeth 14" discs              |
| Ploughs                    | disc harrows with or without harrow wheel                 |

| AGRICULTURAL IMPLEMENTS    |   |
|----------------------------|---|
| IMPLEMENT                  | TYPE  |
| harrow cultivator          | 2 or 4 furrows with 3-point depth control, with supports or without weepers |
| forward mounted cultivator | 2 or 4 furrows with 3-point depth control, with supports                    |
| disc harrow                | 1, 2 or 3 smooth or toothed 24" discs                                       |
| disc plow                  | 1, 2 or 3 .6" discs with hydraulic depth control, tractor drawn             |
| fertilizer spreader        | tractor drawn, 31 spots   |
| "lowline" harrow           | 1, 2, 3 or 4 smooth 24" discs, tractor drawn                                |
| disc drill                 | 1, 2 or 3 points, mounted aft, hydraulic depth control                      |

WAGGERS

CAPACITY

- 1/2 ton
- 3/4 ton
- 1, 2 and 3 ton
- 4 ton
- 5 ton
- 6 ton
- 7/8, 1, 2, 3 and 4 ton
- 5 - 10 ton
- 6 ton

PART TOOL

| TYPE OF TOOL | CHARACTERISTICS | UNIT VALUE |
|--------------|-----------------|------------|
| Mattocks     | 3 lbs           | 22.00      |
| Forks        | 2 lbs           | 17.00      |
| Picks        | 3 lbs           | 25.00      |
| Crow bars    | 18 lbs          | 127.50     |
| Spades       |                 | 11.00      |
| Axes         | 4 lbs           | 22.50      |
| Sickles      | 1 1/2 x 1 1/2"  | 7.10       |
| Machetes     | 2 1/2"          | 12.70      |
| Hammers      | 15 oz           | 31.25      |
| Field knife  |                 | 27.20      |

C. Demand

Studies carried out by various institutions suggest that, with adequate provision for renewal and for a gradual increase in the number of tractors, annual demand might be of the order of 3000 tractors a year.

The main implements required for such a quantity would be:

- 2000 ploughs,
- 1800 harrows,
- 1200 seed drills,
- 1500 cultivators.

III. THE AGRICULTURAL MACHINERY AND TOOLMAKING INDUSTRY IN COLOMBIA

A. The agricultural machinery industry

The metal manufacturing industry is expanding and already produces various types of industrial equipment, but there are still a number of obstacles to the manufacture of heavy machinery which it will not be easy to remove in the near future, notably insufficient markets to allow for adequate economies of scale. Thus there is still no manufacture of tractors in Colombia, though the possibility of setting up assembly plants has already been considered. There is also some interest in the manufacture of low-powered tractors (up to 12 hp), which could be produced at economic prices, but such machines would not provide a complete solution to the problem.

Most of the types of implements and tools required for soil preparation and tillage are being produced in sufficient quantities to cover domestic demand. Harvesting and product-processing equipment is manufactured in smaller quantities and much of it has to be imported.

There are no up to date statistics of production, so that we are unable to give figures. All we can do is to list the equipment, implements and tools now being manufactured, namely:



mills  
threshers  
maize huskers  
grain dryers  
fibre separators for sisal  
rice-processing machines  
trailers  
ploughs  
cultivators  
seed drills  
harrows  
manure spreaders  
mattocks  
picks  
crow-bars  
spades  
sickles  
machetes  
pickaxes  
axes

B. Basic and auxiliary industries

The Colombian iron and steel industry is able to meet the bulk of the demand for steels for the manufacture of agricultural implements and tools, except for a number of special steels which it is necessary to import.

With regard to parts and spares for machines and implements, the metal manufacturing industries have installed capacity for the manufacture of nearly all implement parts and a certain number of tractor parts and spares.

#### IV. POLICY FOR THE AGRICULTURAL MACHINERY INDUSTRY

##### A. Incentives provided by the Government

The industries producing implements, tools and some types of processing equipment satisfy the conditions for receiving tax concessions, including 100% exemption from income tax up to this year.

Customs protection for Colombian manufacturers is really extremely small, because Customs duties on nearly all these products are only 2% ad valorem.

Domestic producers are able to obtain credits from various financial institutions, in particular, the Industrial Development Institute, which is the State financial corporation.

##### B. Agricultural machinery research institutions

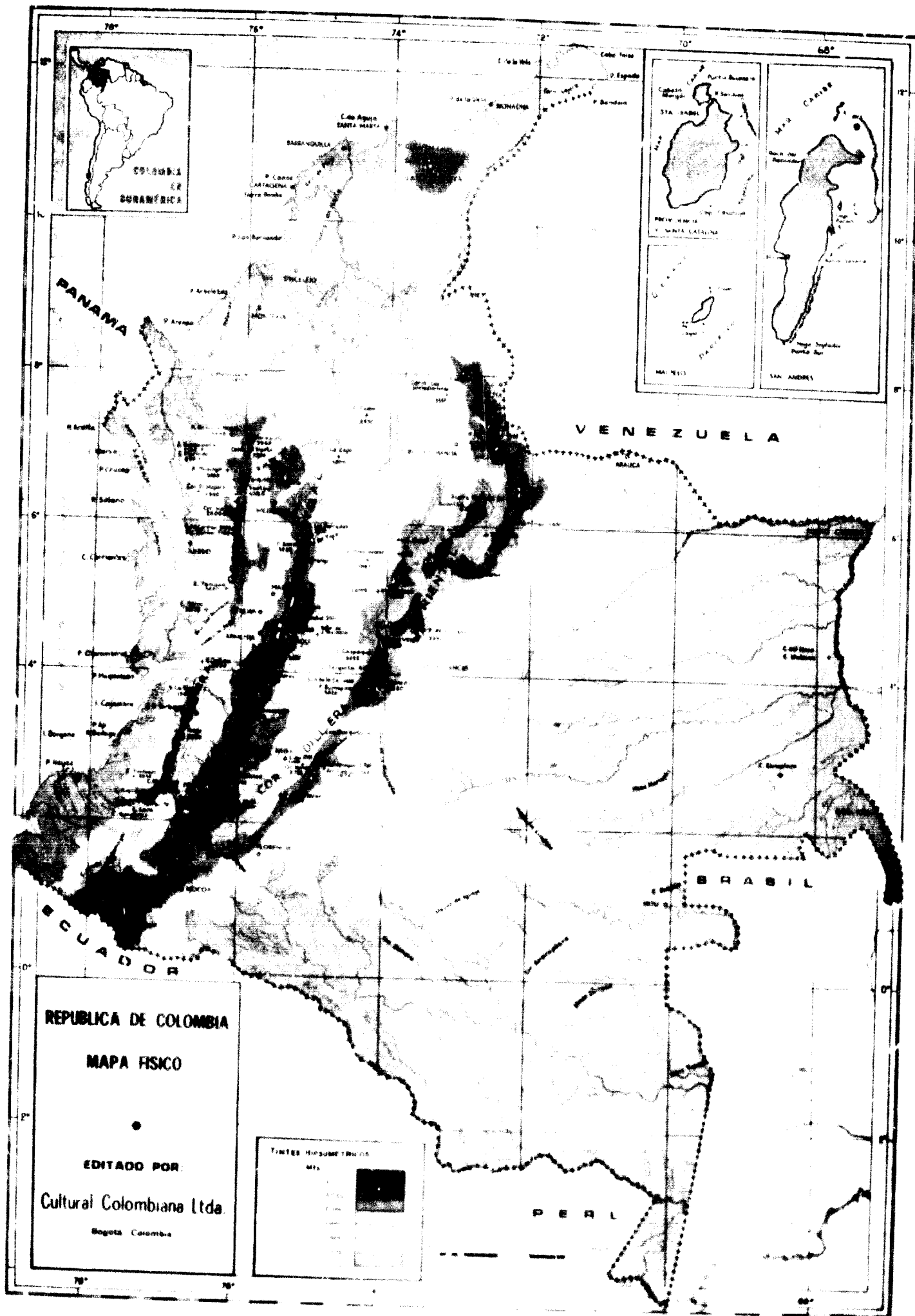
There are a number of bodies in Colombia which study, promote, finance, give technical assistance to and plan agricultural production. Some of these have carried out studies of agricultural machinery requirements. The Industrial Development Institute is now making a study of Colombia's production and needs, with the advice of a UNIDO expert.

##### C. Future needs

Since Colombia is essentially a farming country in which agricultural and stockraising output constitutes about 30% of the Gross Internal Product, with vast unpopulated areas which are only gradually being brought into production, the attention which has to be devoted to the mechanization of agriculture is a matter of particular importance.

The State is fully aware of the position and has set up a number of bodies designed to help improve production in the future and obtain higher yields.

To achieve this aim, it is essential that the country should be able to count on the possession of sufficient agricultural machinery and an industry capable of adequately meeting requirements in this field.





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