4.2 Technical Problems by Metalworking Process

4.2.1 Casting

Based on the survey results given in Table 4.1 - Table 4.5, it can be estimated that there are some 500 foundries in Colombia and it appears that more than half of these foundries are concentrated in the three large cities; Bogota, Medellin and Cali. In terms of enterprise size, LEs with 200 or more employees account for some 5% while SMEs with 11 - 199 employees and MEs with 10 or less employees account for some 50% - 70% and 25% - 45% respectively.

Table 4.6 shows production of iron or steel castings for 1985 - 1987 citing statistical data issued by the DANE (Departamento Administrativo Nacional de Estadistica). The production for these 3 years can be summarized as follows.

Domestic Production of Iron or Steel Castings and Annual Rate of Increase

	1985	1986	1987
Production (tons)	11,337	14,076	18,480
Rate of Increase over Previous Year	-	24.2	31.3

Note: The Figures are the combined total of iron or steel castings classified as CIIU Codes 3710 - 7.
Source: Table 4.6

According to the above table, the production increased by 24% and 31% annually. The users of these castings are shown below based on the 1987 survey by the PROEXPO (Fondo de Promocion de Exportaciones) on 16 casting enterprises in Colombia.

Users of Castings (1987)

Type of Industry	Demand Ratio (%)
Automobile	35 - 40
Cement	10 - 15
Mining (Crushing/Pulverizing)	5 - 8
Sugar Refining	5 - 7
Agricultural Machinery	5 - 7
Pump (and Parts)	5
Other Products	18 - 36

Source: PROEXPO "Estudio Sectorial sobre la Fundicion en Colombia con Destino a la Exportacion al Mercado Norteamericano", Bogota D.E., Octubre de 1987

As shown above, 30% - 40% of demand for casting products came from the automobile industry, and 10% - 15% from cement industry.

Of the several foundries visited in Bogota, some produced castings for automobiles including brake drums, disc brakes, disc wheels, shaft hubs, fly wheels, manifolds and clutch plates. There is no foundry producing cylinder blocks or cylinder heads for automobile engines in Colombia.

Table 4.7 shows imports of iron or steel castings and parts for 1985 - 1987 while Table 4.8 shows exports of these products for 1986 - 1988. Both tables are based on statistical data issued by the INCOMEX (Instituto Colombiano de Comercio Exterior). The imports and exports given in these tables can be summarized as follows:

Imports and Exports of Iron or Steel Castings and Parts

	1985	1986	1987	1988
Imports (tons)	10,041.4	7,623.6	15,379.4	-
Exports (tons)	-	1,431.2	2,392.1	2,910.8

Source: Table 4.7 and Table 4.8

Although the annual imports fluctuated between some 8,000 tons and 15,000 tons, the exports steadily increased; the volume in 1988 was more than double than in 1986. Considering the total demand to be the production plus the imports minus the exports, the demand for iron or steel castings and parts in 1987 was 31,500 tons.

Enterprises manufacturing castings for automobiles are generally large or medium scale enterprises and their production processes are largely mechanized. They also have certain types of quality control equipment. In comparison, however, the production processes of Sml-Es and MEs which are assumed to account for not less than 70% of the total number of foundries are not yet almost mechanized as far as those enterprises visited in Bogota, Medellin and Bucaramanga are concerned. Moreover, much of the available machinery is deteriorated and very little quality control equipment was observed.

In general, the fraction defective at Colombian foundries is as high as 8% - 10%. However, some foundries have a fraction defective of some 5% while others have a rate higher than 15%. The evaluation of domestic castings by the machining factories visited by the Study Team which are the users of these castings is generally low. Complaints were frequently expressed by these machining factories on inferior materials and defects such as chilled structure and blowholes found during the machining process which lead to a low yield rate.

The current technical conditions of the Colombian casting industry seem to be as follows:

(1) Melting and pouring

The following types of furnaces are generally used as melting furnaces.

Acid lining cupola	: Cast iron
Arc furnace, induction furnace	: Spheroidal graphite cast iron
Arc furnace, induction furnace	: Cast steel
Crucible furnace	: Non-ferrous alloy castings

Most SMEs and MEs manually conduct pouring using a shank ladle. The main problem of the melting and pouring processes is that most foundries, except large foundries and some medium scale foundries, lack the necessary equipment for foundry tests and temperature checks and rely on the intuition of the workers. Pig iron is hardly used and the raw material used to produce cast iron is mainly low quality iron scrap with rust and/or sand attached to it. Together with the deterioration of the melting equipment, it is extremely difficult for these foundries to manufacture good quality castings.

(2) Molding

Most molds are greensand molds using silica sand. Many Sml-Es and MEs produce a large variety of products in small quantities and, therefore, frequently employ floor molding. In comparison, LEs and some Med-Es have molding machines in their production lines but many of these machines are old and deteriorated.

Batch type sand mills are widely used for the sand preparation of pre-production process. However, there are many MEs which have no sand mill.

With regard to patterns, while LEs have their own pattern making shops, Sml-Es and MEs either use wooden patterns supplied by the users or request pattern makers to make them.

The biggest problem of the molding process seems to lie with sand preparation. Good castings require good molding sand but the present sand preparation facilities are largely deteriorated. In addition, none of the enterprises visited in Bogota, Medellin and Bucaramanga except LEs have sand testing equipment. Even at LEs, the equipment is installed in the laboratory and no such equipment is provided at the sand preparation shop to check molding sand quality in terms of compactability, strength, permeability, moisture content, etc. when necessary.

(3) Core making

The most frequently used cores at the foundries visited in Bogota, Medellin and Bucaramanga are CO2 cores. Although the CO2 core making process has the advantage of low cost, it also has such disadvantages as the possible decline of core strength due to moisture absorption during storage and poor collapsability of the core after use. Consequently, this process is unsuitable for the manufacture of complicated cores. As none of the foundries have CO2 sand reclamation facilities, the used sand lumps must be disposed after the castings have been removed.

Some LEs manufacturing castings for automobiles use shell cores but the blowing machines used to make the cores are both small and old, resulting in low productivity.

(4) Cleaning and fettling

LEs use shot blasting machines and stand grinders for cleaning and fettling while Sml-Es and MEs lack such equipment and use hand grinders and wire brushes. Some of them commission the cleaning and fettling

processes to other enterprises. In general, the cleaning and fettling equipment is poor.

(5) Inspection and quality control

LEs and some Med-Es manufacturing castings for automobiles have certain types of quality control equipment, including product inspection equipment, sand tester, analytical instruments and material testing equipment. However, it is no exaggeration to say that very little quality control is conducted in the inspection and production processes of Sml-Es and MEs which account for 70% or more of the total number of enterprises in the casting industry in Colombia.

(6) Raw materials

1) Pig iron

The pig iron produced by Acerias Paz del Rio has a high phosphorus content and is, therefore, unsuitable for the manufacture of castings.

Colar, a pig iron factory near Zipaquira, commenced the production of pig iron for castings in 1972. However, the factory was closed in the late 1970's due to the fact that improvement of the pig iron quality was impossible because of the iron ore conditions.

As already mentioned, most of the foundries visited in Bogota, Medellin and Bucaramanga do not use pig iron but by melting of iron scrap and pig iron which is exceptionally used is imported from Brazil.

2) Iron scrap

As many foundries use iron scrap as the raw material instead of pig iron, there is a general shortage of iron scrap. The iron scrap used is both return scrap and purchased one.

Since no thorough selection of iron scrap is conducted, the chemical composition of the iron scrap used varies largely. In addition, it is often covered with rust or foreign matter, causing such unacceptable material as chilled structure. Thoroughly selected good quality iron scrap is largely monopolized by LEs and some Med-Es with the result that the iron scrap used by Sml-Es and MEs is often of poor quality.

3) Steel scrap

Steel scrap is used as a main raw material not only for cast steel but also for spheroidal graphite cast iron and high quality cast iron. Although there does not appear to be any serious problems regarding the quality of steel scrap, there is a supply shortage.

4) Non-ferrous alloy scrap

For the production of copper alloy castings and aluminum alloy castings, such scrapped castings as old gas, water and sewerage valves and cocks containing these metals are frequently used.

5) Molding sand

Molding sand is required to have high refractoriness, thermal stability and an appropriate fineness distribution of round grains. The most frequently used molding sand is silica sand of which the main ingredient is quartz (SiO2).

While the sand produced in Colombia appears to be of good quality, the sand treatment (including screening, mixing and storage at quarries) appears to be poorly conducted. The main sand producing areas in Colombia are Cundinamarca and Boyaca.

6) Auxiliary materials for melting

a) Ferroalloy

Ferronickel is the only ferroalloy produced in Colombia. Ferrosilicon, ferromanganese, ferrochromium and ferromolybdenum which are popularly used for the production of cast iron and cast steel are all imported.

b) Coke

Colombia produces a large volume of good quality coal and the coke used in the casting industry is produced in Cundinamarca and Boyaca.

c) Limestone

Limestone consists of calcium carbonate and is used to lower melting temperature of slag in Cupola and to prevent the excessive melting of sulphur into the molten metal by removing ash from the coke. Limestone from Cundinamarca and Boyaca is mainly used and appears to be problem-free.

7) Auxiliary materials for molding

a) Bentonite

Bentonite is used as a binder for greensand. In general, there are 2 types of bentonite, i.e. sodium-based bentonite and calcium-based bentonite. Colombian bentonite is largely calcium-based bentonite, the quality of which appears satisfactory.

The casting industry is one of the key industries supporting industrial activities of any country. While the casting industry in Colombia has many problems related to technology. That is poor raw material control, deteriorated equipment and the biggest problem probably is de-

rived from poor quality control.

A thorough quality control system, from the acceptance inspection of raw materials to the final inspection of finished products, hardly seems to exist at most of the foundries owned by Sml-Es and MEs which are estimated to account for 70% or more of all enterprises in the Colombian casting industry.

It is almost impossible for a single Sml-Es or a microenterprise to purchase the quality control equipment required, including various analytical instruments, material testing equipment and sand testers. Therefore, it is necessary to consider the introduction of a public laboratory which provides various services related to quality control mentioned above for both Sml-Es and MEs.

4.2.2 Forging

There is a large forging factory in Bucaramanga which supplied high-grade forged products but suspended operation for the past eight years as a result of liquidation of the operating company by financial problems. Recently, domestic steel manufacturers have become shareholders of the liquidated company by acquiring its whole assets, and the closed factory resumed production in March 1989. In addition, there are 10 to 15 small forging factories (product weight of around 2kg) throughout the countries.

Table 4.9 shows recent production of forged products. Major products are blanks for shafts, gears and pulleys; approximately 760 tons of blanks for shafts were produced in 1986, while 100 tons of blanks for gears and pulleys in 1987. The annual production in total has been ranging 500 to 800 tons, with demand on the increase.

Table 4.10 shows recent import trends of forged products. While large imports over 2,000 tons were recorded in 1986, the annual imports ranged between 300 and 400 tons in other years. As forged products accounted for the largest share, On the other hand, exports of forged products

remained in small quantities; 1,451kg in 1987 and 955kg in 1988. By adding up the domestic production and imports, the total demand for domestic products is estimated at 800 to 1,200 tons annually.

If production of forged products in Colombia is assumed to represent 30% of production of castings, as observed in some industrialized countries, the total annual demand for forged products is estimated at around 4,000 tons, based on that for castings being 14,000 tons in 1986.

Forged products are important materials for capital goods and metalworking industries. In particular, forged products are used as reinforcing materials and need to be supplied economically at a stable rate.

Recently, small forged products have been gradually replaced with castings, press products, sintered products, and non-ferrous products in industrialized countries due to advancement of raw materials and manufacturing methods. As a result, forging is used for large and precise products. Although forged products have wide applications as machine elements worldwide, the production in Colombia has not grown significantly due to the small market size and availability of imported products.

The forging factory in Bucaramanga has two factory buildings and one laboratory on a 90,000m^2 site. The factory is divided into a forging shop and a machining shop. The forging shop has production lines consisting of large billet shearing machines, gas heating furnaces, forging rolls, drop hammers, presses, and other large equipment. Also, installed are annealing furnaces, shot blast machines, induction hardening machines, and other processing equipment after forging. However, as the production has been started recently, the capacity utilization rate remains at low levels.

The forging shop also has equipment to manufacture forging dies, including milling machines, electric discharge machines, grinders, shapers, milling, lathes, radial drilling machines, boring machines, and other large equip-

ment, together with inspection tables and overhead traveling cranes. Raw materials for forging dies are imported from Australia.

The machining shop has equipment which appears to have produced large parts, including broaching machines, grinders, lathes, milling machines, drilling machines, hobbing machines and other general machine tools, as well as machines designed for special parts. Also, heat treatment machines, induction hardening machines, magnaflux, hardness gauges, and painting booth are incorporated into the production line. The existing equipment may not be sufficient for volume production.

The laboratory has tension testers, impact testers, hardness gauges, a chemical analysis laboratory, metallurgical microscopes, etc.

The factory has an estimated annual production capacity of 7,800 tons, including free and die forged products, under a two-shift system, and capable of manufacturing 80kg - 120kg of die forged products and 500kg of free forged products at maximum. Therefore, if the existing facilities and equipment are upgraded, the capacity utilization will be increased to meet the present domestic demand.

The factory procures 80% of raw materials from domestic sources and imports remaining 20%. Major products are forged products for automobile parts of the domestic industry. The fraction defective ranges between 1% and 1.2%, and careful inspection is said to be carried out upon acceptance of raw materials.

The factory plans to diversify products, including pipe joints for the petroleum industry, exports of which will be started in the near future. At the same time, it is contemplating technical cooperation with a foreign manufacturer. To meet the anticipated increase in demand, the factory plans to add heat treatment equipment which is considered to be insufficient at present.
Analysis of the forging factory indicates that the forging industry in Colombia has a sufficient production capacity

to meet the total domestic demand as well as exports in some quantities. From local conditions, new forging factories may be sited near other industrial cities. Nevertheless, to promote metalworking MEs and SMEs in Columbia, a priority should be given to boost the capacity utilization rate as much as possible through remodeling and upgrading of the existing facilities and equipment. This requires technical and financial support.

4.2.3 Plating

(1) General conditions

It is roughly estimated that there are some 150 enterprises specializing in plating in Colombia of which some 60 are located in the Bogota area while the remainings are scattered all over the country. However, the exact number of enterprises and employees, the production values, etc. are not known due to the lack of relevant statistics. Table 4.11 lists the main plating enterprises in the Bogota area.

There is currently no association or cooperative of plating enterprises in Colombia, resulting in a lack of communication and information exchange. The owners of plating enterprises appear not to be very open minded and are very competitive with one another.

There is no provision of information concerning foreign technologies. While the SENA (Servicio Nacional de Aprendizaje) does not provide a plating course, it occasionally holds seminars. As a result, the technology level is far behind the times.

The main purpose of plating is to improve the product appearance. The subject products include automobile parts (steering wheels, wheels, wheel caps, bumpers, etc.) furniture (gas tables, sinks, door handles, metalware, etc.), general purpose tools and household goods. In addition to enterprises specializing in plating, some large and medium scale manufacturers of

automobile parts, electrical parts and furniture also have their own plating lines. These manufacturers do not subcontract plating operations to enterprises specializing in plating due to the superiority of their own plating lines in terms of quality, cost and punctuality. However, they are willing to subcontract them if plating enterprises can produce better results.

In general, the plating lines of the manufacturers give a better impression than those of enterprises specializing only in plating. However, the working conditions of both are poor because bad air is not adequately exhausted by a ventilator with ducts and hood over the plating tank but is ineffectively exhausted by some wall-type ventilators and also because lighting is not enough. The inferiority rate is as high as 5 - 30% (less than 0.1% in Japan) and the work is not automated. As the domestic market for the plating industry is promising due to the strong demand, the introduction of new technologies to expand the types of plating, especially functional plating, should be considered.

Although there is growing concern in Colombia regarding pollution, none of the plating factories have waste water treatment facilities as there is no legal requirement to prevent water pollution. Consequently, waste water from plating work is simply discharged without any prior treatment. Unless appropriate legal measures are introduced in the near future, not only the natural environment but also human lives may be endangered.

(2) Results of factory diagnosis

1) Subjects of factory diagnosis

a) Plating training school - Centro Don Bosco Electroquimica
b) Specialized plating enterprise; 2 companies
c) Plating factories owned by manufacturers; 4

companies

2) Plating work

a) Plating substratum

The plating substratum is mainly iron/steel and stainless steels and plastics are sometimes plated.

b) Plating types

The three layer plating of copper, nickel and chromium is mainly conducted. In addition, zinc plating and tin plating are conducted. No plating involving such precious metals as gold and silver is conducted.

c) Methods

Either rack plating or jig plating methods are used and barrel plating method is non-existent.

(3) Facilities, equipment and agents

1) Factory buildings and auxiliary facilities

a) While the buildings have a brick and block structure and high ceilings, the ceilings are not strong enough to support an overhead traveling crane.

b) The floors are concrete covered by acid-resistance mortar (without acid-resistant painting) and wooden stools are placed on the floor.

c) There is the possibility of spilt acid and cyanide cleaning water being mixed in the drainage ditch, producing toxic cyanide acid gas.

d) Although indoor lighting is provided in addition to natural lighting through windows, the work and inspection areas are rather dark.

e) Plating work areas should have a luminous intensity of at least 200 lux.

f) Inspection work areas should have a luminous intensity of at least 500 lux.

g) Ventilation is made by windows and fans on one wall and no mechanical ventilation or local ventilation with a hood and a duct is provided, resulting in a poor circulation of air. Since plating work generates strong acid, strong alkali and cyanide mist, this poor ventilation need to be improved urgently in view of the safety of workers and improved equipment maintenance.

h) No overhead traveling crane is used.

2) Equipment and agents

a) Plating tanks (Domestic products)

Most plating tanks are made of iron with a PVC or rubber lining on the inner wall and with acid-resistant painting applied to the exterior. FRP tanks are also used as exceptions.

b) Cleaning tanks (Domestic products)

Cleaning tanks are made of iron with a PVC internal lining.

c) Rectifiers (Imported from Italy, Canada, U.S., etc.)

Selenium rectifiers with manual controls are used. The current capacity of the rectifier is set for the maximum plating area with the result that the actual current is much lower than the rectifier capacity in the case of the plating of a small area, possibly leading to the disruption of the current wave pattern. (The current wave pattern is best when the actual current is some 80% of the level of the rectifier's current capacity.)

d) Filters (Imported from Italy, Canada, U.S., etc.)

Cartridge type filters are used and only the plating solution used for nickel plating is filtered. All other types of plating solutions should also be filtered.

e) Baking furnaces (Domestic products)

Oil combustion type baking furnaces are used and the thermal distribution is inappropriate.

f) Pre-treatment and plating agents

Such simple agents as sodium hydroxide, sodium carbonate, chloric acid and sulphuric acid are domestically produced while agents for cleaning, plating, brightening, leveling, etc. are imported and sold by wholesalers.

(4) Quality control

1) Solution analysis

Solution analysis is regularly conducted by in-house or by outside specialists and whether the analysis conducted weekly or monthly depends on the analysis items. All analysis items are, however, simple and can be conducted by means of pH analysis or titration analysis. As atomic absorption spec-

trophotometers are not available, the analysis of metal ions and contamination in plating solutions cannot be conducted.

2) Inspection of parts

a) Visual inspection of all parts

The inspection areas are dark and magnifiers are not used.

b) Plating thickness inspection

Sampling inspections are conducted using electromagnetic thickness meters.

c) Corrosion prevention test

The test pieces are plated and are then tested using salt spray test instruments.

3) Fraction defective

Although the fraction defective is as high as 5% - 30%, hardly any quality control using production data is implemented. When parts are rejected by inspection, they are simply dipped into an agent to remove the plating and are then replated. Investigation into the causes of defects is seldom conducted.

4) Plating work

a) Buffing

Buffing is conducted manually and is, therefore, inefficient. In addition, a lot of dust is generated. The automatization of the work is recommended from the view-point of the health and safety of workers.

b) Precleaning

After parts have been dipped into an organic solvent, they are manually cleaned using brushes containing solvent. As this work is currently conducted in areas of poor ventilation, local ventilation unit with hood and duct should be installed to prevent fires and harmful effects on the health of workers.

c) Acid cleaning

The chloric acid concentration is maintained as the solution is checked and supplemented. As no check is conducted on the dissolved metals, therefore, the acid cleaning solution is highly contaminated. Analysis of the dissolved metal ions should be conducted and the entire solution should be replaced when necessary.

d) Rinse water tank

The rinse water is conspicuously dirty and unless more overflow is conducted, inferior plating, rusting and deterioration of the plating solution will result.

e) Plating jigs

In most cases, plating jigs are not used and the subject parts are simply bound using copper wires. With the agitation of the solution, inferior contact with the busbar or parts and electric sparks occur.

f) Location of electrodes and parts during plating

More attention should be paid to the location of the electrodes and parts in order to achieve a more uniformity of plating thickness.

g) Plating methods

The separate jig plating method or rack placing method is used but barrel plating method. The barrel plating method is, however, much more efficient for the simultaneous plating of a large number of small parts.

h) Plating tank work records

Work records should be kept for each plating tank.

i) Investigation of inferior plating cnditions

Investigation into the causes of plating inferiorities is unsatisfactory.

(5) Problems in poduction technologies and production processes

1) Low production technologies and few upgrading opportunities

a) Plating training school

The SENA does not provide any plating training course and lacks a plating laboratory. However, the Centro Don Bosco provides a plating training course and also a plating service for outsiders for which a charge is imposed. The plating equipment owned by the Centro Don Bosco is of old manual type and while this equipment is useful for learning basic technologies, it is far behind advanced equipment and technologies of today.

b) Overseas technical information

There is no organization in either the public sector or private sector which collects information of surface treatment technologies from

overseas and provides it for domestic enterprises. Consequently, there is a lack of advanced technical information. An international surface treatment society which holds a general meeting every 3 years is an obvious source of information on advanced technologies but no organization or enterprise in Colombia has yet joined the society.

c) Technical guidance by plating agent manufacturers

Plating agent manufacturers provide technical guidance for plating enterprises as part of their sales promotion and after-sale activities. However, as plating enterprises tend to use agents which are imported through dealers, technical guidance cannot be readily applied to plating firms.

d) Insufficient motivation for improvement

Enterprises appear to lack strong motivation for the introduction of more advanced and efficient equipment, improvement of the technical level, reduction of the fraction defective, etc.

2) Problems concerning production processes (in the case of specialized plating enterprises)

a) The demand mainly consists of spot orders for a large variety of items in small quantities as continuous bulk orders are difficult to obtain due to the slow development of the assembly industry, resulting in the following problems.

- difficulties in rationalization and high cost

- difficulties in production planning and the bulk purchase of materials in a big lot due to customized production

- difficulties in the manufacture of special jigs for exclusive use

b) Orders generally require only low level technologies. Most plating enterprises have devoted themselves entirely to pricing competition with low technology level, thus incapable of high-quality plating of export parts.

c) Activities to develop new markets cannot be conducted due to insufficient information on the plating market.

d) The plating work tends to cause pollution and health problems due to the use of various chemical agents.

(6) Promotion measures for the plating industry

1) Introduction of plating training course by SENA

With the technical assistance of an industrialized country, a plating training course should be provided with the latest automated equipment to teach the latest plating technologies.

2) Establishment of plating association

A plating association should be established with members consisting of universities, governmental agencies, plating enterprises, dealers of plating materials and manufacturers of chemical agents with a view to the following.

a) Affiliation with an international surface treatment society for the purpose of obtaining information on the latest technologies and diffusing this information to association members

b) Holding of workshops and seminars

c) Cooperation with the ICONTEC for the preparation of standards

d) Certification for plating workers and quality control supervisors

e) Periodical publication of bulletins and data

f) Provision of factory diagnosis service and guidance for member enterprises to solve problems

g) Provision of guidance for the installation of pollution control facilities and equipment

4.2.4 Plate Work and Welding

There is a large gap between large/medium scale enterprises and small/microenterprises in Colombia in terms of plate work and welding technologies in the metalworking field.

(1) Plate work and welding at small/microenterprises

The subject items of plate work and welding at small/microenterprises are mainly thin plate products (using mild steel with a thickness of some 1mm) such as window frames, doors, fences, etc. Consequently, the surface finish and appearance are considered more important than a high technical production level. However, as both types of work are largely conducted by hand, i.e. cutting using either a manual shearing machine or scissors and welding using a manual welder, the finish is rather rough. In this context, few Colombian products are qualitatively competitive in the markets of industrialized countries.

In the case of industrialized countries, an automatic shearing machine is generally used for the cutting of a thin plate in a straight line while plasma arc cutting or, in exceptional cases, laser cutting is

conducted for cutting work which involves a curve or complicated figure. The introduction of the NC machine together with these advanced machines and cutting methods is recommended for Colombia and at least the use of coordinate drive flame shape cutting machine should be considered. A smooth cutting face with no distortion can be obtained using these advanced methods and the cutting capacity is substantially increased.

Welding in Colombia is entirely conducted manually. The bead surface is rough and requires grinding. While the most common welding method for thin plates is semi-automatic welding using CO_2, the recent invention of the flux cored wire has enabled fast welding with few spatters and an excellent finish and the use of this flux cored wire is fast gaining popularity throughout the world. TIG welding is also used depending on the welded materials. These advanced welding methods assure faultless bead which does not require grinding and largely increase the welding productivity.

(2) Plate work and welding at large/medium scale enterprises

The subject items of plate work and welding at large/medium scale enterprises are mainly medium or thick plate products (generally a thickness of 6 - 38mm but 50mm in exceptional cases), including petroleum industry-related equipment (tanks, compressors, large pipes, etc.), air-conditioning equipment and accessories for agricultural machinery. As a result, the quality of the deposited metal is more important than appearance.

Cutting is conducted mostly by hand or using a semi-automatic cutting machine. From the viewpoint of achieving improved productivity, the introduction of either NC gas automatic cutting machines or coordinate drive flame shape cutting machines is desirable.

While some factories employ the semi-automatic welding method using CO_2 or the TIG welding method, manual welding is still the mainstream.

The use of the submerged arc welding or semi-automatic welding methods using CO_2 is desirable to obtain high productivity and high quality of the deposited metal.

(3) Vocational training of welding

While the vocational training of welding is mainly conducted by the SENA, however in Bogota, the Centro Don Bosco and Instituto de Soldadura (training school of West Arco) also provide training courses on welding.

1) SENA

No semi-automatic or automatic welding training is provided. During the factory diagnosis, complaints were heard that the SENA only taught basic techniques and not new ones. It is, therefore, recommended that the training course be divided into 2 courses in the future to teach both basic techniques and more advanced techniques.

2) Centro Don Bosco

The Centro Don Bosco does not currently provide a course specialized only in welding. Cutting and welding work are taught for a year as basic techniques as part of the mechanical engineering and other courses. In course of actual training, not only the manual welding method but also the semi-automatic welding method using CO_2 are taught. In this aspect, the training provided by the Centro Don Bosco receives a good reputation among metal-working enterprises.

3) Training school of West Arco (Instituto de Soldadura)

This is a welding training institute established by West Arco, a leading manufacturer of welding materials. It is easy to gain admission to this institute and such new techniques as the semi-automatic welding method using CO_2 and TIG welding method are taught in addition to manual welding, gaining the popularity among steel fabricating enterprises sending their workers for training. In principle, the trainees are workers of steel fabricating enterprises using the welding materials produced by West Arco, while college students are also accepted. Trainees of the institute can become qualified welders certified by the American Welding Society (AWS).

(4) Welding materials

There are 7 manufacturers of welding materials in Colombia with a total annual production of some 3,000 tons, of which approximately 400 tons are materials for semi-automatic or automatic welding. Only special welding materials are imported as most of the domestic demand is met by local manufacturers. The leading manufacturers have technical cooperation agreements with foreign manufacturers and, therefore, the factory diagnosis did not find any serious quality problems for welding materials produced in Colombia.

(5) Technical welding society

There is currently no officially recognized technical welding society in Colombia but preparations to establish such a technical society appear to be underway. An association or society with the following objectives is required for the promotion of welding technology.

a) Introduction of new technologies/techniques
b) Holding of workshops and seminars

c) Cooperation with the ICONTEC (Instituto Colombiano de Normas Tecnicas) for the preparation of standards
d) Certification of welders and inspectors for non-destructive testing
e) Publication of technical information and data
f) Publication of regular bulletins covering items a) - e) above

It is desirable that members of the society consist of universities, such associations as the ICONTEC, SENA, FEDEMETAL (Federacion Colombiana de Industrias Metalurgicas), steel fabricating enterprises, manufacturers of welding materials, manufacturers of raw materials, etc.

4.2.5 Machining

(1) General conditions

While machining is carried out in all industries, it is particularly important in the automobile and industrial machinery manufacturing industries. In the case of the Colombian automobile industry, however,only 1 out of 3 manufacturers produces gasoline engines and all driving units are imported while modern machining factories properly equipped with machine tools are few in the industrial machinery industry.

There is no modern machining factory owned by a small or medium scale enterprise, or microenterprise in Colombia. However, those small and medium scale foreign subsidiaries and enterprises which have introduced foreign technologies have equipment and production systems which are far superior to those of purely Colombian enterprises. In general, foreign subsidiaries are on a totally different level from purely Colombian enterprises, including microenterprises.

An average microenterprise has 2 - 3 ordinary lathes or bench drilling machines which are over 10 years old

and uses a room inside a house of 70 - 90m^2.

Machining technology, taking Japanese case as an example, has progressed stage by stage; 1) usage of specialized automatic machine tools, 2) Flexible Manufacturing System (FMS) which are composed of NC machine tools, robots and automated storage system and 3) Computer Integrated Manufacturing (CIM) system. Meanwhile, most of machining shops in Colombia still uses multipurpose machining tools which are older fashioned tools than the stage 1) mentioned above. Only a few machining shops is equipped with NC machine tools.

Only bench type drilling machines are produced locally and all other types of machine tools are imported and are mostly second-hand.

(2) Production equipment

As already described, the most popular equipment owned by an average microenterprise consists of 2 - 3 ordinary lathes or bench drilling machines which are more than 10 years old. In the case of SMEs, the equipment quality and quantity vary depending on the size of the enterprise. In general, the following characteristics can be pointed out.

1) Few gear cutting machines are used and milling machines are usually used for gear cutting. The factory diagnosis results show that only 2 enterprises have gear hobbing machines with a maximum capacity of 550mm in diameter.

2) While foreign subsidiaries and some competent enterprises use NC machine tools or special-purpose machines, all other enterprises use old-fashioned second-hand machine tools.

3) In general, the equipment of compressor and pump manufacturers is better than others.

4) Few precision machine tools are used. Among all SMEs, only 2 enterprises have old surface grinding machines required to produce dies. There is only 1 jig borer which is owned by a large manufacturer of automobile parts.

5) Except for bench drilling machines, all machine tools are imported. High class machine tools are imported from Japan while medium and low class machine tools are imported from Spain, Brazil, Taiwan and East European countries. Second-hand machine tools are sold at approximately half the price of a new machine. Many tools are also imported. Although domestically produced drills are available, imported drills are popular because of the better quality despite 20% - 30% higher prices.

(3) Production technology and control technology levels

All machining factories in Colombia manufacture finished products and are not available for subcontracting. In view of this fact, it is appropriate to discuss machining as part of the general conditions of the production and control technologies in Colombia. In general, there is a great deal of room for improvement in production and control technologies and the following problems in particular require early solutions.

1) Lack of concerns about production accuracy and fitting at some machining factories

2) Inadequate control, as well as grinding technology, of tools

3) Lack of sufficient knowledge on measuring instruments and a shortage of these instruments

4) Lack of sufficient knowledge on new machine tools

5) Insufficient use of jigs and tools

Small floor area is also a problem which is very untidy because of production of various items in small volumes. Inadequate production control can be observed at first glance. Although these problems cannot be solved by technical improvement only, the following should be conducted.

- maintenance of a clean and tidy shopfloor (disposal of chips)

- maintenance of a tidy material yard

- improvement of the transportation method

Most factories do not have any overhead traveling crane as many of them are rented properties.

The improvement of the following control technologies is also required.

- process control

- material control

- quality control

The most important elements of machining work are the assurance of accuracy and productivity.

For the assurance of accuracy, the following efforts should be made;

- Improvement of the accuracy of machine tools and cutting tools,

- Improvement of setting accuracy by use of suitable jigs and fixtures,

- Periodical accuracy check of machine tools

- Control of jigs and tools

- Accuracy control of measuring instruments

- Proper shopkeeping

For the upgrading of productivity,

- Selection of optimal cutting conditions

- Proper selection of cutting tools and cutting fluid

- Periodic maintenance and accuracy check of machine tools

- Appropriate layout of facilities

- Efficient arrangement of tools and jigs

- Proper utilization of jigs and tools

- Retrofitting and upgrading of old and low efficiency machines with NC functions

Without any doubt, it is a heavy burden for micro, small and medium enterprises to purchase expensive measuring instruments. Also it needs high levels of technologies and skills to repair, remodel and check accuracy of machine tools. Therefore, it would be necessary to establish an organization which provides technical services to them by using measuring and inspection instruments as well as facilities for repair.

4.2.6 Machine Assembly

Machine assembly work in Colombia has been protected and fostered under Decree No. 3218 of 1983. The eligible industries include automobile, motorcycle, telephone and telephone exchange, electrical household appliance, small aircraft, bicycle, engine, mobile electrical machinery, elevator, tractor and electronic equipment industries. A total number of 46 enterprises have so far been authorized

as assembly enterprises and further 50 have made applications for authorization.

Once authorized, the assembly enterprise has such obligations as (a) the transfer of technology from abroad, (b) the procurement of locally produced parts and (c) the staged increase of exports. In return for these obligations, the assembly enterprise benefits from (a) the avoidance of excessive competition in the domestic market due to the limitation of the number of authorized enterprises in each type of industry, (b) an advantageous position in obtaining government contracts due to the status of domestic manufacturers and (c) preferential tariff treatment against imported similar finished products.

Authorized enterprises are only engaged in assembly work based on Government contracts and are not allowed to manufacture or process components or parts.

Components and parts used for assembly are both imported and domestically produced. The import of those components and parts which can be produced locally is restricted. As the authorized enterprises must subcontract the production of locally available products to outside sources, the consolidation of the assembly industry requires the development of SMEs and MEs which can produce components and parts with similar quality to imported products.

Most assembly enterprises are medium scale or larger and receive financial and technical assistance from foreign enterprises. As a result, the levels of their production equipment, production technologies and production management and quality control are reasonably high. The innovation or replacement of equipment, however, tends to be delayed and the transfer of technical know-how based on the long-standing experience of advanced enterprises is inadequate, causing such problems as unsatisfactory product design, process design, quality design (operating standards and inspection standards), jig and tool design and technologies to confirm the precision, performance, durability, etc. of the finished products. A slightly

higher product cost compared to imported items can also be pointed out.

Assembly enterprises not under protection of Decree No. 3218 often conduct other processes, including plate work, welding, machining,etc. and some even receive financial and technical assistance from foreign enterprises. Therefore, most of such enterprises are medium scale or larger and their main fields of work are the assembly of machines including processing parts, the assembly of components and units and machine repairs. While those enterprises receiving foreign technical assistance are on the standard mentioned above, those without such assistance are far behind in terms of equipment, technologies and control.

In general, equipment is small and deteriorated due to aging, and equipment maintenance appears to be inadequate. The working technology largely depends on skills of workers and working conditions are poor. Consequently, high precision cannot be expected and the productivity is low. Fitting is done manually and there is some doubt regarding product performance or functions despite the reasonable appearance.

The production cost tends to be slightly higher than that of imported products but products appear to maintain their competitiveness in the domestic market because of the protection measures.

The design technologies are generally immature and many products are developed on the basis of full copies of foreign products but a few products change their design to meet the domestic requirements. As equipment to inspect the conditions in custody, precision and measuring instruments of intermediate products and equipment to check the performance and functions of finished products are not fully provided, independent inspection organizations are often used to confirm product quality. Since assembly enterprises are in a position to guarantee the quality of finished products, they should be capable of confirming product quality, performance, etc. by means of the necessary in-house checks and adjustments so that they can

ensure the reliability in their products.

At present, the assembly industry tends to strongly rely on imported components and parts because of small domestic markets for these products and the small variety of components and parts produced locally, and also because of the immaturity of fully trust worthy SMEs and MEs in terms of product quality, punctual delivery and product cost, all of which fail to reinvest and positively promote nationalization. Therefore, the policy to promote local production for import substitution is not promoted and no fostering of SMEs and MEs is fully achieved.

Those assembly enterprises receiving foreign technical assistance should find it relatively easy to introduce new production equipment and technologies. If the present restrictions on the assembly industry are lifted to allow the partial in-house production of main components and parts, together with the systematic nationalization of auxiliary parts, a linkage-type industry fully utilizing and fostering the SMEs and MEs production may be developed.

The assembly industry is a technology-intensive type industry with strong linkage to each other where many components are assembled to manufacture an end product and necessitates the close cooperation of many specialized component manufacturers. Assistance measures for SMEs and MEs are the key to the development of the assembly industry.

4.2.7 Press Work

(1) General conditions

When press work is divided for the purpose of this study into that for large products and that for small and medium-size products, the former is mainly for the automobile industry while the latter is not only for the automobile industry and household electrical appliance industry but also for all industries where

mass production of plate working is involved. In some industries, such as the can industry, press work is a dominant process.

As automobile bodies are entirely imported in Colombia, no press work for large products is carried out. In the case of the household electrical appliance industry, press work is a main production process, and all of them belong to LEs with their own processes and do not subcontract press work.

Press work is also the main production process of SMEs engaged in the manufacture of cans, automobile parts, stationery, lighting apparatus, etc. In the case of MEs, press work is mainly conducted for the manufacture of metal fittings, hinges, etc. which are final products simply obtained by press work.

Press products in Colombia are produced in small quantities due to the small domestic market and the advantages of press work suited to mass production have not been fully exploited. The present maximum capacity is 1,000 tons for a hydraulic press and less than 600 tons for a mechanical press.

(2) Materials

Press materials used are cold rolled steel plates, tin plates, galvanized iron sheets, copper alloy sheets and aluminum sheets. While cold rolled steel plates are used for all kinds of products, tin plates and galvanized iron sheets are used for cans and furniture respectively. The main use of copper alloy sheets is for the production of electrical switches and sockets and aluminum sheets are mainly used for lighting apparatus.

As cold rolled steel plates are not produced in Colombia, they are imported from Japan, Brazil, South Africa, Venezuela and Spain. Although Japanese steel plates are of high quality, they are also expensive and, therefore, are used for the manufacture of highly

value added products.

The thickness of all types of sheets is generally 0.2 - 1.0mm due to the range of the main products mentioned above.

No coiled materials are used and all the materials are of standard size. The only exception is the use of copper alloy coil by Ave Colombiana Ltd. (a large enterprise) which manufactures switches and sockets for household electrical appliances.

Standard size sheets are used even in the case of mass producing industries, such as the can industry, and the material yield is consequently poor. This yield is particularly important for press products where material cost accounts for a high proportion of the product cost. In addition, the automatization of press work is difficult with the use of standard size sheets.

MEs purchase odd ends of plates and sheets at a cheap price to reduce the material cost, because personnel cost is comparatively lower than material cost.

(3) Types of press work

1) Shearing and blanking

While electric motor driven shearing machines are mainly used for shearing, manual shearing machines are also used, particularly by MEs. West German universal shearing machines are used by some automobile repair shops and one freezer manufacturer uses nibbling machines.

Blanking is the important first process of all types of press work. Technically speaking, the work quality is determined by the die quality. The expected life of a die is 10,000 - 15,000 pieces in the case of hinges and 30,000 - 40,000 pieces in the case of cans. Since dies are made of carbon

steel, these lives appear reasonable.

2) Bending

Bending is mostly either folding or V-shape bending and is conducted in the production of furniture, panels and freezers. Manual bending machines are widely used by MEs and the use of electric press brakes is mostly limited to small and larger enterprises. While spring back poses a problem in bending, all the techniques involved are rather simple. The level of bending in Colombia is, therefore, considered to be on a par with the world level. The productivity of the manual bending machines currently used by MEs is low and these should gradually be replaced by press brakes.

3) Deep drawing

Cylindrical deep drawing was not observed by the Study Team but rectangular deep drawing is used for the manufacture of gas ranges and lighting apparatus. The materials used for these products are cold rolled steel plates for gas ranges (with a porcelain enameled finish) and aluminum sheets for lighting apparatus. The drawing rate is relatively high and no conspicuous wrinkles were observed.

The automobile parts industry generally must have advanced press technologies but the Colombian automobile parts industry still does not manufacture high drawing rate products and is limited to manufacture simple products such as door opening mechanisms.

Lighting apparatus manufacturers produce aluminum reflectors by means of spinning where spatulas are manually operated. Although this method suffers from low productivity, it may suit the present conditions in Colombia in view of the low equipment cost. Deep drawing by press should, however, gradually be introduced in accordance with the

expansion of the domestic market.

4) Dies

Dies are mainly manufactured in-house. Since no enterprise has a jig borer or surface grinder, dies are manufactured by milling machines, shapers, drilling machines and by hand. Electric discharge machines are unavailable and, therefore, the manufacture of precision dies is impossible.

Heat treatment is generally carried out by outside manufacturers and the finished hardness just allows the use of files.

The use of die sets is relatively common but the accuracy is questionable. Second-hand dies sets using ball bearings for guides are imported.

While can factories are supposed to be the most advanced in the mass production system, can factories in Colombia use different presses for blanking, drawing, bending, etc. which means that progressive die is not adopted.

5) Presses and dies

Most mechanical presses are imported either new or second-hand and are power presses. Most widely used are C-frame crank presses, while no high production presses, such as dieing machines, are used. Hydraulic presses up to 200 ton capacity are manufactured domestically.

No double-action presses or hydraulic presses with die cushions are used. Consequently, the blank holder and the processing of knock-outs required for deep drawing must be conducted by making dies. While automatic feeding mechanisms are not employed, this mechanism is not so important as no coil materials are used. For industries such as the can industry where a small number of products

are manufactured in large quantities, however, the introduction of automatic feeding mechanisms together with the use of coil materials should be considered. No safety devices are used.

The fostering of specialized die manufacturers will be required in view of the fact that it is difficult for individual enterprises, especially Sml-Es and MEs, to own expensive die manufacturing equipment.

Table 4.1 GEOGRAPHICAL LOCATION OF THE FOUNDRIES IN COLOMBIA

(1/2)

Region		(1977) No. of Foundries	Percentage
Zone 1	CUNDINAMARCA		
	BOGOTA	147	
	PACHO	1	
	NACAIMA	1	
	GIRARDOT	3	
	Sub-total	152	30.2%
Zone 2	ANTIOQUIA		
	MEDELLIN	70	
	ITAGUI	16	
	BELLO	8	
	ENVIGADO	6	
	SABANETA	3	
	CALDAS	3	
	RIONEGRO	1	
	Sub-total	107	2.1%
Zone 3	VALLE		
	CALI	51	
	PALMIRA	16	
	TULUA	5	
	CARTAGO	2	
	BUGA	1	
	Sub-total	75	15.0%
Zone 4	COSTA ATLANTICA		
	BARRANQUILLA	34	
	CATAGENA	6	
	SANTA MARTA	2	
	Sub-total	42	8.3%
Zone 5	SANTANDER		
	BUCARAMANGA	37	
	BARRANCABERMEJA	2	
	Sub-total	39	7.8%
Zone 6	ANTIGUO CALDAS		
	MANIZALES	15	
	PEREIRA	14	
	ARMENIA	10	
	Sub-total	39	7.8%

(2/2)

Region		(1977) No. of Foundries	Percentage
Zone 7	TOLIMA		
	IBAGUE	6	
	VENADILLO	2	
	ESPINAL	3	
	ARMERO	1	
	Sub-total	12	2.3%
Zone 8	NORTE DE SANTANDER		
	CUCUTA	9	
	OCANA	2	
	Sub-total	11	2.2%
Zone 9	BOYACA		
	DUITAMA	3	
	SOGAMOSO	4	
	TUNJA	3	
	Sub-total	10	2.0%
Zone 10	HUILA		
	NEIVA	8	
	Sub-total	8	1.6%
Zone 11	NARINO		
	PASTO	6	
	Sut-total	6	1.2%
Zone 12	CAUCA		
	POPAYAN	2	
	Sub-total	2	0.4%
	Total National	503	100.0%

Source: COLCIENCIAS. LA FOUNDICION EN COLOMBIA. BOGOTA, 1979.

Table 4.2 SCALE AND LOCALIZATION OF THE 99 FOUNDRY ENTERPRISES IN THE SAMPLE 1977

Classification (No. of Employees)	Zone 1	2	3	4	5	6	7	8	9	Total No.	%
	(No. of Enterprise)										
200 or more	2	3	-	-	-	-	-	-	1	6	6.0%
100 to 199	3	3	1	-	-	1	-	-	-	8	8.0%
50 to 99	6	4	3	1	-	-	-	-	-	14	14.4%
20 to 49	9	7	7	2	1	5	1	-	1	33	33.3%
10 to 19	3	1	4	-	5	-	-	1	1	15	15.1%
1 to 9	-	1	3	1	4	3	-	8	3	23	23.2%
Total	23	19	18	4	10	9	1	9	6	99	100.0%

Note : Zone 1 = CUNDINAMARCA Zone 2 = ANTIOQUIA Zone 3 = VALLE
Zone 4 = COSTA ATLANTICA Zone 5 = SANTANDER Zone 6 = ANTIGUO CALDAS
Zone 7 = TOLIMA Zone 8 = NORTE DE SANTANDER
Zone 9 = BOYACA

Source: COLCIENCIAS. LA FUNDICION EN COLOMBIA. BOGOTA, 1979.

Table 4.3 CLASSIFICATION OF FOUNDRY ENTERPRISES IN BOGOTA - 1986

Classification (No. of Employees)	No. of Enterprise	Percentage (%)	
200 or more	3	2.59	(4.28)
100 to 199	2	1.72	(2.86)
50 to 99	2	1.72	(2.86)
20 to 49	15	12.93	(21.43)
11 to 19	16	13.79	(22.86)
1 to 10	32	27.59	(45.71)
N.A.	46	39.66	(-)
Total	116	100.00	(100.00)

Note : Numerical values in ( ) show the values excepting the enterprises for which data of employees are not available.

Source: UNIVERSIDAD EXTERNADO DE COLOMBIA FACULTAD DE ADMINISTRACION DE EMPRESAS.
LA FUNDICION DE HIERRO EN BOGOTA. BOGOTA, 1987.

Table 4.4 CLASSIFICATION OF THE 23 SAMPLE FOUNDRY ENTERPRISES IN BOGOTA - 1986

Classification (No. of Employees)	No. of Enterprise	Percentage (%)
200 or more	2	8.70
100 to 199	0	0.00
50 to 99	3	13.04
20 to 49	6	26.09
11 to 19	7	30.43
1 to 10	5	21.74
Total	23	100.00

Source: UNIVERSIDAD EXTERNADO DE COLOMBIA FACULTAD DE ADMINISTRACION DE EMPRESAS.
LA FUNDICION DE HIERRO EN BOGOTA. BOGOTA, 1987.

Table 4.5 PRODUCTION QUANTITY OF IRON OR STEEL CASTINGS IN COLOMBIA

Unit: Ton

CIIU Code	Description	1985	1986	1987
37107018	Rails (Rieles)	-	828.0	-
7026	Joint Plates for Rail (Eclisas)	-	-	-
7034	Iron or Steel Cast Pipes	-	72.0	1,360.0
7042	Iron or Steel Cast Wheels	41.4	15.0	2.9
7051	Steel Cast Pieces for Railway	-	-	-
7069	Steel Cast Pieces for Machinery	503.8	615.1	459.9
7093	Other Iron or Steel Cast Pieces	6,971.5	8,034.8	13,334.0
7107	Grinder Body	3,820.7	4,458.9	3,242.1
7115	Grating for Drainage	-	12.0	10.1
7123	Iron or Steel Cast Pieces for Water Works	-	40.0	71.4
37107Total	Iron or Steel Castings	11,337.4	14,075.8	18,480.4

Source: DANE

Table 4.6 IMPORTED QUANTITY OF CAST IRON OR CAST STEEL PRODUCTS AND PARTS (1/2)

Unit: Ton

Nabandina Code	Products and Parts	1985	1986	1987
73.16.01.00	Rails (Rieles) for railway of iron or steel casting	594.8	245.8	4,311.6
73.16.89.01	Ties for railway of iron or steel casting	0.0	0.0	0.0
73.16.89.03	Needles, crosses and switches of railway, etc. of iron or steel casting	0.9	22.2	164.2
73.16.89.99	Contra-rails, unions and fixtures of rail, etc. of iron or steel casting	82.7	43.5	8.0
73.17.00.00	Casting pipes	12.1	1.9	0.1
73.20.01.00	Accessories of piping of non-malleable iron casting	10.0	7.1	13.3
73.20.02.00	Accessories of piping of malleable iron casting	68.4	109.0	118.8
73.20.89.99	Other accessories for piping of iron or steel casting	553.5	123.0	62.0
73.21.01.01	Doors, windows, handrails and grantings, etc. of iron or steel casting	0.0	0.3	42.4
73.21.01.99	Other constructs and their parts of iron or steel casting	3,788.1	3,758.7	4,829.5
73.21.02.00	Plates, bars, etc. to be used for construction of iron or steel casting	2,317.8	1,094.0	2,405.6
73.22.01.00	Silos of iron or steel casting	0.0	11.7	0.0
73.22.89.00	Other tanks, receivers, etc. (except compressed and liquid gases)	0.0	41.6	7.6
73.29.01.99	Other chains and their component parts for transmission	166.5	140.5	107.4
73.29.02.00	Chains of link and their component parts except transmission	125.0	169.1	404.6
73.29.89.00	Other chains and their component parts of iron or steel casting	310.2	306.9	172.8
73.30.00.00	Anchors and their component parts of iron or steel casting	0.4	0.4	17.4
73.31.01.01	Clamps for fence of iron or steel casting	1.3	0.0	9.4
73.31.01.05	Nails for rail of iron or steel casting	0.0	0.0	0.0

Source: INCOMEX.

Unit: Ton

Nabandina Code	Products and Parts	1985	1986	1987
73.31.01.06	Nails for horsehoe of iron or steel casting	0.0	0.0	0.0
73.31.01.99	Other pins and nails of iron or steel casting	124.5	65.8	131.7
73.31.89.01	Needles or tooths for textile machines of iron or steel casting	1.1	4.3	3.1
73.31.89.99	Other hooked nails, hooks and tacks, etc. of iron or steel casting	5.9	8.5	44.5
73.32.01.00	Hooks, screws with ring, etc. of iron or steel casting	6.2	36.1	11.2
73.32.02.01	Expansible anchor bolts for concrete of iron or steel casting	329.4	110.6	245.4
73.32.02.99	Other bolts, nuts, screws and wood screws of iron or steel casting	685.0	671.6	1,453.5
73.32.03.00	Rivets of iron or steel casting	26.1	44.7	53.1
73.32.04.00	Pins, plugs, keys of iron or steel casting	57.7	60.7	47.5
73.36.01.00	Non-electric cooking stoves of iron or steel casting	0.7	8.4	5.4
73.36.89.00	Other stoves, heaters, etc. of iron or steel casting	-	4.1	3.7
73.37.01.00	Iron pots and radiators for central heating, etc. of iron or steel casting	63.7	1.5	12.0
73.37.90.00	Parts and pieces for apparatuses of 73.37.01.00 of iron or steel casting	0.1	3.4	-
73.38.11.01	Sinks and bathtubes of iron or steel casting	0.1	0.0	4.9
73.38.11.99	Other hygienic articles of iron or steel casting	7.7	5.9	1.0
73.38.90.01	Parts and pieces for hausehold articles of iron or steel casting	0.0	0.0	0.5
73.38.90.99	Other parts and pieces for hygienic articles of iron or steel casting	1.0	0.1	0.9
73.40.01.00	Manufactures of casting on no-machining	102.7	7.1	190.2
73.40.89.99	Other manufactures of iron or steel casting	597.8	515.1	496.1

Source: INCOMEX.

Table 4.7 EXPORTED QUANTITY OF CAST IRON AND CAST STEEL PRODUCTS AND PARTS (1/2)

Unit: Ton

Nabandina Code	Products and Parts	1986	1987	1988
73.16.01.00	Rails (Rieles) for railway of iron or steel casting	0.0	0.0	0.0
73.16.89.01	Ties for railway of iron or steel casting	0.0	0.0	0.0
73.16.89.03	Needles, crosses and switches of railway, etc. of iron or steel casting	0.0	0.0	0.0
73.16.89.99	Contra-rails, unions and fixtures of rail, etc. of iron or steel casting	0.0	0.0	-
73.17.00.00	Casting pipes	0.0	0.0	0.0
73.20.01.00	Accessories of piping of non-malleable iron casting	25.7	13.0	10.8
73.20.02.00	Accessories of piping of malleable iron casting	114.0	56.5	44.5
73.20.89.99	Other accessories for piping of iron or steel casting	-	0.7	-
73.21.01.01	Doors, windows, handrails and grantings, etc. of iron or steel casting	47.7	0.0	0.1
73.21.01.99	Other constructs and their parts of iron or steel casting	139.3	77.9	131.4
73.21.02.00	Plates, bars, etc. to be used for construction of iron or steel casting	0.0	0.0	16.8
73.22.01.00	Silos of iron or steel casting	0.0	21.3	19.4
73.22.89.00	Other tanks, receivers, etc. (except compressed and liquid gases)	0.0	7.4	0.0
73.29.01.99	Other chains and their component parts for transmission	51.0	8.6	79.5
73.29.02.00	Chains of link and their component parts except transmission	71.2	21.9	21.8
73.29.89.00	Other chains and their component parts of iron or steel casting	19.7	56.9	88.3
73.30.00.00	Anchors and their component parts of iron or steel casting	0.0	0.0	0.0
73.31.01.01	Clamps for fence of iron or steel casting	0.0	0.0	0.0
73.31.01.05	Nails for rail of iron or steel casting	0.0	0.0	0.0

Source: INCOMEX

Unit: Ton

Nabandina Code	Products and Parts	1986	1987	1988
73.31.01.06	Nails for horsehoe of iron or steel casting	136.3	212.8	285.9
73.31.01.99	Other pins and nails of iron or steel casting	179.2	177.2	271.4
73.31.89.01	Needles or tooths for textile machines of iron or steel casting	0.0	0.0	0.0
73.31.89.99	Other hooked nails, hooks and tacks, etc. of iron or steel casting	1.6	3.7	18.4
73.32.01.00	Hooks, screws with ring, etc. of iron or steel casting	0.1	0.2	1.1
73.32.02.01	Expansible anchor bolts for concrete of iron or steel casting	1.0	-	0.0
73.32.02.99	Other bolts, nuts, screws and wood screws of iron or steel casting	37.9	85.7	88.0
73.32.03.00	Rivets of iron or steel casting	8.0	14.0	22.0
73.32.04.00	Pins, plugs, keys of iron or steel casting	0.0	0.6	0.4
73.36.01.00	Non-electric cooking stoves of iron or steel casting	166.5	253.3	157.6
73.36.89.00	Other stoves, heaters, etc. of iron or steel casting	1.1	12.3	13.8
73.37.01.00	Iron pots and radiators for central heating, etc. of iron or steel casting	0.0	4.3	0.0
73.37.90.00	Parts and pieces for apparatuses of 73.37.01.00 of iron or steel casting	0.0	0.0	0.0
73.38.11.01	Sinks and bathtubes of iron or steel casting	0.0	0.0	0.0
73.38.11.99	Other hygienic articles of iron or steel casting	1.7	0.0	-
73.38.90.01	Parts and pieces for household articles of iron or steel casting	0.0	0.0	0.0
73.38.90.99	Other parts and pieces for hygienic articles of iron or steel casting	0.0	0.0	0.0
73.40.01.00	Manufactures of casting on no-machining	0.0	0.0	0.0
73.40.89.99	Other manufactures of iron or steel casting	429.2	1,363.8	1,639.6

Source: INCOMEX.

Table 4.8 PRODUCTION VALUE OF FORGED PRODUCTS

Unit: kg

	1985	1986	1987
Iron or Steel Forged Pieces for Tractor and Similar	778	7,985	8,581
Other Iron or Steel Forged Pieces	5,345	N.A.	1,719
Iron or Steel Shafts and Other Turning Pieces	270,941	763,192	422,695
Iron or Steel Pulleys	22,956	26,820	98,591
Total	300,020	797,997	531,586

Source: DANE

Table 4.9 IMPORTS OF FORGING

Unit: kg.

DESCRIPTION	1985	1986	1987
Other Forged Bars of Iron or Steel, W/O Working	218,906	2,084,493	44,035
Blooms, Slabs, Flatbars of Forged Carbon Steel	7	111,702	1,559
Blooms, Slabs, Flatbars of Forged Alloyed Steel			651
Massive Bars of Simply Forged Carbon Steel	7,470	11,000	2,148
Massive Bars of Simply Forged Alloyed Steel	119,858	118,625	180,298
Diameter 80mm or More, Forged or Rolled Carbon Steel	5,443	162,011	
Diameter 80mm or Less, Forged or Rolled Stainless Steel	560		104
Other Forged Manufactures of Iron or Steel, W/O Working	19,680	60,852	17,434
Total	371,924	2,548,683	246,229

Source: IMCOMEX

Table 4.10 MAJOR PLATING FACTORIES IN BOGOTA

1) ACABADOS ELECTRO QUIMICOS LTDA
2) ACABADOS GALVANICOS LTDA
3) GEQUIPOS GALVANICOS LTDA
4) INDUSTRIA COLOMBIANA GALVANOTECNICA
5) COLOMBO ARGENTINA DE CROMADOS LIMITADA
6) TRATAMIENTOS DE PIEZAS A TAMBOR
7) CROMADUR LTDA
8) CROMAMOS LTDA
9) CROMATODO
10) CROMO-METAL MANUEL AVELLA
11) CROMOPLAS LTDA
12) CHEMICAL INCO
13) ELECTRO DELGADO Y PULIDO LTDA
14) FUNDICION OSPINA HNOS
15) GALTECO LTDA
16) GALVACROM LTDA
17) GALVANOTECNIA LTDA
18) GALVANOVA LTDA
19) TODAPARA GALVANOPLASTIA
20) INDUSTRIA NACIONAL DE CROMADOS
21) INDUSTRIA ELECTROQUIMICA LTDA
22) INDUSTRIAS ELECTROGALVANO LTDA
23) INGUVAR LTDA
24) MECANIZADOS Y CROMADOS LTDA
25) METALMECANICAS RUIZ LTDA
26) PULIMENTOS COLOMBIA
27) MATERIAS PRIMAS PARA GALVANOPLASTIA
28) RELEC LTDA
29) ZINCADOS ELECTROLITICOS LTDA

Chapter 5 POLICIES TO PROMOTE SMALL AND MEDIUM SCALE ENTERPRISES AND MICROENTERPRISES IN COLOMBIA

Chapter 5 POLICIES TO PROMOTE SMALL AND MEDIUM SCALE ENTERPRISES AND MICROENTERPRISES IN COLOMBIA

The general outline of industrial promotion policies has already been described in 2.4 Of Chapter 2. Here, promotion policies related to SMEs and MEs and the current situation of implementation are examined in detail to identify and problems facing them. At first, the current state and roles of SMEs and MEs in metal-working industries in Colombia economy to be discussed.

5.1 Small and Medium Scale Enterprises and Microenterprises in Colombia

5.1.1 Manufacturing Industry and Small and Medium Scale Industries

The share of manufacturing industry in the GDP remained stable at around 21% in the late 1960s and started to increase little by little in the beginning of the 1970s, then reached the peak of 23.5% in 1974.

In the second half of the 1980s, at the time of national economy being stagnant, the share stayed around 20% and became a little over 21% in the late 1980s. During this decade, the share appears to be stable around 21%. Table 5.1 summarizes the number of formal manufacturing enterprises, the number of employees, and the value added by enterprise size which are shown in the statistical data; note that MEs less than 10 employees has been excluded. The manufacturing industry comprising of 6,556 enterprises, accounted for 21% of the 1986 GDP, 46 million of employment and 1.3 trillion pesos of value added. Small and medium scale enterprises in the statistics represented 93% of total enterprises, 52% of employment and 37% of value added. Value added per employee accounted for 1.7 million pesos in Sml-Es, 2.1 million in Med-Es and 3.6 million in LEs, respectively.

Both in terms of the number of enterprises and employment, Sml-Es shows apparent increase, otherwise Med-Es being constant and LEs being decreased in the ten years since 1977. The same tendency is observed in the value added.

5.1.2 Metalworking Industry

(1) Historical background and problems

Compared with the neighboring countries such as Venezuela and Brazil or Asian countries such as Korea and Taiwan, technical level of the metalworking industry (including machinery manufacturing sector) in Colombia appears to be left behind since 1960. It became apparant as the country tried to promote import substitution of capital goods in the early 1970s. Thus, Colombia selected to engage only in import substitution of consumer goods. Again in the beginning of 1980s, the country started to take part in the import substitution of capital goods. However, it was estimated that only 20% of capital goods was substitutable at that time and 30% at the present.

Relatively low technical level of the metalworking industry, especially in the capital goods sector, caused one of the great obstacle to the development of Colombian economy. If the development of nationalization of capital goods can progress, possibility in improvement of trade imbalance, export expansion of consumer goods which are manufactured by using those capital goods and export expansion of capital goods itself will be realized.

Delay in technological advancement of the metalworking industry appears to be caused by the following negative spiral cycle: 1) the domestic market is too small; 2) this makes domestic production unfeasible, necessitating government subsidy which often leads to monopoly; 3) lack of healthy competition causes delay in modernization of production technology, which deteriorates international competitiveness in terms of

quality, price, and delivery schedule; 4) as a result, the degree of dependency of metalworking products on imports fails to decline, so that the smuggling of foreign products under import restriction becomes common, while exports do not grow continuously; then 5) domestic production cannot grow in share of the domestic market, and coupled with sluggish export, results in the small domestic market.

In fact, there are only a few assembly makers and big foreign enterprises in Colombia. Also, the enterprises whose domestic market and selling price are protected by the tariff are enjoying in the monopolistic condition without making any efforts in technical development nor foreign market development. Moreover, metalworking products manufactured by using domestic raw materials found very expensive and low quality since the domestic raw materials also are protected by the tariff. The fact also made the domestic products uncompetitive in the export market.

Recently, the Colombian government decided to implement a liberalization policy which consists of stepwise import liberalization and reduction of tariff rates. This is expected to introduce the market principle to deal with the problem in 3), necessitating metalworking enterprises to modernize their production equipment and practices. Thus, the policy is considered to be effective in departing from the unfavorable cycle.

(2) Position of metalworking in the manufacturing industry

Table 5.2 shows the position of metalworking operations (including machinery manufacturing) in the manufacturing industry. Metalworking industry is classified as CIIU code No. 381 to 385, and are as following subsectors.

CIIU	Subsector
381	Metal products except machinery
382	Machinery except electrical machinery
383	Electrical machinery
384	Transportation equipment and their repair
385	Office appliances and electronic equipment

The table shows that the metalworking industry represented 20% of total manufacturing enterprises, 17% of employment in the manufacturing industry and no differences are found between 1975 and 1983. As for the value added, the share was 14.1% in 1975 and down to 12.8% in 1983. On the contrary that the growth of GDP is very high in 1975, Colombian economy was stagnant in 1983. In comparison with the average value of the whole manufacturing industry, metalworking look easily to be influenced by business fluctuation.

Table 5.3 shows the position of metalworking in the Colombian economy. The share of metalworking in the GDP has not been known because of lack of statistical data. Thus estimation was made by multiplying a share of manufacturing industry in the GDP by the rate of value added by the metalworking industry in the manufacturing sector, and then, as a share of metalworking in the GDP.

The share of metalworking in the GDP was 3.27% in 1975, and decreased steadily to 2.42% in 1986. The share of the value added in the manufacturing sector also decreased from 14.1% to 11.4% during the period. Thus it appears that the metalworking industry did not contribute to the GDP of manufacturing sector, nor expand the share of the industry in the sector in Colombia. Though the metalworking and machinery industries in general are considered as a leader of industrialization, these had been left behind in the whole industry.

Table 5.1 COMPARISON OF MANUFACTURING INDUSTRY 1/ BY SCALE

	1977		1980		1983		1986	
	Value	%	Value	%	Value	%	Value	%
(1) Number of Establishment								
Small 2/	3,943	(66.8)	4,017	(66.6)	4,293	(68.7)	4,638	(70.7)
Medium 3/	1,464	(24.8)	1,493	(24.8)	1,494	(23.9)	1,453	(22.2)
Large 4/	493	(8.4)	519	(8.6)	463	(7.4)	465	(7.1)
Total	5,900	(100.0)	6,029	(100.0)	6,250	(100.0)	6,556	(100.0)
(2) Number of Employment								
Small	91,669	(19.0)	92,791	(18.2)	96,290	(20.4)	102,929	(22.3)
Medium	140,109	(29.1)	144,340	(28.3)	142,432	(30.2)	135,548	(29.4)
Large	250,468	(51.9)	273,595	(53.5)	233,322	(49.4)	223,311	(48.3)
Total	482,246	(100.0)	510,726	(100.0)	472,044	(100.0)	461,788	(100.0)
(3) Value Added (Million Pesos)								
Small	14,871	(9.2)	29,885	(9.0)	47,431	(8.6)	175,868	(13.8)
Medium	36,146	(22.4)	67,157	(20.3)	131,807	(24.0)	289,405	(22.8)
Large	110,701	(68.4)	233,685	(70.7)	369,399	(67.4)	804,932	(63.4)
Total	161,718	(100.0)	330,727	(100.0)	548,637	(100.0)	1,270,205	(100.0)

Note: 1/ CIIU 311 to 390 2/ 10 to 49 workers 3/ 11 to 199 workers 3/ 200 and more workers
Source: DANE—Encuesta Anual Manufacturera

Table 5.2 METALWORKING INDUSTRY IN MANUFACTURING INDUSTRY SECTOR

	Number of Establishment				Number of Employment				Value Added (Million Pesos)			
	1975		1983		1975		1983		1975		1983	
(1) Total Manufacturing Industry (CIIU 311 to 390)												
Small 1/	3.934		4.293		90.074		96.290		7.363		47.431	
Medium 2/	1.380		1.494		131.914		142.432		21.267		131.807	
Large 3/	448		463		230.605		233.322		58.471		369.399	
Total	5.762		6.250		452.593		472.044		87.101		548.637	
(2) Metal-Mechanical Industry (CIIU 381 to 385)												
Small	841	(21.3) 4/	902	(21.0)	19.802	(22.0)	20.080	(20.9)	1.489	(20.2)	9.935	(20.9)
Medium	263	(19.1)	242	(16.2)	20.951	(15.8)	20.291	(14.2)	2.651	(12.5)	15.133	(11.5)
Large	110	(24.6)	116	(25.1)	37.207	(16.1)	40.205	(17.2)	8.175	(14.0)	44.920	(12.2)
Total	1.214	(21.1)	1.260	(20.2)	77.960	(17.2)	80.576	(17.1)	12.315	(14.1)	69.988	(12.8)

Note: 1/ 10 to 49 workers 2/ 11 to 199 workers 3/ 200 and more workers 4/ Percentage to Total Manufacturing Industry

Source: DANE—Encuesta Anual Manufacturera

Table 5.3 METALWORKING INDUSTRY IN TOTAL ECONOMY

Unit : %

	(1) Share of Manufacturing Sector to GDP	(2) Share of Metalworking Sub-sector to Whole Manufacturing Sector (Value Added)	(3) Share of Metalworking Industry to GDP (1) × (2)
1975	23.2	14.1	3.27
1980	22.4	12.7	2.84
1981	21.3	13.1	2.79
1982	20.8	13.7	2.84
1983	20.7	12.8	2.65
1984	21.2	12.8	2.71
1985	21.2	12.2	2.59
1986	21.2	11.4	2.42

Source:DANE, COLOMBIA ESTADISTICA, 1988

5.2 Measures to Promote Small and Medium Scale Enterprises and Microenterprises

The Socio-Economic Development Plan (Plan de Economia Social) announced by the Government of Colombia in August, 1987 states that the promotion of SMEs and MEs will play a crucial role in Colombia's employment, income and production increases. For the smooth and successful promotion of these enterprises, a series of basic laws and plans to support this objective must be introduced in view of the establishment of a more definite legal and implementation systems. Efforts to consolidate the legal system for the implementation of promotion plans have just begun in Colombia and, as of February, 1990, only one act and one plan relevant to the objective, i.e. Law 78 showing the framework for the promotion of SMEs and MEs and the National Plan for the Development of Microenterprises (PNDM), have been introduced. The former was enforced in December of 1988 while the first and second plans for the latter were announced in March of 1984 and May of 1988 respectively. The contents of the Act and Plan are discussed below.

5.2.1 Basic Law for the Promotion of SMEs and MEs (Law 78)

Enforced on December 21, 1988, Law 78 is a law (ley) to promote SMEs and MEs consisting of 15 articles to provide the framework for promotion measures. As of February 1990, the Ministry of Economic Development prepared the enforcement ordinance for the law. The law is outlined below.

(1) Objectives

1) To foster companies of all sizes to grow, i.e. MEs in the informal sector to Sml and Med-Es, Sml-Es to Med-Es then Med-Es to LEs.

2) To encourage entrepreneurship for individual businesses and MEs, most of which are run by individuals, and to redistribute income and loans to the low income class.

3) To make SMEs contribute to the creation of employment, regional development, reorganization of industries, redistribution of income, formation of national capital and creation of new enterprises by implementing of comprehensive promotion measures.

4) To establish an effective cooperation system for related authorities and organizations by clarifying guidelines for national actions in view of the consolidation of manpower training and utilization efforts which will play an important role in the improvement of productivity.

5) To promote the development of favorable environment for establishment of new SMEs, MEs, as well as better management.

(2) Definitions of small and medium scale enterprises and microenterprises

1) Microenterprises

ME is an economic unit having at least one worker. In the case of the manufacturing, commerce, construction and service industries, the following conditions must also be met.

- The number of full-time employees is less than 20.

- The total assets is less than 15 million pesos.

2) Small and medium enterprises

An individual or legal entity engaged in manufacturing which also satisfies the following conditions is defined as a small and medium enterprise.

- The number of employees is less than 200.

- The total assets is less than 300 million pesos.

Note: The above definitions are based on 1987 statistics and can be modified to reflect the state of inflation.

(3) Roles of Ministry of Economic Development

1) The Government of Colombia is required to establish advisory committees for policies relating to MEs and SMEs within the Ministry of Economic Development.

2) The Government of Colombia is required to establish sections responsible for MEs and SMEs within the Ministry of Economic Development.

3) All government organizations participating in the above advisory committees are expected to report their action programmes and relevant costs every 6 months to the Ministry of Economic Development.

(4) Financial assistance

1) Roles of CFP (Corporacion Financiera Popular)

The CFP is a government-owned financial institution under the jurisdiction of the Ministry of Economic Development and is responsible for financing SMEs and MEs and providing technical assistance. It can also serves as a finance corporation under the relevant law as well as a leasing company and a savings bank to perform its objectives.
In addition, CEP is authorized to provide the following financial services.

a) For MEs and SMEs or their cooperatives intending to purchase raw materials and/or capital goods required for their production activities.

b) For SMEs, either individually or in the form of a cooperative, intending to develop new markets.

c) For enterprises engaged in the repair of vehicles, capital goods or equipment require loans.

d) For MEs and SMEs in the manufacturing, commerce, construction or service industries intending to form a cooperative to expand their economic or production activities.

e) For MEs and SMEs intending to export their products using a loan provided by the Export Promotion Fund (Fond de Promocion de Exportaciones - PROEXPO).

The CFP is expected to allocate 25% of its total loans to MEs.

2) Roles of IFI (Instituto de Formento Industrial-Corporacion Financiera)

The IFI is a government-owned development bank under the jurisdiction of the Ministry of Economic Development. The IFI is required to channel 7% of its total loans to SMEs and MEs through the CFP.

(5) Technical assistance and technical development fund for micro enterprises and small and medium enterprises

The above fund is created to serve for the training of management techniques and the introduction of appropriate technologies and the central government should account for the required sum in its budget. The CFP is responsible for the operation of the fund in accordance with regulations set by the Ministry of Economic Development.

(6) Technical assistance organization

The National Training Department (Servicio Nacional de Aprendizaje - SENA) under the jurisdiction of the Ministry of Labour is required to allocate 2% of its annual budget for assistance in the start-up of MEs and technical assistance for SMEs. The SENA is also

expected to play a role in the utilization of the fund described in (5) above.

(7) National Fund for Development Project (FONADE)

The FONADE (Fondo Nacional de Proyectos de Desarrollo) is required to allocate 4% of its annual non-repayable credit amount to pre-investment studies for MEs and SMEs..

The Basic Law (Ley 78) for the Promotion of SMEs and MEs is outlined in (1) through (7) above. The special features of the Law 78 are the commissioning of the CFP to act as a financial institution for SMEs and MEs, the establishment of the Technical Development Fund and the assignment of the SENA to promote technological development. Also important are that the CFP is required to allocate 25% of its total loans to MEs and that the IFI is demanded to allocate 7% of its credit to MEs and SMEs.

One problem of the Law is that the definition of MEs differs from the traditional definition used by the DNP. For example, the DNP definition which has been adopted in the present study classifies those enterprises with up to 10 employees as MEs while the corresponding figure in Law 78 is 20. The credit line for MEs adopted by the Inter-American Development Bank also defines MEs as those with 10 employees or less. A unified definition will be required in the future in the course of consolidating the relevant legal system.

5.2.2 The National Plan for the Development of Microenterprises (PNDM)

The PNDM (Plan Nacional para el Desarrollo de la Microempresa) is not a legal decree but is a national plan prepared by the DNP and authorized by the Consejo Nacional de Politica Economica y Social (CONPES). The CONPES is an organization established pursuant to Ordinance No. 627 in 1974 to advise the Government on socioeconomic development policies. Its members consist of the Minister of Finance, Minister of Agriculture, Minister of Economic development,

Minister of Public Works, Director General of the DNP, Governor of the Central Bank, Director General of the INCOMEX and the Chairman of the Coffee Producers' Association with meetings chaired by the Director General of the DNP.

The PNDM commenced in March, 1984 under the leadership of the DNP and was expanded in May, 1988 under the new PNDM/1988 - 1990. The PNDM has been a movement on a substantial scale to promote MEs, involving not only government organizations but also a number of non-government organizations (NGOs), particularly various types of foundations, labor unions, domestic financial institutions, international financial institutions, especially the Inter-American Development Bank (IDB), and universities (see Tables 5-4 and 5-5).

The new PNDM is outlined below.

(1) *Objectives*

The basic objective of the PNDM is to support the development of MEs under the recognition that they are an important element in the economic development of the country and in the creation of employment opportunities. In addition, the PNDM intends to advance the living standard of workers by upgrading management, production technologies, productivity and social participation and sets forth the following six objectives.

1) To improve production technologies to boost the productivity of MEs;

2) To increase the income of workers at MEs;

3) To promote creation and fair distribution of wealth by the integration of production activities with other sectors, thereby strengthening the abilities of MEs;

4) To create new marketing channels for procurement of

raw materials by MEs and for the sale of their products;

5) To encourage the participation of owners and workers of MEs, as well as their families, in health and social insurance schemes; and

6) To support the cooperatization among MEs and the organization of labor unions

(2) Strategies and results

The following seven strategies have been introduced in order to achieve the objectives described in (1) above. The first three strategies were inherited from the original PNDM which commenced in 1984 while the other four were added for the PNDM/1988 - 1990.

1) Training related to management;

2) Advice related to management;

3) Expansion and consolidation of finance for MEs;

4) Establishment and expansion of marketing organizations (for material procurement and product sales);

5) Organization of MEs into associations and cooperatives;

6) To develop a legal system to promote the development of MEs; and

7) To promote technical development.

The outline, method and past results of each strategy are described below.

1) Management training related to management techniques

Training courses are provided to enable owners of MEs to learn basic management techniques. The basic courses are "Accounting", "Business Planning", "Marketing" and "Production Cost" and attendance at these four courses is a prerequisite to application to the Inter-American Development Bank (IDB) for the BID line loan.
The Fundacion Carvajal has introduced other training courses such as "Management Principles", "Financial Analysis", "Production Principles", "Personnel Management" and "Quality Control".
The training courses are not only open to those intending to apply for loans but also to the general public. Organizations providing the courses are NGOs (mostly non-profit, private foundations) and the SENA, which operate nationwide.
The courses deal with management techniques which can be applied to any type of business and education, but training directly relating to production technology is not provided.

2) Management advice

Those organizations providing the training courses described in 1) above also send advisors to MEs to improve their business management, financial management, marketing, and technical abilities as well as the exploration of markets.

3) Finance

Loans amounting to 7.2 billion pesos were provided under the PNDM between 1984 and August, 1989 with BID line finance (1st, 2nd and 3rd) accounting for some 50% of the total while the remainder was provided by NGOs.

The 800/SF loan based on the BID line was introduced at the time of the commencement of the

PNDM/1988 - 1990, providing the main financial source for loans under the PNDM (details of the BID line are given in 6.3.1). In addition, NGOs also have their own sources to provide loans.
A total of 1,646 loans amounting to 1,468 million pesos were made by the BID line in the period between September of 1988 and June of 1989.

4) Marketing organizations

The introduction of 10 non-profit marketing organization is planned in 10 major cities under the PNDM to assist the procurement of raw materials and the sale of products by MEs. These organizations will be funded by foundations, the SENA, ME cooperatives and financial institutions, etc. and will charge a commission of 5%. This type of organization is already operating in the following cities.

BOGOTA	-	PROMIC
MEDELLIN	-	PROCOMMERCIAL
CALI	-	FUNDEMIC
IBAGUE	-	ACTUAR

Plans to establish marketing organizations in other cities (Barranquilla, Bucaramanga, Pasto, Caldas and Riohacha) are currently in progress.

5) Promotion of cooperative

To encourage MEs to form a cooperative is intended to improve the efficiency of business activities, to transform MEs from informal to formal and legally responsible enterprises, to efficiently implement various ME promotion programmes, to create a channel to discuss business matters with governmental organizations and others, and to provide group education and training. Some 80 cooperatives have already been established under the cooperation of

the SENA, CORFAS, UNICEF and FESCOL and, as one cooperative consists of average 50 companies, some 4,000 MEs have been organized into cooperatives.

6) Development of legal system

Various research has been conducted on possible legislation to bring the workers of MEs into the existing legal system and to enable them to enjoy social welfare benefits. While only Law 78 described in 5.2.1 has so far been enforced under the PNDM/1988 - 1990, many new acts and laws covering a wide range of subjects are currently being prepared.

7) Technical development

The main purposes of the technical development under the PNDM are (a) to conduct research on conventional production technologies and the possible direction of future technologies to efficiently promote the improvement of the production technologies employed by MEs, (b) to unify training and educational activities on management techniques through training and advice on production technologies, and (c) to improve the production technologies related to capital goods.
The SENA, universities and the DNP are expected to assume the responsibility for the implementation of technological advancement activities and a number of studies have already been conducted with the assistance of the World Bank and JICA, etc.

(3) Overall evaluation of the PNDM and problems

Many government organizations have been promoting the PNDM while some 30 NGOs have been participating in training and finance with some 6 financial institutions involved in institutional financing.
Some 150,000 enterprises received a certain kind of assistance under the PNDM with total loans amounting to 7.2 billion pesos in the period between 1984 when the first PNDM commenced, and mid-1989. Assuming the number of MEs in Colombia to be one million, some 15% of the MEs have benefited from the PNDM.

Promotion of the PNDM has been mainly conducted by NGOs. In fact, it can be said that private organizations have contributed more to the promotion of MEs than public organizations. While this method of promotion is peculiar to Colombia and may well have various advantages, it lacks uniformity in terms of activities and methodology as the activities of those private organizations traditionally providing assistance to MEs and poor people were incorporated into the PNDM framework without proper coordination. It will be necessary for the Government to exert strong leadership in the future to coordinate activities of private organizations in the implementation process of the PNDM.

With regard to advice and training activities, both quantitative expansion (increase of participating organizations) and qualitative improvement (expansion of training courses) are required. It is fortunate that the BID line finance is expected to continue beyond 1990 although the amounts provided are generally small.
Among all the PNDM-related activities, particular emphasis should be given to cooperatization, technical development assistance, legal system establishment and public relations in the future. According to the questionnaire survey results and visits to MEs, many owners of MEs have no knowledge of the PNDM and its activities and finance by the BID line is also rela-

tively unknown. This is one reason why advertising efforts need further emphasis.

Some 80% of MEs are informal enterprises and are not incorporated in any social welfare system. With the advancement of cooperatization, the participation of MEs in social systems will became easier. However, legal assistance offering incentives for MEs to form cooperatives will be essential for the advancement of the movement.

The change from an informal enterprise to formal enterprise is said to result in a cost increase of 60% - 80% because of the labor cost increase, in turn due to the payment of social welfare costs by the company, preparation of registration documents and payment of business taxes. In addition, profits are said to decline by 37%. At present, the procedure to become a formal enterprise is said to consist of 13 steps, including registration with the Chamber of Commerce, providing no incentive to informal MEs. This procedure must be simplified and tax and financial incentives must be provided to promote the formalization of MEs.

While the advice and training activities regarding management can be favorably evaluated, advice and training activities regarding the modernization of production technologies and quality control are far from satisfactory. Although NGOs have been trying hard, they lack adequate manpower and budget and, therefore, the SENA should take leadership in these fields. Moreover, human resources capable of providing training and advice on production technologies and quality control should be fostered using domestic resources, as well as foreign assistance.

5.2.3 Government Organizations for Promotion of SMEs and MEs

Government organizations preparing and promoting development plans in the industrial sector are the DNP responsible for the preparation of national policies, the Ministry of Economic Development responsible for administration in the industrial sector, the Ministry of Labor and Social Security responsible for vocational training and the Ministry of National Education responsible for the promotion of science and technology.
Those organizations directly involved in the promotion of SMEs and MEs are the DNP and Ministry of Economic Development.

(1) DNP

Two organizations in the DNP are closely related to the present study, i.e. the Industrial Development Unit under the Directorate of Sectoral Development and the Directorate of Social Development. The former is responsible for the preparation of general industrial development policies while the latter is responsible for improving productivity and efficiency of MEs - considered as the weak in the society - and providing benefits of social security to larger population.

The Directorate of Social Development, which is the counterpart of the Study Team and originally proposed the PNDM, has been coordinating the various organizations participating in the PNDM.
At present, DNP has no special section responsible for matters related to SMEs. Although it was decided to establish the division on microenterprises and enterprise cooperation (Division de Microenterpresas y Empresas Asociativas) under Decreto 2410 issued in October 1989, no significant activity is carried out as of July 1990.

(2) Ministry of Economic Development

In Colombia, the Ministry of Economic Development is the administrative organ for industrial and trade affairs and is also responsible for the promotion of SMEs and MEs. The ministry prepared the draft for Law 78 in which the establishment of a section dealing with SMEs and MEs was stipulated and although the SMEs Section and the MEs, Technology and Informal Sector Section have been established within the ministry, only managers have been appointed in these sections as of February 1990.

The ministry has only some 80 staffs as of August, 1989, all of which are assigned to the General Affairs, Management and Coordinating Sections, and no external administrative activities are currently conducted by the ministry. Although new recruitment is in progress, the ministry only plans to double the staffing to 160. (About 100 staff, as of February, 1990)

There is a tendency in Colombia to establish public corporations to which ministerial work is assigned. The ministry is no exception to this and entrusts trade affairs, the promotion of exports and development finance to the INCOMEX, PROEXPO and CFP and IFI respectively.

Table 5.4 NON-GOVERNMENTAL ORGANIZATIONS PARTICIPATED TO PNDM (AS OF MAY, 1988)

	Organization	Coverage
A. ORGANIZATIONS REGISTERED	1. FUNDACION CARVAJAL	CALI, YUMBO, DAGUA
	2. CORPORACION MICROEMPRESAS DE ANTIOQUIA	MEDELLIN Y AREA METROPOLITANA
	3. FUNDACION COMPARTIR	BOGOTA
	4. FUNDACION BARRANQUILLA	BARRANQUILLA
	5. FUNDACION SOCIAL	BOGOTA, IBAGUE, NEIVA, PASTO
	6. FUNDACION SARMIENTO PALAU	TULUA, CARTAGO, BUGALAGRANDE, BUGA
	7. FUNDACION PARA EL DESARROLLO DE SANTANDER - FUNDESAN -	BUCARAMANGA
	8. CORPORACION PARA EL DESARROLLO DEL CAUCA - CORPOCAUCA -	POPOYAN
	9. CORPORACION PARA EL DESARROLLO DE CALDAS - CORPOCALDAS -	MANIZALES
	10. FUNDACION PARA EL DESARROLLO ECONOMICO DEL LITORAL PACIFICO - FUNDELPA -	BUENAVENTURA
	11. FUNDACION PARA EL DESARROLLO EMPRESARIAL DEL NORTE DE SANTANDER - FUNDENOR -	CUCUTA
	12. FUNDACION PARA EL DESARROLLO INDUSTRIAL, COMERCIAL Y ARTESANAL DE LA GUAJIRA - FUNDICAR -	RIOHACHA, MAICAO, VILLANUEVA, SAN JUAN DEL CESAR, FONSECA
	13. FUNDACION PARA LA EDUCACION Y EL DESARROLLO COOPERATIVO - FUNDECOOP -	BOGOTA
	14. FUNDACION SANTA HELENA	BOGOTA, CUNDINAMARCA, ANTIOQUIA, BOLIVAR
	15. FUNDACION CIRCULO DE OBREROS	CARTAGENA
	16. FUNDACION CULTIVAR	BOGOTA, NORTE DEL TOLIMA, MAGDALENA MEDIO
	17. FUNDACION PARA EL FOMENTO DE LA INICIATIVA EMPRESARIAL - FUNDAEMPRESA -	CALI

	Organization	Coverage
8. ORGANIZATIONS UNDER PROCESS FOR REGISTRATION	1. FUNDACION SHELL PARA EL APOYO A LA MICROEMPRESA	BOGOTA
	2. MICROEMPRESAS DEL QUINDIO	ARMENIA
	3. MICROEMPRESAS DE PALMIRA	PALMIRA
	4. FUNDACION PARA EL DESARROLLO SOCIAL - FUNDESARROLLO -	BOGOTA
	5. CORPORACION FONDO DE APOYO DE EMPRESAS ASOCIATIVAS - CORFAS -	NACIONAL
	6. CORPORACION ACCION POR ANTIOQUIA - ACTUAR -	MEDELLIN
	7. CORPORACION ACCION POR TOLIMA	IBAGUE
	8. CENTRO DE DESARROLLO VECINAL DE CARTAGENA	CARTAGENA
	9. COOPERATIVA MULTIACTIVA DE DESARROLLO SOCIAL - CIDES -	BOGOTA
	10. FUNDACION FAMILIAR	CALI
	11. FUNDACION BANCO MUNDIAL DE LA MUJER	CALI
	12. FUNDACION BANCO MUNDIAL DE LA MUJER	BUCARAMANGA
	13. CORPORACION BANCO MUNDIAL DE LA MUJER	MEDELLIN
	14. FUNDACION PARA EL DESARROLLO EMPRESARIAL DE CORDOBA - FUNDECOR -	MONTERIA
	15. FUNDACION SAN ISIDRO	MONTELIBANO
	16. FUNDACION PARA EL DESARROLLO DE RISARALDA	PEREIRA
	17. PLAN PADRINOS	NACIONAL
	18. FUNDACION PARA EL DESARROLLO DEL NORTE DEL VALLE - FUNDENORVALLE -	ROLDANILLO
	19. COOPERACION TECNICA COLOMBO ALEMANA - COTECA -	DEPARTAMENTO DE NARIÑO
	20. ASOCIACION GENERAL PARA ASESORAR PEQUEÑAS EMPRESAS - AGAPE -	COSTA ATLANTICA

	Organization	Coverage
C. ORGANIZATIONS FOR SPECIAL SERVICES	1. PROMOTORA DE COMERCIO SOCIAL - PROCOMERCIAL -	MEDELLIN
	2. SISTEMA DE INFORMACION COMERCIAL PARA EL SECTOR MICROEMPRESARIAL - SICME -	VALLE DEL CAUCA. SE EXTENDERA GRADUALMENTE A TODO EL PAIS.
	3. FUNDACION PARA EL DESARROLLO DE LA MICROEMPRESA - FUNDEMIC -	VALLE DEL CAUCA, CAUCA
	4. FUNDACION PROMOTORA DE SERVICIOS MICROEMPRESARIALES	BOGOTA
D. OTHER ENTITIES	1. CAMARAS DE COMERCIO	VARIOUS CITIES
	2. FUNDACION PARA LA EDUCACION SUPERIOR - FES -	CALI, BOGOTA

Table 5.5 PUBLIC ORGANIZATIONS DIRECTLY RELATED TO PNDM
(AS OF MAY, 1988)

1.	DEPARTAMENTO NACIONAL DE PLANEACION (DNP)
2.	MINISTERIO DE DESARROLLO ECONOMICO
3.	MINISTERIO DE TRABAJO Y SEGURIDAD SOCIAL
4.	MINISTERIO DE COMUNICACIONES
5.	DEPARTAMENTO NACIONAL DE COOPERATIVAS
6.	SERVICIO NACIONAL DE APRENDIZAJE (SENA)
7.	ARTESANIAS DE COLOMBIA
8.	CORPORACION FINANCIERA POPULAR (CFP)
9.	BANCO DE LA REPUBLICA
10.	FONADE
11.	COLCIENCIAS
12.	UNIVERSIDADES PUBLICAS
13.	FONDO DRI
14.	PROEXPO
15.	FONDO NACIONAL DE GARANTIAS
16.	LA PREVISORA S.A.

5.3 Present SME and ME Promotion Activities in Colombia

5.3.1 Characteristics of SME and ME Promotion Activities in Colombia

SME and ME promotion activities in Colombia is characterized by clear distinction between SMEs and MEs in order to emphasize the protection and fostering of MEs, as well as the important role played by NGOs due to the small and understaffed government organizations.

(1) ME promotion measures

An ME is defined as an enterprise having less than 11 employees, monthly sales of less than 55 times the minimum monthly wage and fixed assets of less than 220 times the minimum monthly wage. While Law 78 defines an ME as an enterprise with less than 21 employees, the present Report adopts the former definition and this discrepancy should be corrected in the future.

Although there is no official figure for the number of MEs in Colombia, it is generally believed that there are one million MEs (half a million in urban areas and half a million in rural areas), employing 40% of the total labor force. Some 80% of this one million MEs are said to be so-called informal enterprises which are not officially registered and do not pay tax. It is estimated that 40% are engaged in some kind of production, 40% in commerce and distribution and 20% in services.

While the PNDM serves as a national programme for the promotion of MEs, the BID line of the Inter-American Development Bank (to be described in detail in Chapter 6) provides institutional financing for MEs. NGOs also provide their own financing. Furthermore, MEs can apply to the World Bank for the SME loan (see Chapter 6).

NGOs, most of which are various types of foundations,

and the SENA are the main organizations conducting a wide range of activities in terms of training, technical assistance, loan arrangement, project finding and advice, etc. for MEs. NGOs are non-profit organizations which assist MEs and the poor. A further description of NGOs is given in 5.3.2.

(2) SME promotion measures

Law 78 establishes the legal support for the promotion of SMEs, but no related national programme has yet been prepared.

The main loan facilities for SMEs are the SME loan of the World Bank and the FFI loan using domestic funds. Med-Es can also apply for commercial bank loans. Technical assistance for SMEs is mainly provided by the SENA. From the viewpoint of modernizing the metalworking industry, SMEs are expected to play an increasingly important role and thus are eligible for more support.

(3) Role and activities of NGOs

There is no legal definition of an NGO in Colombia. Assuming that an NGO is a non-profit private organization established in view of social welfare, however, Colombia has 5,000 - 6,000 NGOs, most of which are foundations established by private enterprises. The importance of NGOs in the promotion of MEs is undeniable and the PNDM cannot succeed without their cooperation.

While NGOs are generally concerned with providing assistance for the poor and the fostering of MEs, each NGO has its own field of work and conducts a wide range of activities with subject fields including the education of the poor, finance, health, culture, sports,low cost housing and various assistance for MEs (training, education, finance, new establishment, etc.) No single NGO covers the entire range of activities but each has its own programmes.

Major functions of those NGOs participating in the PNDM are 1) to identify needs of MEs, 2) to provide training and education for MEs 3) to make arrangement of finance and 4) to provide advice on management. The advantages of promoting MEs through NGO assistance rather than by direct government involvement are 1) ease in cooperating with entrepreneurs to determine their requirements and solutions to problems, 2) direct contact with entrepreneurs and continuing services for them, 3) better understanding of the local characteristics, 4) ease in establishing a trustworthy relationship with MEs and 5) provision of flexible services without bureaucratic redtape.

In general, the activities of NGOs are financed by the profits of the enterprises which originally established them. As this financing is generally insufficient, however, a service charge is imposed on beneficiaries and part of the interest obtained by arranging BID line finance is also used. The common practice appears to be that most NGOs use their own financial sources for their operating cost while raising funds from outside for loan services.

5.3.2 MEs and NGOs

As already described, NGOs provide important assistance especially for MEs. In fact, the World Bank plans to use NGOs to provide the SMEs loan for SMEs (see 6.3.2). If this plan materializes, the activities of NGOs will expand to cover SMEs.

NGOs were originally established to provide specific services in the field of social welfare. Cooperation for the PNDM has, however, resulted in the provision of additional services by NGOs for MEs in terms of training, advice and credit. Some of those foundations participating in the PNDM are described below for a better understanding of the diverse activities of NGOs.

(1) Fundacion Carvajal

The foundation is one of the leading non-profit organizations in Colombia with a substantial organization and financial resources. It was established in Cali in 1961 with 40% of the stock in the Carvajal Group being handed over by the Carvajal family. The Carvajal Group is one of the largest group of companies in Colombia and is engaged in a wide variety of businesses, including printing, book-binding and overseas trade. 50% of the foundation's running costs are provided by stock dividends and the remainder by service charges.

The foundation has 120 staff members, mostly serving for 1) the welfare of the poor, 2) slum redevelopment and 3) fostering of MEs, with relatively strong growth potential. At the time of its establishment, it was mainly engaged in the provision of services for the public, mostly of an educational nature. It received a loan of half a million U.S. dollars in 1977 from the Inter-American Development Bank and commenced a programme to foster MEs. This was the turning point of the Foundation's strategy and the provision of various kinds of services for some 2,000 MEs was planned in 1989.

The actual services provided by the foundation for MEs are as follows.

1) Education and training of entrepreneurs

The textbooks used nationwide for the education and training of entrepreneurs under the PNDM were originally prepared by the foundation. The foundation provides a total of 9 training courses, i.e. "Accounting", "Production Cost", "Marketing", "Business Plan Preparation", "Management Principles", "Financial Analysis", "Production Principles", "Personnel Management" and "Quality Control", the first 4 of which are compulsory for anyone intending to apply for a BID line loan.

2) Financing

Under the PNDM, the foundation arranges loans using the BID line as the fund source. There are not, however, direct loans by the Foundation. NGOs providing the training for entrepreneurs which is a prerequisite to applications for BID line loans arrange loans between MEs and financial institutions, receiving 12% of the interest for this service.

3) Management advice

The foundation provides advice for MEs on management methods before and after the completion of loan agreements.

4) Technical service

The foundation provides advice for MEs to improve production technologies under the cooperation of the SENA and outside experts.

In addition, the foundation is currently implementing a revitalization programme for poor areas in Cali with the financial assistance of the Ford Foundation in the U.S. It has so far established a small retailers' cooperative in a poor area and a supermarket (wholesaler) which offers high quality but low price food and daily necessities for members of the cooperative. As this constitutes a kind of joint purchase system where goods are purchased in bulk from the manufacturers to cut margins for middlemen, the retailers (i.e. cooperative members) can stock merchandise at a low cost. The supermarket does not impose any margin and, therefore, the purchase prices of the retailers are generally 25% - 30% lower than usual.

The foundation is also implementing a programme to produce or purchase construction materials in bulk so that the poor can construct their houses by themselves cheaply. Factories and warehouses are located on the same premises to facilitate the purchase of materials.

(2) Fundacion Sarmiento Palau

The foundation was established in Cali in 1968 by contribution of 40% of the stock of the San Carlos Sugar Mill. As of October 1989, it has 50 staff members. 2,163 enterprises have so far received some kind of assistance from the foundation.
While the foundation arranges BID line finance, it also has its own credit scheme for street vendors. About 4 to 5 street vendors who have no surety organize themselves into a group with joint and several liability and then apply for a loan. Social education is also provided for these street vendors as their educational level is generally low. Other services include the educational campaign to call for street vendors to save several percent of their monthly sales as working capital in order to prevent loan defaults. The loan period of 90 days and annual interest rate of 23% is more advantageous than ordinary commercial bank loans.

The foundation started its credit service in view of the lack of a domestic financing system for street vendors and informal MEs which forced them to rely on usurers in order to purchase raw materials or merchandise. While the actual situation of usury is difficult to clarify, a staff member of the foundation told the Study Team that usurers demanding 10% interest/day are not unusual.

The foundation also conducts the following welfare services.

1) Assistance for MEs

2) Assistance for small merchants selling fruit and vegetables

3) Health control and other medical services

4) Assistance for cultural activities

5) Education

6) Recreation

7) Football schools

8) Improvement of small food shops

(3) Fundacion Social

The foundation was established in Bogota in 1980 to develop leaders in various fields based on the Christian spirit. It now also provides various services for MEs in accordance with the objectives of the PNDM and has 173 staff members. As only member enterprises of the foundation can enjoy these services, however, a total of 9,361 MEs joined in the 5 years between 1983 and 1988.

The foundation provides training, advice, technical services and a credit service for member MEs which have a good prospect of future growth.

(4) Fundacion Compartir

The Fundacion Compartir was established in Bogota in late 1979 to foster coordinators and managers for public and social activities in order to promote these activities and to deal with population and other social problems in Colombia. It has 52 staff members.

The foundation has two objectives, i.e. 1) the supply of low cost housing and 2) the promotion of MEs based on the PNDM. Activities relating to the second objective cause a financial loss which is covered by the

profits from activities relating to the first objective. The foundation provides training, advice and credit services in line with the PNDM with credit based on the BID line. The foundation has provided services for 5,780 MEs to date.

(5) Fundacion para el Fomento de la Iniciativa Empresarial (FUNDAEMPRESA)

This foundation was established in Cali in 1985 with the objective to support the start-up of new businesses by encouraging the entrepreneurship of MEs while avoiding duplication with the activities of other foundations. Although it has only several staff members, it actively cooperates with other foundations, universities and banks and has already assisted in the successful start-up of 85 new enterprises which created 400 direct jobs and 800 indirect jobs. It plans the start-up of 500 enterprises a year in 1991.

The foundation provides a management education course for those with strong entrepreneurship abilities and relatively high educational background (those with technical college education or higher: TECHNICO) to enable them to successfully form and manage new enterprises. The foundation also conducts feasibility studies on plans to establish new enterprises as submitted by graduates of this course and, if a plan is assessed as being feasible, the foundation provides 50% of the project cost.

After a new enterprise has been established, the foundation conducts a weekly check for approximately one year on the business activities of the enterprise with a view to provide advice and continues to regularly provide advice for the next 3 years. Since applications for BID line credit are accepted one year after the establishment of a new enterprise, an enterprise can hope to expand its business at that time.

(6) Fundacion Santa Elena

The Fundacion Santa Elena was established in Bogota in 1963 to provide education and training services, increasing employment opportunities, improving income and health, as well as housing for the poor. It launched the Enterprise Development Fund (Fondo de Desarrollo Empresarial: FDE) in 1986, a programme to foster MEs, and the foundation's services for MEs are based on the FDE.

The enterprises eligible for the FDE services are those with less than 10 employees, fixed assets of less than 7 million pesos and monthly sales of less than 2 million pesos. These figures are similar to those used to define a ME under the PNDM. Under the FDE, training, advice, technical services and a credit service were provided for 965 MEs in line with the objectives of the PNDM in the period between September 21, 1987 and June 30, 1989.

Financial sources of the foundation are its own capital and the BID line. Those completing the 4 basic courses (Accounting, Production Cost, Marketing and Business Planning, totaling 70 hours) can apply for the BID line credit. Proposed projects applied for the credit must be feasible and must have more than one year's business experience.

Loans of up to 800,000 pesos can be provided from the foundation's own financial sources for entrepreneurs intending to establish new businesses. The loan conditions are a repayment period of 2 years and an annual interest rate of 24%. 8 days are required to process a loan application and grant a loan while the authorization procedure in the case of the BID line credit requires 1 - 2 months.

(7) Corporacion Fondo de Apoyo de Empresas Asociativas (CORFAS)

The CORFAS was established in 1978 under bilateral assistance from Holland with the backing of the SENA. Its original purpose was to study appropriate methods to promote and provide advice for enterprises managed by people with low income. When the study was completed, it was agreed to maintain the CORFAS in its present form in 1983.

The CORFAS currently aims at improving the living standard of the poorest by creating employment opportunities and by unifying MEs into groups to assure the income of their employees and to encourage their participation in social affairs. The CORFAS in fact consists of 3 NGOs, i.e. the Asociacion de Apoyo a la Empresa de Autogestion, Fundacion Participar and Centro de Investigacion y Educacion Popular. It has 23 offices nationwide and 70 consultants which provide various services.

The CORFAS has the following assistance programmes to achieve the above objectives.

1) Rural MEs programme
2) Daily necessities distribution programme
3) Loan programme
4) Special programme for women
5) Community development programme

The CORFAS relies on external assistance for 75% of its budget and member organizations provide financial assistance for one or more of the above programmes. These organizations include the Colombian Ministry of Agriculture, Government of Holland, UNICEF, WFP, CEBEMO (Dutch fundation), Inter-American Foundation (U.S.) and Ford Foundation (U.S.).

The CORFAS emphasizes the development of new markets for MEs and is cooperating with the PROMIC and FUNDEMIC, both of which are non-profit trading companies.

The CORFAS provides most of its loans from its own financial sources and, unlike other foundations, relies little on the BID line. The loan conditions offered by the CORFAS are as follows.

1) Annual interest rate : 24%
2) Loan limit : None
3) Guarantor : Not required
4) Collateral : Mortgage on purchased item(s)
5) Working capital loan
   - no guarantor required
   - loan period : 2 years
   - grace period : 6 months
6) Fixed asset loan
   - mortgage on purchased asset
   - no guarantor required
   - loan period : 4 years
   - grace period : 1 year

5.3.3 Trade Associations by Size of Enterprises

(1) Asociacion Nacional de Industriales (ANDI)

The ANDI was established in Medellin on September 11, 1944 as an association of private enterprises. Its members are leading large and medium scale enterprises in various industrial fields. In addition to the main office in Medellin, it also has offices in such main cities as Bogota, Barranquilla, Bucaramanga, Cali, Cartagena, Pereira, Manizales, Ibague and Armenia.

The 5 main objectives of the ANDI are as follows:

1) to contribute to the improvement of society, economy and production to upgrade the living standard of the public

2) to protect the interests of member enterprises through the provision of various services.

3) to contribute to national development by cooperating with the Government

4) to act as a representative of member enterprises in dealings with both the Government and the public

5) to provide data and information to assist member enterprises in dealings with social and economic problems both at home and abroad

As the members of the ANDI have a substantial share in the national economy, the achievement of these objectives will result in the vitalization of domestic production and the improvement of living standards. In relation to its objectives, the ANDI sends representatives as permanent members or directors to some 17 governmental administrative councils and corporations, including the Consejo Nacional Laboral, Consejo Nacional del ISS* and Junta Administradora de Riesgos Economicos del ISS. Moreover, it also sends representatives on behalf of Colombia industries to some 10 international committees and congresses, including the Consejo de Administracion de la Organizacion Internacional del Trabajo (OIT) and Organismo Especializado de las Naciones Unidas con sede en Ginebra (SUIZA).

Note: *ISS: Instituto de Seguros Scociales

In addition to representing Colombian industries, the ANDI acts as the brain for these industries by analyzing socio-economic phenomena which appear to have major impacts on both industries and individual enterprises and by submitting recommendations to government agencies. The ANDI also has some influences on legislative organizations through the submission of recommendations following feasibility studies on whether or not new legislation is required for the implementation of projects.

The ANDI provides the following services for its members to protect their interests and to promote their development.

- Publication of "REVISTA ANDI"

  This is an information magazine which gives the results of the ANDI's analysis of immediate problems facing related industries.

- Publication of special issues

  Special issues carry articles relating to social, labour, judicial, economic and commercial affairs.

- Provision of advice

  Advice on such subjects relating to foreign trade as imports, exports, foreign exchange, overseas investments, foreign markets, tariffs and transportation costs, etc. is provided.

  Information and advice on how to deal with government pressure (by administrative or judicial organizations) are also provided.

- Industrial committees

  Committees for each type of industry are established to analyze specific conditions of each industry.

In view of the stagnation of the domestic manufacturing industry since the early 1980s, the ANDI has given priority to the restructuring of the manufacturing industry. One of the measures taken in this direction is the establishment of the Subcontract Exchange (Bolsa de Subcontratacion) under cooperation with other organizations in the private sector in order to promote the specialization of enterprises. This was followed by the introduction of the Distribution Center Project.

Reduction of the production cost is essential to manufacture internationally competitive products. To achieve this, therefore, each manufacturer should specialize by commissioning those processes which hinder production line efficiency to other manufacturers specializing the these processes.

The Subcontracting Exchange is discussed in detail in 5.3.5.

The high proportion of the transportation cost in the overall production cost of domestic manufacturers who depend on imported raw materials and intermediate products makes the competitiveness low in domestic market, as well as in export market, owing to the lack of a well organized distribution system, together with the lack of distribution centers.

The Distribution Center Project to be promoted by such leading organizations in the private sector as the ANDI and ACOPI will receive financial assistance from domestic steel enterprises. However, the Project has not yet been implemented due to unsolved problems.

(2) Asociacion Colombiana Popular de Industriales (ACOPI)

The ACOPI was established in 1953 by the merger of the Asociacion de Pequenos Industriales de Barranquilla (ADIBA), Organizacion de Pequenos Industriales Colombianos (OPICOL), Asociacion de Pequenos Industriales de Occidente (APIO) and Asociacion Colombiana de Pequenos Industriales (founded in Bogota in 1951).

MEs are playing an important role in the domestic economy. The ACOPI aims at the vitalization of the Colombian economy through the creation and fostering of SMEs. Its activities are divided into those which are jointly conducted with other private or public organizations and those based on its own programs. It largely depends on external aid for the promotion of technical assistance programs and for those programs

requiring large amounts of funding.

1) Establishment of new organizations

The ACOPI encourages the establishment of new private organzization to actively promote SMEs. For example, it established the Corporacion de Ferias y Exposiciones (CORFERIAS) under cooperation with the Ministerio de Fomento (antecedents of the Ministry of Economic Development) to market domestic and foreign products by holding exhibitions. The ACOPI also contributed to the establishment of the SENA and the Bolsa de Subcontratacion in addition to the CFP to promote easily accessible loans for SMEs.

2) Dispatch of technical study teams overseas.

With the financial assistance of such companies as ICETEX Industrial and Instrumento del Gobierno Nacional, the ACOPI sends the following categories of technical study teams overseas to both tangibly and intangibly contribute on the technical development of SMEs.

a) Overseas technical level study team
b) Technology transfer and promotion study team
c) Joint venture promotion study team

3) Technical information service

The ACOPI provides technical information in the following fields in cooperation with the SENA and the COLCIENCIAS.

a) Products
b) Production processes
c) Equipment
d) Control technology

4) Diffusion of technologies

The ACOPI conducts the following activities in view of technology diffusion.

a) Publication of the technical information magazine "El Informador Tecnologico" to introduce domestic and foreign technologies.

b) Publication of Normas Sobre Calidad Producidas (product quality standards).

c) Provision of a quality control course for members under cooperation with the ICONTEC and the provision of the "Best Quality" course for food processing enterprises under cooperation with the COLCIENCIAS.

d) Publication of articles in industrial news papers and other media to diffuse national standards.

The establishment of the Bolsa de Subcontratacion, improvement of the distribution system and establishment of distribution centers are commonly requested by all Colombian industries and the ACOPI has been actively promoting projects relating to these objectives.

One common weakness of Colombian SMEs is marketing. The ACOPI plans the establishment of a trading company to expand the sales outlets for Colombian products while conducting the various promotional activities and services described above. While the PROEXPO has agreed to provide the most part of the planned capital (200 million pesos) for this trading company, the ACOPI has so far failed to secure the remaining 50 million pesos which has prevented the implementation of the project. A weak financial background is a common feature of private organizations and the limited scope of the activities conducted by private organizations is inevita-

ble, as long as these activities are not expected to show any profit.

(3) Confederacion Nacional de Microempresarios de Colombia (CONAMIC)

The CONAMIC was established in Manizales on April 20, 1985. Although many small cooperatives or associations of MEs began to emerge all over Colombia at the beginning of the 1980's, they never reached a size capable of representing MEs in negotiations with the Government or public organizations. Against this background, the SENA and UNICEF believed that the unification of these cooperatives and associations was essential for the promotion of MEs and their efforts resulted in the establishment of the CONAMIC.

Any informal or formal microenterprises are eligible for membership of CONAMIC and, therefore, such personal businesses as street vendors and home helpers are excluded from the CONAMIC. The CONAMIC currently has 7 regional groups with some 3,000 members as of 1989.

The socio-economic basis of MEs is weak in all the related aspects, such as productivity, profitability, organizational strength and credit worthiness, etc. The CONAMIC represents these weak MEs in their negotiations with the Government in order to protect their interests and also provides various services for the promotion of MEs.

One important function of the CONAMIC is to act as an information center providing extensive information required by MEs for the expansion of their business activities. While the information service consists of 3 pillars, i.e. marketing, technology and credit, such activities as the expansion of marketing channels, the provision of loans, credit guarantee and technical guidance are conducted by specialized organizations outside the CONAMIC. The CONAMIC intermediate between such organizations and MEs.

As MEs generally lack funds and manpower, they also lack full-time staff for information gathering. Even if measures or systems to promote MEs are introduced, MEs often fail to obtain the vital information on these measures or systems due to the limited scope of their activities. This is where the CONAMIC comes in which conducts information gathering and analysis on behalf of MEs.

In the area of marketing, for example, such non-profit organizations as the Fundacion Promotora de Servicios Microempresariales (PROMIC) and Sistema de Informacion Comercial Microempresarial (SICME) actively assist MEs. These organizations which specialize in marketing assist the expansion of the business of MEs in terms of expanding the marketing channels, raw material purchase, credit to enable MEs to accept order, discount of bills and the provision of information.

With regard to loan systems for MEs, the BID line and the CORFAS loan, both of which have been introduced line with the PNDM, are available. The CONAMIC explains these loan systems to MEs and assists them with their applications.

Since the introduction of the PNDM and the enforcement of Law 78, the promotion of MEs has been integrated in the national policy. As already described in 5.2, these promotion policies have proved effective for MEs despite some unsolved problems.

Nevertheless, numerous MEs are still struggling to survive without any knowledge of these measures or the existence of the CONAMIC. The CONAMIC is, therefore, trying hard to expand its membership in addition to consolidation of its services.

5.3.4 Metalworking Related Organizations

Both of FEDEMETAL and COPIME play an important role in the metalworking industry. While the former is a federation of metalworking enterprises, the latter is a kind of incorporated trading enterprise engaged in the purchase and marketing of raw materials and machinery. The activities of these 2 organizations are described below.

(1) Federacion Colombiana de Industrias Metalurgicas (FEDEMETAL)

1) Establishment and objectives

The FEDEMETAL was established on April 4, 1955 as a non-profit private organization and was the first federation of enterprises in Colombia covering specific industries (metalworking industry and steel industry).
The FEDEMETAL conducts the following activities for the purposes of consolidating the unity of domestic enterprises, organizing related industries and stimulating the development of industries while handling metals as the means or objectives of its economic and industrial activities.

a) To represent the interests, requirements and demands of member enterprises in relation to government agencies and the general public.

b) To encourage mutual cooperation and joint work between member enterprises.

c) To support the systematic introduction and diffusion of new technologies for the benefit of the industries while also supporting scientific and technical research on related industrial areas.

d) To promote the development of member enterprises by employing measures which can be implemented through own efforts of the industries, industri-

al organizations or government agencies related to the industries.

e) To collect, systematize and diffuse all information and documents relating to the industries and activities of member enterprises.

f) To actively participate in economic agreements or plans agreed by the Colombian government with foreign countries, which relate to the interest of member enterprises or the industry.

g) To make plan and execute cooperation with international economic organizations or associations for the benefit of the steel industry and metal-working industry in Colombia.

2) Services

The FEDEMETAL provides the following services for member enterprises.

a) Representation of industries

To protect and promote the interests of member enterprises and to put forward their requirements in relation to government agencies.

b) Industry related activities

To conduct industry related activities by means of its internal organizations, especially sub-sector committees which are convened to discuss agendas closely related to the industries in order to lead the unity and development of the industries.

c) Direct assistance

To conduct assistance work and activities specially requested by member enterprises in such fields as trade (imports, exports, tariffs,

foreign exchange, tax exemption and tariff subsidies), finance, trade marks, patents, labor law and labor policies. In addition, it provides assistance in any field requested by a member enterprises.

d) Information and reference services

To provide technical, commercial, economic, scientific and technical data, indices, regulations, documents and other reference materials on the metalworking and steel industries.

e) Diffusion of information

To analyse data, problems and themes in which member enterprises have a direct interest and diffuse the analysis results via regular periodicals, including newsletter, bulletins, magazines, annual reports and special reports.

f) International cooperation

To cooperate within the framework of international agreements and cooperation plans with overseas private organizations as well as international organizations which are related to the economic and commercial development of the metalworking and steel industries.

3) Organization

The FEDEMETAL has two types of internal working committees to conduct technical and economic work.

a) General committees

These committees discuss those problems of common and permanent concerns which affect the domestic metalworking and steel industries. At present, the following general committees are operating on both national and regional levels.

- Trade committee
- National Procurement Committee
- Labor Issue Committee
- Taxation System Committee
- Development Strategy Committee

b) Sub-sectoral committees

These are special committees which are established in response to a request by member enterprises in order to serve specific sectors. The number of committee members, organization and activities are determined in a flexible manner depending on the theme and the degree of concern on the part of member enterprises. At present, there are 56 sub-sectoral committees, such as the Aluminum Committee, Automobile Committee, Welding Committee and New Technology Committee, etc., with a total of 1,095 members.

c) Office network

The FEDEMETAL has its main office in Bogota and branch offices in the main cities as listed below.

Main Office	: Bogota
Atlantico Branch Office	: Barranquilla
Antioquia Branch Office	: Medellin
Bolivar Branch Office	: Cartagena
Cardas Branch Office	: Manizales
Central Branch Office	: Bogota
Santander Branch Office	: Bucaramanga
Valle del Cauca Branch Office	: Cali

4) Evaluation of FEDEMETAL's services

As the representative of the metalworking industry, the FEDEMETAL actively expresses its opinion on government policies which affect the metalworking industry. For instance, in the case of the liber-

alization and restructuring of the industry which are the most important issues for the metalworking industry, the FEDEMETAL expresses its views through the general meeting attended by government officials, leading newspapers, its own periodicals and papers.

The FEDEMETAL publishes a number of books and periodicals not only to diffuse general and special information but also to act as a vehicle for its opinions. For example, past statistical data are extensively used to make proposals on general economic policies, public finance, labor, finance, trade, technologies and systems for the promotion of the metalworking industry in the "Plataforma Metalmecanica" published a few years ago and written by a consultant under the supervision of the FEDEMETAL. The FEDEMETAL also publishes a wide range of information through statistical data books and periodicals.

The FEDEMETAL is also active in the field of international cooperation, including attendance at the Andes Group Economic Unification Treaty Talks. It also actively involved in sending economic missions overseas.

Members of the FEDEMETAL have so far been dominated by large and medium scale enterprises. In the future, however, the FEDEMETAL should try to include Sml-Es and MEs which are essential for the general development of Colombian industries in order to protect their interests and to provide the services required by these Sml-Es and MEs. With their participation in the FEDEMETAL, Sml-Es and MEs committee should be established so that their requirements can be put forward to government agencies and other organizations.

(2) Cooperativa de Industriales Metalurgicos LTDA (COPIME)

The COPIME is a cooperative (in the form of a limited company) formed by SMEs (approximately 10 - 100 employees) in the metalworking industry situated in the Bogota area. At present, it has 250 members and provides services only for its members. It was established in February, 1963 with the purpose of unifying SMEs in the metalworking industry, protecting the interests of its members and assisting their development.

The main business of the COPIME is to purchase raw materials and machinery for metalworking purposes and resale them to members. In this context, it can be said that the COPIME acts as a trading company with a cooperative character. In addition, the COPIME has a financing function, providing financial assistance for the members. Other services include seminars on production technologies and management techniques and the introduction of new products and new technologies through its bulletins. It has some 40 staff members, half of which are engaged in the transportation and distribution of raw materials while the other half consists of administrative staff which provide various services for members.

The COPIME has its own funds to provide loans for members. Members are eligible for a loan by paying an enrollment fee of 50,000 pesos plus a deposit of at least 100,000 pesos which serves as a guarantee for the loan. There are two types of loans available. One is applicable for the purchase of products or raw materials which are sold by the COPIME, constituting a kind of credit purchase, while the other is used for purchases from other than the COPIME. The actual loan provided by the COPIME are as follows.

1) Linea Ordinaria

- Used for the purchase of raw materials which are sold by the COPIME

- Purchase on credit up to double the amount of the deposit balance with the COPIME

- Monthly interest rate: 2.5% (annual rate: 30%)

- Grace period: 30 - 40 days

2) Linea Fondo Financiero

- Used for the purchase of processing machines and raw materials which are sold by the COPIME

- Purchase on credit up to 12 times the deposit balance with the COPIME

- Loan period - purchase of machinery :120 days
  - purchase of raw materials: 90 days

- Annual interest rate: 18%

- No grace period

3) Linea Ahorro y Credito

This is similar to an ordinary bank loan. Members are required to make an interest-payable deposit to the COPIME and can borrow up to 4 times the deposit amount in return.

- No withdrawal of the deposit in the first 3 months (i.e. 3 month deposit)

- Annual deposit interest: 21%

- Annual loan interest: 28%

- Loan limit: 4 times the deposit amount

- Can be used for the purchase of products not handled by the COPIME

4) Linea Corporacion Financiera Popular

- Used for the purchase of raw materials which are sold by the COPIME
- No deposit required
- Guarantor: 2 guarantors required
- Annual loan interest: 38%
- Loan repayment: 50% of the 90th day and the remaining 50% on the 180th day
- Loan limit: 2.5 million pesos

When a member enterprise purchases goods from the COPIME, it must deposit 4% of the purchase price with the COPIME in the case of credit purchase and 1% in the case of cash purchase. This way, the COPIME makes its members create assets (in the form of increased deposits) and also obtains funds for further loans.

Approximately a half of raw materials purchased in bulk by the COPIME and sold to its members is imported. As it is difficult for each enterprise to individually import such raw materials because of small volumes and complicated import procedure, the role played by the COPIME is extremely important. The popularity of the COPIME's credit system was witnessed by the Study Team at some of the enterprises visited which are members of the COPIME. This system is very convenient for those enterprises lacking sufficient working capital or investment funds.

The COPIME does not currently intend to expand its service area beyond the Bogota area. In view of the important function played by the COPIME for SMEs and MEs in the metalworking industry, however, it is desirable that similar cooperatives be established in other areas.

5.3.5 Promotion of Subcontracting and Subcontracting Exchange (Bolsa de Subcontratation)

The division of labor, i.e. subcontracting, among SMEs and MEs is quite useful in improving the production efficiency, particularly in the metalworking industry, advantageous for both contractors and subcontractors.

1) Advantages for contractors

- The production cost can be reduced as no investment in new equipment is required.

- The loss of opportunity costs and an excess production capacity can be avoided by removing those production processes which are provided by subcontractors.

- The lead time between investment in new equipment and the commencement of production (earning of income) can be eliminated or reduced by placing orders to those subcontractors with the necessary equipment.

- The production of more competitive products is possible by the use of the special technologies owned by subcontractors.

- The surplus time and resources created by subcontracting can be used for the useful research and development of new markets.

2) Advantages for subcontractors

- Production equipment can be used to the maximum capacity.

- The product mix and production line can be highly specialized.

- Technical innovation can be achieved following changes of the technologies employed by customers.

- The cost to develop markets and the sales promotion cost (marketing cost) can be drastically reduced.

The New Colombian Industry Foundation (Fundacion Nueva Colombia Industrial: NCI) was established under the leadership of the FEDEMETAL aiming at preparation of development programmes and policies by the establishment of working groups, the members of which are manufacturers' representatives, scientists, engineers, etc., which study the various themes which are essential for the industrial development of Colombia. The Colombian Subcontract Service Foundation (Fundacion Servicio Colombiano de Subcontratacion) was created in 1988 to promote subcontracting business in Colombia.
In addition, the Bolsa de Subcontratacion were established in Bogota in 1987, Medellin in 1988 and Cali in 1989.

(1) Need for establishment of subcontracting exchange and objectives

An information center to promote subcontracting has long been demanded in Colombia and the Bolsa de Subcontratacion was established in September, 1987 to serve the function with the following objectives.

- Assistance for horizontal relationships between Colombian industries

- Assistance for closer relationships between large enterprises and SMEs

- Assistance for the maximum utilization of the production capacities in industries

- Assistance for technology transfer between large enterprises and SMEs

(2) Support organizations

Founding Members

Asociacion Nacional de Industriales (ANDI)
Asociacion Colombiana Popular de Industriales (ACOPI)
Federacion Colombiana de Industriales Metalurgicas (FEDEMETAL)
Camara de Comercio de Bogota (CCB)
Camara de Comercio de Medellin (CCM)
Nueva Colombia Industrial (NCI)

Supporting Member

Microempresas de Antioquia

Technical and Financial Assistance Members

Organizacion Naciones Unidas Desarrollo Industrial (ONUDI: UNIDO)
Junta Acuerdo de Cartagena (JUNAC)
Fondo Nacional de Proyectos de Desarrollo (FONADE)
Fondo Colombiano de Investigaciones Cientificas (COLCIENCIAS)

(3) Organization

National Level: Servicio Colombiano de Subcontratacion (established in September, 1987)
Local Level: Bogota Bolsa de Subcontratacion (established in September, 1987)
Medellin Bolsa de Subcontratacion (established in November, 1988)
Cali Bolsa de Subcontratacion (planned establishment in November, 1989)

The regional Bolsa de Subcontratacion are subordinate offices of the Fundacion. The Bogota office has 4 staff members while the Medellin office has 2 staff members.

(4) Activities

The work of the Bolsa de Subcontratacion is to record data on prospective subcontractors in the computer and to provide this information to those enterprises requiring subcontractors. The Bolsa de Subcontratacion explains its objectives over the telephone to possible subcontractors selected from the lists of the ANDI, ACOPI, FEDEMETAL and regional Chamber of Commerce and invites them to register with the Bolsa de Subcontratacion. If an enterprise shows interest in registering, outside experts are commissioned to visit the enterprise to collect relevant data. The data is then sorted in accordance with the predetermined format and is stored in the computer databank.

An enterprise looking for a subcontractor submits an inquiry to the Bolsa de Subcontratacion and receives a list of possible subcontractors chosen from the databank. On receiving this list, the enterprise (prospective contractor) directly negotiates with the prospective subcontractor and the Bolsa de Subcontratacion is not involved in these negotiations. This matching service is provided free of charge.
The first databank was created for the metalworking industry, followed by the plastics processing industry. The creation of databanks for the sewing industry and the printing industry are currently in progress.

Number of Registered Subcontractors (July, 1989)

	Metalworking	Plastics
Bogota	385	85
Medellin	270	65
Cali	in preparation	in preparation

The Bogota Bolsa de Subcontratacion received 416 enquiries and achieved 200 successful subcontracting agreements to a total value of 1,200 million pesos up to July, 1989 while the Medellin Bolsa de Subcontratacion received 155 inquiries and agreements to a total value of 150 million pesos were successfully concluded.
Sixty percent of enterprises registered as potential subcontractors are Sml-Es, 25% Med-Es and 15% LEs. No ME has yet registered due to the lack of information and poor equipment conditions. 90% of the concluded agreements were temporary agreements while the remainder were for continuous subcontracting.

According to a staff of the Bogota Bolsa de Subcontratacion interviewed by the Study Team, almost all the agreements were made between Med-Es and Sml-Es, with few subcontracting agreements between LEs and SMEs which was the initial objective of the Bolsa de Subcontratacion. The main reason for this is that SMEs are unable to manufacture products of the quality demanded by LEs because of the technological gap between them. In addition, the assembly industry (large enterprises) in Colombia tends to prefer imported products to domestic products. After the successful conclusion of subcontracting agreements, a number of problems can arise. Typical problems in the past have been (1) subcontractors unwilling to reduce the unit cost despite an increased order, (2) poor product quality largely due to poor quality of raw materials, (3) high raw material cost and (4) late delivery of subcontracted products.

5.3.6 Industrialization Policies

Those systems closely related to the promotion of SMEs and MEs and their implementation conditions have so far been described. Here, industrialization measures which are common for all types of industries and all sizes of enter-

prises are briefly discussed. Refer to Chapter 6 for the financial system for industrial promotion and Chapter 7 for organizations providing technical assistance.

(1) Export promotion

1) Certificado de Reembolso Tributario (CERT)

This is an export promotion system under which exporters of Colombian products can redeem a certain percentage of the export value (FOB price). This redemption is made in pesos by means of a certificate for tax deduction (CERT) issued by the Central Bank. However, such traditional export commodities as coffee, oil and petroleum products are excluded from the system. The CERT is transferable and can be used to pay income tax, customs duty or commodity tax, etc. at its face value. The rate of redemption depends on the type of product to be exported and is reviewed every year. The highest rate is currently 12% of the FOB price.

2) Plan Vallejo

This is a system to partially or totally exempt the imports of raw materials and capital goods (machinery and others) used for the production of export products from deposits or import tax. In addition, import licences are preferentially granted for the imports of capital goods, raw materials and intermediate products which are required for the production of export products and services.

3) Free Zones (Zona Franca)

A total of six free zones have so far been established and two additional zones are under development to promote exports, domestic and foreign investment and efficient imports. The established free zones are located in Santa Marta, Barraquilla and Cartagena from east to west on the Atlantic coast, Cucuta inland near the border with Venezue-

la, Buenaventura on the Pacific coast and Palmaseca in subburban Cali to the southeast of Buenaventura while those under development are located in Uraba on the Atlantic coast near the border with Panama and Rionegro inland near Medellin.

These free zones are under the control of the Ministerio de Desarrollo Economico and the INCOMEX. There are both industrial and commercial zones in these free zones and bonded warehouses controlled by the ministry are located in the commercial zones.
The act governing the free zones was amended in 1985 by Law 109. In accordance with the law, free zones are exempt from local regulations, meaning that all production and commercial activities in the free zones are treated in the same way as those abroad.

- Import duty : not applicable
- Domestic sale of products: applicable import duty
- Income Tax : not applicable
- Currency : free exchange with national currency
- Profit remittance : remittance of all profits of foreign enterprises allowed
- Application of CERT : not applicable for exports from free zones. But applicable for the sale of domestic products to free zones as they constitute exports

4) Fondo de Promocion de Exportacion (PROEXPO)

The PROEXPO was established pursuant to Decree 444 of 1967 which aimed at the promotion of exports and its activities are a) provision of export credit,

b) promotion of exports and c) surveys on foreign markets. 6% of the 18% special import duty is allocated to the PROEXPO to support its activities. Refer to 6.2.2 for the credit conditions offered by the PROEXPO and other information.

(2) Programa Bienes de Capital (PBC)

The Capital Goods Program (PBC) was jointly prepared in 1985 by the Colombian government and the UNIDO with a time limit of 5 years to promote the import substitution of capital goods and to correct trade imbalance where 50% of the total demand for intermediate goods and 80% for capital goods were imported.

The domestic founding members of the implentation body of the PBC are the DNP, INCOMEX, IFI and COLCIENCIAS (Fundo de Investigaciones Cientificas "Francisco Jose de Caldas") and the PBC is supported by two organizations of the UNIDO and UNDP (United Nations Development Programme). In principle, the operation cost is borne by the UNDP, but the Colombian government, IFI, INCOMEX and UNDP also provide financial assistance depending on the types of activities. The PBC consists of the following subprogrammes.

1) Selection of promising industries and feasibility studies on selected industries (MONOGRAFIAS)
2) Promotion of industries (PROIN)
3) Promotion of technologies (PROTEC)
4) Studies on economic means to promote industries (ECONO)
5) Establishment of an information system (INFO)
6) Provision of information on domestic products (SIPNA)

1) MONOGRAFIAS

Identify promising industries and conduct feasibility studies on them. Based on the study results, activities to promote those enterprises to be engaged in actual production are conducted to

encourage local production. Industries with high domestic consumption values and high import ratios are given the highest priority in the selection of promising industries and these industries are then classified into four ranks (A-D) depending on the degree of technical difficulty involved. Feasibility studies are conducted from the highest ranked industries downwards.

2) The PROIN aims at promoting the development of local industries by making the above feasibility study results known to the public and effectively utilizing the national purchasing power. In practice, public organizations list equipment and parts which are domestically available and procure the listed domestic products through tenders for national projects. These activities are conducted by the GII which was established under the PBC based on Law 780 in 1987. The GII is organized by the telecommunications, mining, energy and public works sectors.

3) The PROTEC aims at promoting research and development, utilization, quality control and technology transfer which have favorable impact on the development of industries to produce capital goods. Foreign experts will be invited to participate in training courses and seminars for the promotion of the PROTEC.

4) ECONO will prepare statistical data on products related to the PBC.

5) INFO aims at maintaining information center to assist staff and researchers of the PBC and to respond inquiries from entrepreneurs.

6) The SIPNA is an assistance program to be introduced by the PBC for the INCOMEX, aiming at the development of a database (including program software and hardware) for locally produced capital goods.

At present, only 1) and 2) above are being implemented and 3) through 6) are awaiting implementation in the future. Those capital goods which have so far been given priority in nationalization efforts under the PBC are telephones, microcomputers, electronic equipment and its components, ovens for industrial and laboratory use, relays, electronic parts for measuring, control and inspection purposes, metal pipes, compressors, etc. In view of the importance of the activities promoted under the PBC, these activities will be continued by a government agency (probably the Ministerio de Desarrollo Economico) after the planned 5 years (up to 1990).

(3) Protection of domestic products

1) Government procurement

Decree 222 of 1983 stipulates the contract method of public works requiring the use of designated domestic products, the use of national labor, etc. The government and public corporations also try to give priority to domestic enterprises under the PBC in view of expanding the procurement of domestic products.

2) Tariff system and import licences

The Central Bank was in charge of trade control up until 1963 when the INCOMEX was established within the Central Bank to take over the responsibility. The INCOMEX has been conducting the actual work since 1968 under the control of the Ministry of Economic Development (Ministerio de Desarrollo Economico) pursuant to Decree 444 of 1967.

Colombia has a multiple tariff system consisting of general tariffs, LAIA preferential tariffs and ANCOM preferential tariffs. In general, the general tariff rate on the CIF price, a 10% sales tax and an 18% special duty are imposed on imported goods. The highest general tariff rate is 55% with

the exception of a 200% tariff rate which is imposed on importation of automobiles in the form of the complete built-up.

There are 2 types of import licences,

Free licence (Licencia Libre)
Previous licence (Licencia Previa)

Besides the import of certain items is prohibited. At present, items subject to import prohibition are those considered harmful to Colombia's political or social system. The subject items for preliminary examination are those which are produced domestically and satisfy domestic market needs to a significant degree, or those which are not availalbe locally and require a large amount of foreign currency for imports, mainly raw materials. Finally, items subject to the Licencia Libre are those not produced locally. It should be noted, however, that this classification sets forth general rules and the INCOMEX makes judgement on individual cases.

As shown in the following table, the number of items which imports are banned was 54 (1.1%) as of July, 1989, while the number of items subject to the Licencia Previa and Licencia Libre were 3,104 (60.4%) and 1,984 (38.6%) respectively. The table also shows that the number of import prohibition items drastically declined in 1985 while the number of items subject to the Licencia Libre increased.

Then, in February 1990, the government shifted from the protection policy to the economic liberalization policy and launched major import liberalization. This was designed to introduce a market mechanism into the domestic industry through increased imports, thereby to increase competitiveness of Colombian products in international markets.

The import liberalization was implemented on the basis of Resolution No.4 of the External Trade Council of the INCOMEX on February 22, 1990, and

the government reclassified 861 items in 8-digit tariff classification subject to preliminary examination to those subject to the Licencia Libre.
These items ranged from live animals and plants to industrial products, with emphasis on industrial materials and parts, including scientific instruments, chemical products, metal products, machinery, and electrical equipment.
In total, 393 items are materials which are not produced locally, while remaining 468 items are registered for domestic production.
This liberalization decreased a share of items subject to preliminary examination from 60% to 46% of the total.

Number of Items by Import Licences

Year	Prohib.	%	Previa	%	Libre	%	Total
1984	828	16.5	4,160	83.0	23	0.5	5,011
1985	69	1.4	3,602	71.6	1,359	27.0	5,030
1986	56	1.1	3,160	62.7	1,826	36.2	5,042
1987	56	1.1	3,081	61.1	1,905	37.8	5,042
1988	54	1.1	3,094	60.3	1,984	38.7	5,132
1989*	54	1.1	3,104	60.4	1,984	38.6	5,142

Note : * July, 1989
Source : INCOMEX

Manufacturers can apply to the INCOMEX for the transfer of an item from the Licencia Libre category to the Licencia Previa category i.e., for the purpose of obtaining protection for domestic products and the INCOMEX will then examine the following points relating to the item in question.

- Local contents, the total percentage of raw materials, components and parts in the final product shall be 50% or more.

- The domestic production capacity of the product shall satisfy most of the domestic demand and also has the potential for expansion to meet the export demand.

- The quality of the product shall be competitive against similar foreign products.

- The price of the product is competitive against similar foreign products.

While tariff rates and import licencing are major means of protecting domestic products, the liberalization of trade has become an urgent issue for the Colombian economy in addition to industrial restructuring. The INCOMEX has expressed its intention to proceed with trade liberalization transferring items from the Licencia Previa category to the Licencia Libre category in the next three years, and to reduce tariff rates in the subsequent two years.

In February, 1990, toward trade liberalization 861 items were transferred to the Licencia Libre from the Licencia Previa resulting 2,860, 2,229 and 54 items of the Licencia Libre, Licencia Previa and Prohibido categories respectively.

3) Protection of assembly industry

The Colombian government instructed the Superintendence of Industry and Commerce (Superintendencia de Industria y Comercio) under the Ministry of Economic Development, to introduce restrictive regulations relating to the assembly industry pursuant to Decree 3218 issued on November 22, 1983 in which enterprises manufacturing the following items have been accredited by the Government as assembly enterprises.

Automobiles/motorcycles (including parts), telephones and switchboards, household electrical appliances, small aircraft, bicycles, engines, mobile electrical machinery, elevators, tractors and electronic equipment

A total of 46 enterprises have so far received the accredition and further 50 have made applications. In the automobile and motorcycle industries, however, only 3 and 4 enterprises respectively have been accredited and no further accredition will be granted in these industries.

An enterprise accredited as an assembly enterprise has the following obligations.

a) To secure technology transfer from abroad
b) To gradually increase the local content
c) To increase exports in stages

In exchange for these obligations, the enterprise has the following benefits.

a) Assurance of a domestic market share due to the lack of excessive competition, in turn due to the limitation of the number of enterprises in each type of industry

b) Advantages in obtaining government contracts due to the status of domestic manufacturers

c) Protection due to tariff protection against the import of similar finished products

However, it is possible to see that the protectionism is modified under the economic liberalization policy.