

No.

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**  
**REGIONAL AUTONOMOUS CORPORATION OF CUNDINAMARCA (CAR)**  
**THE REPUBLIC OF COLOMBIA**

**THE STUDY ON**  
**REGIONAL ENVIRONMENTAL IMPROVEMENT PLAN**  
**FOR**  
**THE BASIN OF LAKE FUQUENE**

**FINAL REPORT**

**Vol. 3 : SUPPORTING REPORT**

**MAY 2000**

**CTI ENGINEERING INTERNATIONAL CO., LTD.**

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***EXCHANGE RATES***

The exchange rates used in this Study are:

US Dollar (US\$)1.00 = Japanese Yen (¥) 106

= Colombian Pesos (Col\$) 1,920

As of October 1999

## **COMPOSITION OF FINAL REPORT**

**Vol. 1 EXECUTIVE SUMMARY**

**Vol. 2 MAIN REPORT**

**Vol. 3 SUPPORTING REPORT (APPENDIX A to K)**

APPENDIX A Socioeconomic Conditions

APPENDIX B Hydrology

APPENDIX C Water Resources and Use Management

APPENDIX D Land Use and Watershed Management

APPENDIX E Water Quality and Pollution Mechanism

APPENDIX F Wastewater Treatment

APPENDIX G Aquatic Plant Control of the Lake

APPENDIX H Monitoring System

APPENDIX I Environmental Education

APPENDIX J Institutional Aspects

APPENDIX K Project Evaluation

***APPENDIX A***

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***SOCIOECONOMIC  
CONDITIONS***

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## APPENDIX A

### SOCIOECONOMIC CONDITIONS

#### Table of Contents

|                   |   |             |
|-------------------|---|-------------|
| <b>CHAPTER I</b>  | <b>EXISTING SOCIOECONOMIC CONDITIONS.....</b>   | <b>A-1</b>  |
| 1.1               | Introduction .....                              | A-1         |
| 1.2               | Socioeconomic Conditions of the Study Area..... | A-1         |
| 1.2.1             | Administrative Units .....                      | A-1         |
| 1.2.2             | Population.....                                 | A-2         |
| 1.2.3             | Main Economic Activities .....                  | A-3         |
| 1.2.4             | Employment.....                                 | A-6         |
| 1.2.5             | Education.....                                  | A-6         |
| 1.2.6             | Health.....                                     | A-7         |
| 1.2.7             | Housing .....                                   | A-7         |
| 1.2.8             | Gross Domestic Product.....                     | A-7         |
| 1.2.9             | Other Socioeconomic Indicators .....            | A-9         |
| <b>CHAPTER II</b> | <b>PROJECTION OF FUTURE SOCIOECONOMY.....</b>   | <b>A-10</b> |
| 2.1               | Existing Plans.....                             | A-10        |
| 2.2               | Population.....                                 | A-11        |
| 2.3               | Livestock .....                                 | A-12        |
| 2.4               | Agriculture.....                                | A-12        |
| 2.5               | Industry .....                                  | A-12        |
| 2.6               | GDP Projection at National Level.....           | A-13        |
| <b>REFERENCES</b> | <b>.....</b>                                    | <b>A-14</b> |

### **List of Tables**

|              |  |       |
|--------------|--|-------|
| Table A.1.1  | Livestock Production in Municipalities of the Study Area.....              | A -T1 |
| Table A.1.2  | Milk Production in Municipalities of the Study Area.....                   | A-T2  |
| Table A.1.3  | Agriculture Production in Municipalities of the Study Area.....            | A-T3  |
| Table A.1.4  | Milk Industries Production in the Study Area (1998) .....                  | A-T4  |
| Table A.1.5  | Mining Production in Municipalities of the Study Area.....                 | A-T5  |
| Table A.1.6  | Health Establishments in the Study Area (1998).....                        | A-T6  |
| Table A.1.7  | Structure of Gross Domestic Product.....                                   | A-T7  |
| Table A.1.8  | Rate of Growth of Gross Domestic Product<br>by Sector in Cundinamarca..... | A-T8  |
| Table A.1.9  | Gross Domestic Product at Market Price by Sector.....                      | A-T9  |
| Table A.1.10 | Rates of Exchanges in Colombia in Col\$/US\$.....                          | A-T10 |
| Table A.2.1  | Projection of the Population in Municipalities of the Study Area.....      | A-T11 |



## **APPENDIX A SOCIOECONOMIC CONDITIONS**

### **CHAPTER I EXISTING SOCIOECONOMIC CONDITIONS**

#### **1.1 Introduction**

The survey on the existing socioeconomic conditions was made utilizing existing available data such as the Municipal and Prefecture Development Plans, Municipal Environmental Plans, Geographic Dictionary of Colombia. In the case of population, the last census of 1993 performed by DANE (National Administrative Department of Statistics) was considered. As for the area of each municipality, were used data provided by the IGAC (Geographic Institute “Agustin Codazzi”).

Regarding the projection of the future socio-economy, the population for the target year was projected considering data of population provided by DANE. As for agriculture and livestock production, existing available data of the URPA (Regional Unit for Agriculture/Livestock Planning) were considered.

As for milk industries, only very few data on the current production were available. Most of the industries are exploited on artisan level and lacks the statistical information on its production.

As for the mining industries, data on the production of consecutive five years were considered for legal mining. Legal mining are those that have permission from MINERCOL (Minerals of Colombia which belong to the Ministry of Mining) and from CAR for its exploitation.

As for the Gross Domestic Product, in view of the absence of information from the municipalities on the subject, data of the Cundinamarca Prefecture was analyzed and considered since more than 70 % of the municipalities of the basin falls under the jurisdiction of that prefecture.

#### **1.2 Socioeconomic Conditions of the Study Area**

##### **1.2.1 Administrative Units**

The number of municipalities conforming the study area are 17, of which 12 fall under the Prefecture of Cundinamarca and 5 under the Prefecture of Boyaca. On the other hand, the institution who is managing environmentally the territory of the study area is CAR with its correspondent branch. Here down is summarized what is mentioned above:

| Municipalities         | Prefecture   | CAR Branch Name       |
|------------------------|--------------|-----------------------|
| 2. Carmen de Carupa    | Cundinamarca | Regional of Ubate     |
| 3. Ubate               | Cundinamarca | Regional of Ubate     |
| 4. Tausa               | Cundinamarca | Regional of Ubate     |
| 5. Sutatausa           | Cundinamarca | Regional of Zipaquira |
| 6. Cucunuba            | Cundinamarca | Regional of Ubate     |
| 1. Suesca              | Cundinamarca | Regional of Zipaquira |
| 8. Villapinzon         | Cundinamarca | Regional of Zipaquira |
| 7. Lenguazaque         | Cundinamarca | Regional of Ubate     |
| 9. Guacheta            | Cundinamarca | Regional of Ubate     |
| 10. San Miguel de Sema | Boyaca       | Regional of Ubate     |
| 11. Raquira            | Boyaca       | Regional of Ubate     |
| 12. Fuquene            | Cundinamarca | Regional of Ubate     |
| 13. Susa               | Cundinamarca | Regional of Ubate     |
| 14. Simijaca           | Cundinamarca | Regional of Ubate     |
| 15. Caldas             | Boyaca       | Regional of Ubate     |
| 16. Chiquinquirá       | Boyaca       | Regional of Ubate     |
| 17. Saboya             | Boyaca       | Regional of Ubate     |

The rural areas of the municipalities are subdivided by small villages named “Veredas”, and every “Vereda” has its own name. When the population of some “Vereda” increase, then the related Municipality set up there a municipal institution named “Inspection of Police” and in this case is not more used the name of “Vereda” but “Inspection of Police”.

## 1.2.2 Population

According to the Population Census Adjusted of 1993, bellow is shown the population of the Municipalities of the Study area for the year 1993 for both urban and rural area.

| Municipalities  | Total          | Urban         | Rural          |
|-----------------|----------------|---------------|----------------|
| 1.C.de Carupa   | 9,293          | 1,250         | 8,043          |
| 2.Ubate         | 35,719         | 14,745        | 20,974         |
| 3.Tausa         | 6,861          | 467           | 6,394          |
| 4.Sutatausa     | 4,263          | 958           | 3,305          |
| 5.Cucunuba      | 8,466          | 952           | 7,514          |
| 6. Suesca       | 11,463         | 3,125         | 8,338          |
| 7. Villapinzon  | 15,276         | 4,656         | 10,620         |
| 8.Lenguazaque   | 9,470          | 1,861         | 7,609          |
| 9.Guacheta      | 11,689         | 3,226         | 8,463          |
| 10.S.M.de Sema  | 4,598          | 441           | 4,157          |
| 11.Raquira      | 11,839         | 1,152         | 10,687         |
| 12.Fuquene      | 5,216          | 217           | 4,999          |
| 13.Susa         | 6,048          | 1,207         | 4,841          |
| 14.Simijaca     | 9,276          | 3,864         | 5,412          |
| 15.Caldas       | 5,769          | 146           | 5,623          |
| 16.Chiquinquirá | 46,793         | 38,707        | 8,086          |
| 17.Saboya       | 14,572         | 695           | 13,877         |
| <b>Total</b>    | <b>216,611</b> | <b>77,669</b> | <b>138,942</b> |

On the other hand, bellow is presented the population of the municipalities and the population of the study area for the year 1998 using data of population projection made by DANE:

| Municipalities  | Population 1998     |               |                |                |               |                |
|-----------------|---------------------|---------------|----------------|----------------|---------------|----------------|
|                 | In the Municipality |               |                | In the Basin   |               |                |
|                 | Total               | Urban         | Rural          | Total          | Urban         | Rural          |
| 1.C.de Carupa   | 9,770               | 1,511         | 8,259          | 7,641          | 1,511         | 6,130          |
| 2.Ubate         | 39,475              | 16,883        | 22,592         | 39,475         | 16,883        | 22,592         |
| 3.Tausa         | 7,097               | 635           | 6,462          | 1,546          | 635           | 911            |
| 4.Sutatausa     | 4,542               | 1,104         | 3,438          | 4,542          | 1,104         | 3,438          |
| 5.Cucunuba      | 9,217               | 1,226         | 7,991          | 7,222          | 1,226         | 5,996          |
| 6. Suesca       | 12,963              | 3,761         | 9,202          | 2,136          | 0             | 2,136          |
| 7. Villapinzon  | 15,970              | 5,138         | 10,832         | 1,330          | 0             | 1,330          |
| 8.Lenguazaque   | 9,897               | 2,133         | 7,764          | 9,897          | 2,133         | 7,764          |
| 9.Guacheta      | 12,338              | 3,621         | 8,717          | 12,338         | 3,621         | 8,717          |
| 10.S.M.de Sema  | 4,492               | 525           | 3,967          | 4,492          | 525           | 3,967          |
| 11.Raquira      | 12,712              | 1,502         | 11,210         | 2,325          |               | 2,325          |
| 12.Fuquene      | 5,477               | 348           | 5,129          | 5,477          | 348           | 5,129          |
| 13.Susa         | 6,261               | 1,368         | 4,893          | 6,261          | 1,368         | 4,893          |
| 14.Simijaca     | 9,771               | 4,215         | 5,556          | 9,771          | 4,215         | 5,556          |
| 15.Caldas       | 5,776               | 275           | 5,501          | 5,776          | 275           | 5,501          |
| 16.Chiquinquirá | 49,175              | 41,021        | 8,154          | 47,630         | 41,021        | 6,609          |
| 17.Saboya       | 14,078              | 979           | 13,099         | 13,080         | 979           | 12,101         |
| <b>Total</b>    | <b>229,011</b>      | <b>86,245</b> | <b>142,766</b> | <b>180,941</b> | <b>75,844</b> | <b>105,097</b> |

Eight of the 17 municipalities composing the study area, the municipalities of Chiquinquirá, Saboya, Carmen de Carupa, Cucunuba, Tausa, Raquirá, Suesca and Villapinzon are divided by the limits of the basin, being included in the study area the urban area and part of the rural sector in the case of Chiquinquirá, Saboya, Carmen de Carupa, Cucunuba and Tausa and part of the rural sector in the case of Raquirá, Suesca and Villapinzon, and the population for those areas were prorated in function of the territorial area.

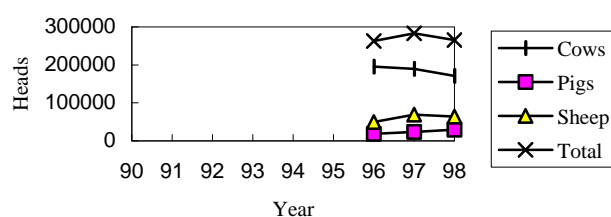
### 1.2.3 Main Economic Activities

#### (1) Livestock

Essentially livestock for milk production is the main economical activity of the region. Municipalities such as Chiquinquirá, Simijaca, San Miguel de Sema, Susa, Fuquene and Ubate are big milk suppliers for Bogota city.

Existing available data of consecutive three years on livestock production in the Municipalities of the Study Area had been collected and the summary is presented in the bellow graph.

**Livestock Production in the Study Area**



The total livestock production composed mainly by cows, pigs and sheep, had been increased in the period 1996-1997, however in contrast, the number of heads of cows had decreased constantly from 1996 to 1998. According to some interviews to officers of the Municipalities and UMATA, many cows die every year for they consume pasture “biche”(local name given to the pasture just starting growing) which contain nitrate.

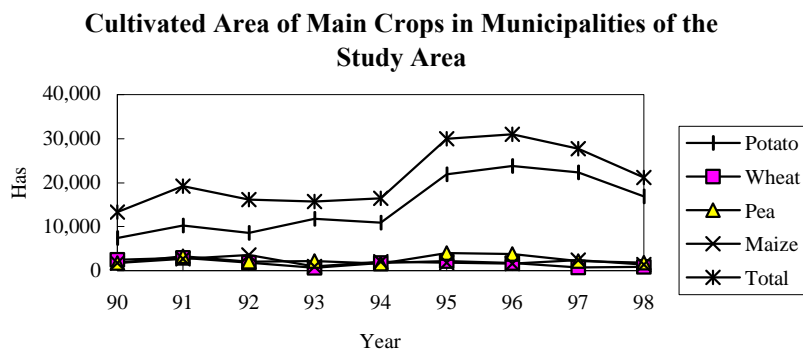
By the year 1998, the total average value of cows, pigs and sheep were Mills Col\$ 165,831(116.26 million US\$), Mills Col\$ 7,464 (5.23 million US\$) and Mills Col\$ 9,660 (6.77 million US\$) respectively. (Exchange rate in 1998: 1US\$=1,426.35 pesos). The pigs and sheep are not exploited formally and from the production in the basin we can say that they represent an important resource for the familiar economy. For more details refer to Table A.1.1.

As for milk production, considering the three year studied, the average production of milk is of 8.3 liters/head/day, being the lowest registered in Caldas, 3.5 liters/head/day, and the maximum in San Miguel de Sema, 15 liters/head/day. In addition the average unit price of the producer in Col\$/liter for the year 1998 was of Col\$ 351.Refer to Table A.1.2.

(2) Agriculture

The Agriculture is less important in terms of economy in the region and the main crops cultivated are potato, maize, wheat, pea and maize. Mixed activities of livestock-agriculture are localized basically around Simijaca, Susa, Ubate and north-side of Chiquinquirá.

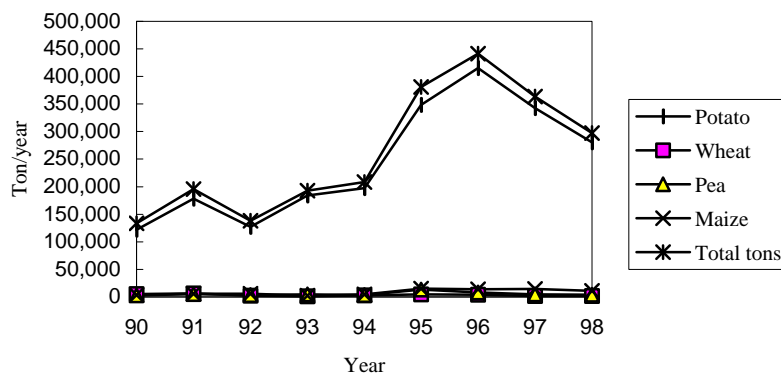
The historical yearly cultivated area of the main crops in Municipalities of the Study Area is shown bellow.



From the graph it is possible to conclude that in the basin the potato occupies the first place in terms of agriculture economy. On the other hand, the total cultivated area of the main crops had begun to decrease from 1996.

Regarding the production as shown bellow, in the case of the potato, since 1996 had started the reduction in its production and this can be attributable mainly to the apparition of a plague named “polilla guatemalteca”.

**Agriculture Production in Municipalities of the Study Area**



By the year 1998, the total amount generated by the potato, wheat, pea, and maize, were Mills Col\$ 80,637 (56.53 million US\$), Mills Col\$ 554 (0.39 million US\$), Mills Col\$ 3,114 (2.18 million US\$) and Mills Col\$ 2,760 (1.94 million US\$) respectively. (Exchange rate in 1998: 1US\$=1,426.35 pesos).

For more details, refer to Table A.1.3.

(3) Industry

The industry sector has low development rate in area. Few industries are functioning in the region and most of them can be categorized as medium to small scale sizes, among these industries there are:

(a) Milk Processing Industries

These industries are distributed mainly in municipalities of Ubate, Chiquinquirá and Simijaca. The total number of milk industries is 50, of which 5 are large, 5 are medium and the rest 40 are small.

It was not possible to get historical statistical information on the production of the milk industries of the basin, however, the average production for 1998 as shown below, was estimated utilizing the results of the questionnaires handed to the managers of the sector.

| Municipalities        | Milk Industries Production in 1998 |                    |                   |                  |
|-----------------------|------------------------------------|--------------------|-------------------|------------------|
|                       | Establishments (nos.)              | Milk(lts)          | Yogurt(lts)       | Cheese(kg)       |
| 1. Ubate              | 29                                 | 55,966,545         | 5,430,470         | 993,895          |
| 2. Tausa              | 1                                  |                    | 5,475             | 16,060           |
| 3. Guacheta           | 1                                  |                    | 5,475             | 16,060           |
| 4. San Miguel de Sema | 1                                  | 13,778,750         |                   |                  |
| 5. Fuquene            | 2                                  | 26,766,545         | 2,630,920         | 246,375          |
| 6. Simijaca           | 6                                  | 69,745,295         | 5,267,315         | 508,810          |
| 7. Chiquinquirá       | 10                                 |                    | 54,750            | 160,600          |
| <b>Total</b>          | <b>50</b>                          | <b>166,257,135</b> | <b>13,394,405</b> | <b>1,941,800</b> |

More details are given in Table A.1.4.

(b) Mining Industries

Among these industries, the extraction of mineral carbon and its conversion in coke and the extraction of sand and stone for construction, are the most relevant in the region. Municipalities such as Guacheta, Lenguazaque, Cucunuba, Sutatausa , are big producers of mineral carbon as indicated bellow.

| Municipalities | Legal Mining (nos.) | Production (1998)<br>(tons/year) |
|----------------|---------------------|----------------------------------|
| 1. Cucunuba    | 105                 | 283,895                          |
| 2. Lenguazaque | 68                  | 107,953                          |
| 3. Guacheta    | 51                  | 124,270                          |
| 4. Tausa       | 5                   | 82,745                           |
| 5. Sutatausa   | 39                  | 153,829                          |
| 6. Raquira     | 12                  | 11,020                           |
| Total          | 280                 | 763,712                          |

See, Table A.1.5 for more details.

#### 1.2.4 Employment

The main source of employment in the study area represents the livestock and agriculture and in minor proportion mining, milk factories and the scarce vacancies either at municipal level as in other institutions. This fact had bring about the migration of the economic active population towards the relatively big cities.

#### 1.2.5 Education

The major findings are described here under:

- (1) The people of the rural area are generally persons dedicated to the agriculture with low income and with incomplete primary education and in many cases non-literacy.
- (2) As for the non-formal education, in some municipalities, SENA (National Service for Learning) is giving training to teachers in the field of computer, human rights, project elaboration, etc.
- (3) Some of the municipalities lacks of institutions for technical or professional education.
- (4) The education had been decentralized, in consequence, the financial support of all public primary schools fall under the responsibility of the municipalities including the construction & maintenance of facilities and salaries of the personnel. Regarding the high schools, some of them are supported by some municipalities and other are supported by the prefecture.
- (5) In some municipalities the coverage of the population in education is very low and among the causes are: long distances between houses and schools, the lack of transport, low income of the families to sustain their children, the low quality of the

education and the early access of the youth to the economical activities.

### **1.2.6 Health**

The major findings are described here under:

- (1) At least one Public Health Office is available in the municipalities of the basin. The rural area is attended in some cases by small Health office from where urgent patients are derived to Hospitals or Health Centers. In addition, the health promoters also attend the rural area making preventive medicine through education, promotion, primary assistance, immunizations and canalization of services to the Health Center.
- (2) Mains diseases affecting the population are: respiratory infections, water born diseases, lung diseases, skin infections, arterial hypertension, etc.
- (3) In some municipalities, most of the children who had been checked in the hospitals present problems of malnutrition.

The number of health establishments are shown in Table A 1.6.

### **1.2.7 Housing**

The major finding from the Municipal Development plans are the followings:

- (1) Most of the houses of the rural area are deteriorated since the countryman lacks the necessary funds for the maintenance. In addition many houses lacks latrines or sanitary services and in many cases can be found more than one family living in one house.
- (2) Some big municipalities such as Ubate, faces with the problems of migration of persons whose houses are made in many cases of inferior quality materials.
- (3) In many municipalities there is a deficit of housing and many of the existing one are made of poor quality materials.

### **1.2.8 Gross Domestic Product**

The composition of the GDP of Cundinamarca prefecture indicates that production is higher than the services in almost 2.5 times. The production is composed by the primary sector for around 44 % and by the secondary sector for approximately 27 %. As for services, the basic services constitutes around of 3 % and other services approximately of 27 %.(See Table A.1.7)

It should be mentioned that the proportion of the basic services that includes the water sector is very low and this fact can have strong implication on the public health.

The agricultural-livestock sector is the main generator of GDP in the prefecture since it occupies around 40 % of the total. The Cundinamarca prefecture is characterized of being composed by small and medium scale producers with low familiar income, low technological level in their productive systems and low educational level.

One problem to the prefecture level is the substitution of agricultural activities for bovine livestock. The bovine population was calculated in 1,222,797 cows for the semester "A" of

1997 and this figure is higher in 4.47 % than that of the semester “B” of 1996. The daily average production are calculated in 8.09 liters of milk per cow, 280 grams of weigh increasing and the capacity of load is of 1.05 heads/ha, being these parameters considered low.

The mining sector is composed by small-scale enterprise using technology of low productivity. This sector had decreased between 1993-1996 due to the economical recession in the construction sector but had increased in 1997 due to the increasing of carbon consumption in the generation of electricity.

The economy of the prefecture has cycle movement of short periods, in fact, there was a decreasing from 1987 to 1990, with a critical point in 1990, then there was an increasing until 1992 due mainly to a strong agricultural production, to get down again in critical form in 1993, finally, in the period 1994-1997, the economy of the prefecture tends to be stabilized with decreasing rates.(See Table A.1.8). The projected GDP value for 1997 is of 1,144,376 Millions Pesos in constant prices of 1987.(See Table A.1.9).

(1) Population and GDP in Currents Prices

The Gross Domestic Product of Cundinamarca Prefecture, in current prices of market, during the period 1987-1997 maintain an average participation of 7% in the National GDP. This participation is higher (7.4%) in the first years 1987-1992 and lower in recent years (6.5%). According to this participation, Cundinamarca becomes the fourth in the National GDP and the first in the Region of Center West. The nominal growth of the GDP per capita has been unstable and with a projection to be reduced. The population and GDP of Cundinamarca in current prices Col\$ is shown bellow.

| Year | Cundinamarca Prefecture |                       |                     |                      | National              |       |
|------|-------------------------|-----------------------|---------------------|----------------------|-----------------------|-------|
|      | Population              | GDP<br>(Mills. Col\$) | GDP<br>(Per capita) | Variation<br>(Col\$) | GDP<br>(Mills. Col\$) | (%)** |
| 1987 | 1,564,730               | 624,859               | 399,340             |                      | 8,824,408             | 7.08  |
| 1988 | 1,612,672               | 883,738               | 547,996             | 148,656              | 11,731,348            | 7.53  |
| 1989 | 1,662,083               | 1,165,707             | 701,353             | 153,357              | 15,126,718            | 7.71  |
| 1990 | 1,713,008               | 1,529,305             | 892,760             | 191,407              | 20,228,122            | 7.56  |
| 1991 | 1,765,493               | 1,991,527             | 1,128,029           | 235,269              | 26,106,698            | 7.63  |
| 1992 | 1,819,586               | 2,517,610             | 1,383,617           | 255,588              | 33,515,046            | 7.51  |
| 1993 | 1,875,337               | 2,875,479             | 1,533,313           | 149,696              | 43,898,166            | 6.55  |
| 1994 | 1,898,851               | 3,702,381             | 1,949,801           | 416,488              | 56,896,561            | 6.51  |
| 1995 | 1,922,366               | 4,708,731             | 2,449,446           | 499,645              | 72,407,014            | 6.50  |
| 1996 | 1,949,369               | 5,635,281             | 2,890,823           | 441,377              | 87,612,487*           | 6.43  |
| 1997 | 1,975,564               | 5,533,949             | 2,801,200           | -89,623              | 106,887,234*          | 5.18  |

Source: Cuentas Economicas Departamentales. Year 1996: provisional; Year 1997: projected

\* : Projected information according to the supposed DNP

\*\* : Percentage of Cundinamarca GDP in the Country GDP  
Exchange rate in 1997: 1US\$= 1,141.12 Col\$)

(2) Population and GDP in Constant Prices

The Gross Domestic Product of Cundinamarca Prefecture, in constant prices of



market 1987, during the period 1987-1997 maintain its condition of being the fourth in the National GDP and the first in the Region of Center West, but the tendency of participation with the National GDP is not the same since in the period 1987-1991 the average participation was of the 7.6% while for the rest years is of 8.4%. This mean that GDP of Cundimarca in constants prices of 1987, maintain a stable participation for the period considered, with tendency to growth. The population and GDP of Cundinamarca in constant prices 1987 Col\$ is shown bellow.

| Year | Cundinamarca Prefecture |                     |                     |                   |                    | National            |                     | (%)** |
|------|-------------------------|---------------------|---------------------|-------------------|--------------------|---------------------|---------------------|-------|
|      | Population              | GDP<br>Mills. Col\$ | Rate of<br>Growth % | GDP<br>per capita | Variation<br>Col\$ | GDP<br>Mills. Col\$ | Rate of<br>Growth % |       |
| 1987 | 1,564,730               | 624,859             |                     | 399,340           |                    | 8,824,408           |                     | 7.08  |
| 1988 | 1,612,672               | 702,924             | 12.49               | 435,875           | 36,535             | 9,183,051           | 4.06                | 7.65  |
| 1989 | 1,662,083               | 753,489             | 7.19                | 453,340           | 17,465             | 9,496,935           | 3.42                | 7.93  |
| 1990 | 1,713,008               | 746,727             | -0.90               | 435,916           | -17,424            | 9,903,124           | 4.28                | 7.54  |
| 1991 | 1,765,493               | 802,192             | 7.43                | 454,373           | 18,457             | 10,101,257          | 2.00                | 7.94  |
| 1992 | 1,819,586               | 903,462             | 12.62               | 496,521           | 42,148             | 10,509,908          | 4.05                | 8.60  |
| 1993 | 1,875,337               | 892,486             | -1.21               | 475,907           | -20,614            | 11,076,165          | 5.39                | 8.06  |
| 1994 | 1,898,851               | 984,827             | 10.35               | 518,644           | 42,737             | 11,690,034          | 5.54                | 8.42  |
| 1995 | 1,922,366               | 1,057,309           | 7.36                | 550,004           | 31,360             | 12,348,981          | 5.64                | 8.56  |
| 1996 | 1,949,369               | 1,117,913           | 5.73                | 573,474           | 23,470             | 12,565,961*         | 1.76*               | 8.90* |
| 1997 | 1,975,564               | 1,144,376           | 2.37                | 579,265           | 5,791              | 12,981,397*         | 3.31*               | 8.82* |

Source: Cuentas Economicas Departamentales. Year 1996:provisional; Year 1997: projected

\* : Projected information according supposes of DNP

\*\* : Percentage of participation of Cundinamarca GDP in the Country GDP

## 1.2.9 Other Socioeconomic Indicators

The inflation rates in Colombia for the period 1983-1998 is presented here down while the rates of exchanges for the period 1983-1999 is given in the Table A.1.10.

| Year | National Level (%) |
|------|--------------------|
| 1988 | 28.12              |
| 1989 | 26.12              |
| 1990 | 32.36              |
| 1991 | 26.32              |
| 1992 | 25.13              |
| 1993 | 22.6               |
| 1994 | 22.59              |
| 1995 | 19.46              |
| 1996 | 21.63              |
| 1997 | 17.68              |
| 1998 | 16.7               |

## CHAPTER II PROJECTION OF FUTURE SOCIOECONOMY

### 2.1 Existing Plans

#### (1) Municipal Development Plan

The future development plan of the municipalities is delineated in the last Municipal Biannual Development Plan for the period 1998-2000. This Plan was prepared by each municipality according its necessity and is composed by a strategic part and by the investment plan for the short and medium term.

The main objective of this plan is to guarantee the efficient utilization of the resources and an adequate management of the functions corresponding to the Municipality.

The economical resources to implement the Municipal Development Plan comes from different sectors: a) current incomes of the municipality, b) resources coming from the Central Government, c) resources coming from the Departmental Government, d) others governmental and non-governmental institutions.

#### (2) Cundinamarca Prefecture Development Plan

The Development and Investment Plan of Cundinamarca had been prepared for the period 1998-2001. The general objective of this Plan is to perform economical, social, cultural and environmental programs to secure the development of the prefecture.

Main General Principles of this Plan are:

- (a) The Government of the prefecture and the civil society of Cundinamarca will be integrated with the aim of mobilization of the all necessary resources for the integral growth of the territory of the prefecture.
- (b) The harmonic relation between the Prefecture, the Nation, the Municipalities and the capital city will be indispensable to secure that resources of the different levels of the State can be addressed adequately for the improvement of the Prefecture.
- (c) The Prefecture will promote relations with international Organizations and States in benefit of its development.
- (d) The Development Plan will promote the economical growing with social responsibility. The institutions of the prefecture and the possibilities of development of Cundinamarca will assure the equity, equality of opportunities and the solidarity with social sectors less favored. The countryman, the people without housing, the families without public services, the mothers who acts as head of family, the children, the elderly and disabled persons, will have a protection and special treatment. The balanced Development will preserve the special treatment of the districts and cities less favored.
- (e) The protection of the ecological patrimony and the natural resources constitutes an urgent and imperative necessity. The socioeconomic development will

incorporate the necessary actions to make well use of the renewal natural resources and to prevent, mitigate or to restore the environmental damages originated of any projected to be executed.

- (f) The Policy for agriculture will be delineated to reach the peace and social justice.
- (g) The institutional development will be a fundamental target, in which the administration efficiency, the transparency and the faith against the corruption will be essential instruments.

(3) Boyaca Prefecture Development Plan

The term period for this plan is 1998-2000. In the Plan is defined 5 basic components to be taken into account for the development of the prefecture and they are: economic development, human development, institutional development, territorial functionality and environmental sustainability. Among the main objectives can be mentioned the followings:

- (a) The integral training of the citizens to make the economy more productive and competitive.
- (b) Consolidation of the growing process and qualitative improvement of the education system.
- (c) The incursion of the citizens to the social security system in health, education, culture and labor participation.
- (d) The strengthen of the economy and the access to the justice, human rights and the security of the population.
- (e) The strengthen of the institutional capability and the coordination with other organizations for the development of basic projects.
- (f) The territorial re-ordering of the prefecture taking into account the potentiality of uses of the territory, limiting factors and the possibility of getting a multiple benefit.
- (g) Minimization of the environmental impacts given by the industry and the production in order to keep the equilibrium of the ecosystem.
- (h) The sustainable economic development will be promoted in the prefecture to avoid or to prevent the degradation of environmental components.
- (i) The protection of the rivers basins, aquifers and swamps areas of the prefecture.
- (j) Adoption of immediate measures for the conservation, recovery and management of the natural resources, especially the water.

## 2.2 Population

Taking into account the projection made by DANE until the year 2005, a projection of the population into the Municipalities conforming the study area was made for the target year

2010. as shown in Table A.2.1.

### 2.3 Livestock

From the environmental point of view, the livestock contributes to the pollution load generated in the basin, therefore, the number of heads is directly proportional to the quantity of pollution.

Although the total number of livestock had been decreased in the recent years, for environmental projection purposes, we can assume that the highest numbers of produced heads during the period of 1996-1998 will remain constant until the target year 2010.

Then the number of heads of livestock to be considered as a constant value till the target year become 195,324 cows, 29,562 pigs and 69,360 sheep, data taken from the bellow table.

|       | 96      | 97      | 98      |
|-------|---------|---------|---------|
| Cows  | 195,324 | 189,618 | 171,402 |
| Pigs  | 18,324  | 23,886  | 29,562  |
| Sheep | 49,430  | 69,360  | 64,400  |
| Total | 263,078 | 282,864 | 265,364 |

### 2.4 Agriculture

Analyzing the statistical data on agriculture production of the main crops in the study area for the period 1990-1998 , the tendency is the reduction of the cultivated areas in the recent years.

At Cundinamarca prefecture level, the tendency also is the same since the lands assigned to the agriculture in principle are being transformed into pasturelands for livestock production.

In the Study Area, for projection purposes it can be assume that the cultivated area until the target year, will be constant as the maximum value registered in the period considered, which correspond to the year of 1996 with 30,998 has as shown bellow:

|        | 90     | 91     | 92     | 93     | 94     | 95     | 96     | 97     | 98     |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Potato | 7,410  | 10,260 | 8,572  | 11,821 | 10,928 | 21,902 | 23,801 | 22,320 | 16,933 |
| Wheat  | 2,460  | 2,900  | 1,900  | 634    | 1,770  | 2,143  | 1,746  | 745    | 880    |
| Pea    | 1,700  | 3,300  | 2,096  | 2,233  | 1,641  | 4,060  | 3,841  | 2,156  | 1,860  |
| Maize  | 1690   | 2,755  | 3,570  | 1,008  | 2,098  | 1,855  | 1,610  | 2,446  | 1,440  |
| Total  | 13,260 | 19,215 | 16,138 | 15,696 | 16,437 | 29,960 | 30,998 | 27,667 | 21,113 |

### 2.5 Industry

#### (1) Milk Industries

As for milk industries, no historical production data are available to estimate the projection, however, we can assume that the milk industry sector will increase proportionally with the number of cows for milk. The bellow table shows the number of cows for milk during the three years.

| Year                     | 1996   | 1997   | 1998   |
|--------------------------|--------|--------|--------|
| Cows for Milk Production | 68,244 | 72,315 | 69,240 |

Taking the highest number of cows which correspond to the year 97 as a constant value until year 2010, we can conclude that the milk industry sector will increase from year 1998 until the target year by 4 %.

(2) Mining industries

Bellow is shown the historical production of mineral carbon in the Study Area.

| Year             | 1994    | 1995    | 1996    | 1997    | 1998    |
|------------------|---------|---------|---------|---------|---------|
| Production (ton) | 577,394 | 614,133 | 574,967 | 862,172 | 763,712 |

Using the same assumption as in the case of livestock and agriculture, the production of 1997, will be taken as a constant value till the target year 2010.

## 2.6 GDP Projection at National Level

The GDP at national level, in constant prices of 1987, is known for the period 1987 to 1997, however, its projection is not available. In the period mentioned above the average rate of growth was of 4.9%, but for projection purposes it is assumed that the GDP at national level, in constant prices of 1987, will growth with a constant rate of 4.0 %. Then, it is assume that the growth rate of national GDP is 0.0% per annum during 1998-2000 and 4.0% per annum during 2001-2010. The bellow table shows the projection, which shall be used for the Study Area.

| Year | National Level      |                       | Year | National Level      |                       |
|------|---------------------|-----------------------|------|---------------------|-----------------------|
|      | GDP<br>(Mlls.Col\$) | Rate of<br>Growth (%) |      | GDP<br>(Mlls.Col\$) | Rate of<br>Growth (%) |
| 1987 | 8,824,408           |                       | 1998 | 12,981,397          | 0.0                   |
| 1988 | 9,183,051           | 4.06                  | 1999 | 12,981,397          | 0.0                   |
| 1989 | 9,496,935           | 3.42                  | 2000 | 12,981,397          | 0.0                   |
| 1990 | 9,903,124           | 4.28                  | 2001 | 13,500,653          | 4.0                   |
| 1991 | 10,101,257          | 2.00                  | 2002 | 14,040,679          | 4.0                   |
| 1992 | 10,509,908          | 4.05                  | 2003 | 14,602,306          | 4.0                   |
| 1993 | 11,076,165          | 5.39                  | 2004 | 15,186,398          | 4.0                   |
| 1994 | 11,690,034          | 5.54                  | 2005 | 15,793,854          | 4.0                   |
| 1995 | 12,348,981          | 5.64                  | 2006 | 16,425,609          | 4.0                   |
| 1996 | 12,565,961          | 1.76                  | 2007 | 17,082,633          | 4.0                   |
| 1997 | 12,981,397          | 3.31                  | 2008 | 17,765,938          | 4.0                   |
|      |                     |                       | 2009 | 18,476,576          | 4.0                   |
|      |                     |                       | 2010 | 19,215,639          | 4.0                   |

## References:

1. Municipal Development Plan of Carmen de Carupa
2. Municipal Environmental Plan of Ubate, 1997
3. Municipal Development Plan of Tausa
4. Municipal Development Plan of Sutatausa
5. Municipal Development Plan of Cucunuba
6. Municipal Development Plan of Lenguazaque
7. Environmental Plan of the Municipality of Guacheta
8. Municipal Development Plan of S.M.de Sema
9. Municipal Development Plan of Raquira
10. Municipal Development Plan of Fuquene
11. Municipal Development Plan of Susa
12. Municipal Development Plan of Simijaca
13. Environmental Plan of the Municipality of Caldas, 1997.
14. Municipal Development Plan of Chiquinquirá
15. Municipal Development Plan of Saboya
16. Results of Interviews and Questionnaires to Municipal Officers
17. Results of Interviews to the Officers of UMATA
18. Population Census by DANE
19. Economic Account 1987-1997, Cundinamarca Prefecture, Planning Office
20. Geographic Dictionary of Colombia, IGAC, Third Edition 1996
21. Agricultural Statistics, Cundinamarca Prefecture
22. Municipal Agricultural Evaluation, Boyaca Prefecture
23. Planning Office of Cundinamarca Prefecture
24. Planning Office of Boyaca Prefecture
25. Results of Interviews to Officers of the Module of Provincial Attention of Boyaca

**Table A.I.1 Livestock Production in Municipalities of the Study Area**

| Year | Municipalities                         | Bovine   |         | Pasture (Has) | Pigs<br>Heads | Sheep<br>Heads |
|------|--|----------|---------|---------------|---------------|----------------|
|      |  | Heads    |         |               |               |                |
|      | 1. Carmen de Carupa                    | 11,270   | 12,500  | 3,950         | 12,000        |                |
|      | 2. Ubate                               | 13,100   | 7,000   | 7,900         | 4,000         |                |
|      | 3. Tausa                               | 3,770    | 8,456   | -             | 800           |                |
|      | 4. Sutatausa                           | 5,881    | 2,800   | 910           | 4,500         |                |
|      | 5. Cucunuba                            | 1,995    | 1,710   | 415           | 6,500         |                |
|      | 6. Suesca                              | 7,380    | 8,000   | 213           | 5,915         |                |
| 1    | 7. Villapinzon                         | 8,600    | 5,610   | 2,700         | 2,500         |                |
| 9    | 8. Lenguazaque                         | 5,005    | 6,865   | 920           | 5,900         |                |
| 9    | 9. Guacheta                            | 19,610   | 8,510   | 772           | 3,680         |                |
| 8    | 10. San Miguel de Sema                 | 19,900   | 7,540   | 380           | 850           |                |
|      | 11. Raquira                            | 1,981    | 940     | 70            | 555           |                |
|      | 12. Fuquene                            | 11,100   | 4,850   | 850           | 8,000         |                |
|      | 13. Susa                               | 13,920   | 6,295   | 2,160         | 4,600         |                |
|      | 14. Simijaca                           | 15,000   | 4,050   | 1,000         | 800           |                |
|      | 15. Caldas                             | 5,290    | 3,700   | 2,572         | 1,300         |                |
|      | 16. Chiquinquirá                       | 18,100   | 7,200   | 1,950         | 2,200         |                |
|      | 17. Saboya                             | 9,500    | 12,000  | 2,800         | 300           |                |
|      | Total                                  | 171,402  | 108,026 | 29,562        | 64,400        |                |
|      | Unit Price (Mills. Col\$)              | 0.967500 |         | 0.252500      | 0.150000      |                |
|      | Sub Total amount (Mills. Col\$)        | 165,831  |         | 7,464         | 9,660         |                |
|      | Total amount in the Study Are in Col\$ | 182,956  |         |               |               |                |

Average Weight of Bovine: 450 Kilograms

Average Weight of Pig: 100 Kilograms

Average Weight of Sheep: 75 Kilograms

Exchange rate in 1998 : 1.0 US\$ = 1,426.35Col\$ (pesos)

Table A.1.2 Milk Production in Municipalities of the Study Area

| Year | Municipalities         | Cows (Heads) | Pasture (Has) | Production<br>(lts/Head/day) | SubTotal<br>Lts/year | Unit Price<br>Col\$/lt | Sub Total<br>Col\$ millions |
|------|------------------------|--------------|---------------|------------------------------|----------------------|------------------------|-----------------------------|
|      |                        |              |               |                              |                      |                        |                             |
| 1    | 1. Carmen de Carupa    | 2,480        | 2,755         | 9                            | 6,026,400            | 300                    | 1,808                       |
| 9    | 2. Ubate               | 7,000        | 3,743         | 12                           | 22,680,000           | 380                    | 8,618                       |
| 9    | 3. Tausa               | 833          | 1,851         | 5                            | 1,124,550            | 305                    | 343                         |
| 8    | 4. Sutatausa           | 720          | 343           | 8                            | 1,555,200            | 300                    | 467                         |
|      | 5. Cucunuba            | 750          | 641           | 6                            | 1,215,000            | 350                    | 425                         |
|      | 6. Suesca              | 3,600        | 3,318         | 7                            | 6,804,000            | 350                    | 2,381                       |
|      | 7. Villapinzon         | 1,800        | 1,176         | 7                            | 3,402,000            | 220                    | 748                         |
|      | 8. Lenguazaque         | 1,400        | 1,918         | 5                            | 1,890,000            | 410                    | 775                         |
|      | 9. Guacheta            | 3,937        | 1,712         | 7                            | 7,440,930            | 300                    | 2,232                       |
|      | 10. San Miguel de Sema | 10,200       | 3,864         | 15                           | 41,310,000           | 420                    | 17,350                      |
|      | 11. Raquira            | 653          | 311           | 8                            | 1,410,480            | 350                    | 494                         |
|      | 12. Fuquene            | 5,100        | 2,227         | 7                            | 9,639,000            | 380                    | 3,663                       |
|      | 13. Susa               | 6,800        | 3,076         | 8                            | 14,688,000           | 350                    | 5,141                       |
|      | 14. Simijaca           | 8,000        | 2,162         | 13                           | 28,080,000           | 380                    | 10,670                      |
|      | 15. Caldas             | 2,300        | 1,608         | 3.5                          | 2,173,000            | 300                    | 652                         |
|      | 16. Chiquinquirá       | 9,267        | 3,692         | 11                           | 27,522,900           | 400                    | 11,009                      |
|      | 17. Saboya             | 4,400        | 5,570         | 7                            | 8,316,000            | 340                    | 2,827                       |
|      | Total                  | 69,240       | 39,967        | 8.3                          | 185,277,460          | 351                    | 69,603                      |

Exchange rate in 1998: 1.0 US\$= 1,426.35 Col\$ (pesos)



**Table A.1.3 Agriculture Production in Municipalities of the Study Area**

| Year | Municipalities                          | Main Crops in Fuquene Lake Basin |        |         |        |         |       |        |       |   |   |   |   |
|------|---|----------------------------------|--------|---------|--------|---------|-------|--------|-------|---|---|---|---|
|      |   | Potato                           |        | Wheat   |        | Pea     |       | Maize  |       |   |   |   |   |
|      |   | Tons                             | Has    | Tons    | Has    | Tons    | Has   | Tons   | Has   |   |   |   |   |
| 1    | 1. Carmen de Carupa                     | 63,000                           | 3,500  | 700     | 350    | 230     | 230   | -      | -     | - | - | - | - |
| 2    | 2. Ubate                                | 6,230                            | 445    | 40      | 40     | 45      | 50    | -      | -     | - | - | - | - |
| 3    | 3. Tausa                                | 36,000                           | 3,000  | -       | -      | 90      | 90    | -      | -     | - | - | - | - |
| 4    | 4. Sutatausa                            | 4,000                            | 250    | -       | -      | 45      | 45    | -      | -     | - | - | - | - |
| 5    | 5. Cucunuba                             | 840                              | 70     | 144     | 80     | 30      | 15    | -      | -     | - | - | - | - |
| 6    | 6. Suesca                               | 23,250                           | 1,550  | 238     | 85     | 40      | 20    | -      | -     | - | - | - | - |
| 7    | 7. Villapinzon                          | 32,400                           | 1,800  | 18      | 7      | -       | -     | -      | -     | - | - | - | - |
| 8    | 8. Lenguazaque                          | 67,500                           | 3,000  | -       | -      | 166     | 52    | -      | -     | - | - | - | - |
| 9    | 9. Guacheta                             | 5,000                            | 250    | -       | -      | 900     | 300   | -      | -     | - | - | - | - |
| 10   | 10. San Miguel de Sema                  | 533                              | 41     | -       | -      | -       | -     | -      | -     | - | - | - | - |
| 11   | 11. Raquira                             | 1,617                            | 77     | -       | -      | 95      | 38    | -      | -     | - | - | - | - |
| 12   | 12. Fúquene                             | 3,480                            | 290    | 140     | 70     | 93      | 70    | -      | -     | - | - | - | - |
| 13   | 13. Susa                                | 3,000                            | 200    | 691     | 240    | 216     | 180   | -      | -     | - | - | - | - |
| 14   | 14. Simijaca                            | 2,400                            | 160    | -       | -      | 392     | 140   | 10,800 | 1,200 | - | - | - | - |
| 15   | 15. Caldas                              | 4,000                            | 400    | 14      | 8      | 123     | 110   | 240    | 240   | - | - | - | - |
| 16   | 16. Chiquinquirá                        | 6,000                            | 400    | -       | -      | 1,340   | 400   | -      | -     | - | - | - | - |
| 17   | 17. Saboya                              | 21,000                           | 1,500  | -       | -      | 240     | 120   | -      | -     | - | - | - | - |
|      | Total                                   | 280,250                          | 16,933 | 1,985   | 880    | 4,045   | 1,860 | 11,040 | 1,440 | - | - | - | - |
|      | Unit Price (Mils. Col\$)                | 0.287731                         |        | 0.27896 |        | 0.76993 |       | 0.250  |       |   |   |   |   |
|      | Sub Total amount (Mils. Col\$)          | 80,637                           |        | 554     |        | 3,114   |       | 2,760  |       |   |   |   |   |
|      | Total amount in the basin (Mils. Col\$) |                                  |        |         | 87,065 |         |       |        |       |   |   |   |   |

Exchange rate in 1998: 1.0 US\$= 1,426.35 Col\$ (pesos)

Table A.1.4 Milk Industries Production in the Study Area (1998)

| Municipalities                         | Small Size |             |              | Medium Size    |        |             | Large Size   |                |        |             |              |                |
|--|------------|-------------|--------------|----------------|--------|-------------|--------------|----------------|--------|-------------|--------------|----------------|
|  | Number     | Milk (lt/d) | Chesse(kg/d) | Yogurth (lt/d) | Number | Milk (lt/d) | Chesse(kg/d) | Yogurth (lt/d) | Number | Milk (lt/d) | Chesse(kg/d) | Yogurth (lt/d) |
| 1. C. Campa                            |            |             |              |                |        |             |              |                |        |             |              |                |
| 2. Ubate                               | 24         |             | 1,056        | 360            | 3      |             |              | 405            | 2      | 153,333     | 1,262        | 14,386         |
| 3. Tansa                               | 1          |             | 44           | 15             |        |             |              |                |        |             |              |                |
| 4. Sutatausa                           |            |             |              |                |        |             |              |                |        |             |              |                |
| 5. Cucumaba                            |            |             |              |                |        |             |              |                |        |             |              |                |
| 6. Suesca                              |            |             |              |                |        |             |              |                |        |             |              |                |
| 7. Villapinzon                         |            |             |              |                |        |             |              |                |        |             |              |                |
| 8. Lenguazaque                         |            |             |              |                |        |             |              |                |        |             |              |                |
| 9. Guacheta                            | 1          |             | 44           | 15             |        |             |              |                |        |             |              |                |
| 10. S.M.de Sema                        |            |             |              |                | 1      | 37,750      |              |                |        |             |              |                |
| 11. Raquira                            |            |             |              |                |        |             |              |                |        |             |              |                |
| 12. Fuquene                            | 1          |             | 44           | 15             |        |             |              |                | 1      | 73,333      | 631          | 7,193          |
| 13. Susa                               |            |             |              |                |        |             |              |                |        |             |              |                |
| 14. Simijaca                           | 3          |             | 132          | 45             | 1      | 37,750      |              |                | 2      | 153,333     | 1,262        | 14,386         |
| 15. Caldas                             |            |             |              |                |        |             |              |                |        |             |              |                |
| 16. Chiquinquira                       | 10         |             | 440          | 150            |        |             |              |                |        |             |              |                |
| 17. Saboya                             |            |             |              |                |        |             |              |                |        |             |              |                |
| Total average                          | 40         |             | 1,760        | 600            | 5      | 75,500      |              | 405            | 5      | 379,999     | 3,155        | 35,965         |
| Total average (yearly)                 |            |             | 642,400      | 219,000        |        | 27,557,500  |              | 147,825        |        | 138,699,635 | 1,151,575    | 13,127,225     |
| Unit Price in Col\$                    |            |             | 6,000        | 3,000          |        | 700         |              | 6,000          |        | 700         | 6,000        | 3,000          |
| Total Amount Mills Col\$               |            |             | 3,854        | 657            |        | 19,290      |              | 887            |        | 97,090      | 6,909        | 39,382         |
| Grand total in the basin (Mills Col\$) |            |             |              |                |        | 168,214     |              |                |        |             |              |                |

Exchange rate in 1998: 1.0 US\$= 1,426.35 Col\$ (pesos)

**Table A.1.5 Mining Production in Municipalities of the Study Area**

| Year | Municipalities          | Mining of Carbon |       |         |             |        |         |            |   |   |   |   |   | Total (t/y) |
|------|-------------------------|------------------|-------|---------|-------------|--------|---------|------------|---|---|---|---|---|-------------|
|      |                         | Small Size       |       |         | Medium Size |        |         | Large Size |   |   |   |   |   |             |
|      |                         | A                | B     | C       | A           | B      | C       | A          | B | C |   |   |   |             |
| 1    | 1. Tausa                | 0                | -     | -       | 5           | 16,549 | 82,745  | 0          | 0 | 0 | 0 | 0 | 0 | 82,745      |
| 9    | 2. Sutatausa            | 37               | 2,536 | 93,829  | 2           | 30,000 | 60,000  | 0          | 0 | 0 | 0 | 0 | 0 | 153,829     |
| 9    | 3. Cucunuba             | 100              | 2,039 | 203,895 | 5           | 16,000 | 80,000  | 0          | 0 | 0 | 0 | 0 | 0 | 283,895     |
| 8    | 4. Lenguazaque          | 67               | 895   | 59,955  | 1           | 48,000 | 48,000  | 0          | 0 | 0 | 0 | 0 | 0 | 107,953     |
|      | 5. Guacheta             | 50               | 2,005 | 100,270 | 1           | 24,000 | 24,000  | 0          | 0 | 0 | 0 | 0 | 0 | 124,270     |
|      | 6. Raquira              | 12               | 918   | 11,020  | 0           | -      | -       | 0          | 0 | 0 | 0 | 0 | 0 | 11,020      |
|      | Total                   | 266              |       | 468,969 | 14          |        | 294,745 | 0          |   |   | 0 |   |   | 763,712     |
|      | Unit Price in P/ton     |                  |       |         |             |        |         |            |   |   |   |   |   | 18,000      |
|      | Total in Millions Col\$ |                  |       |         |             |        |         |            |   |   |   |   |   | 13,747      |

Legend: A: Quantity of mining, B: Production/Mining in Ton/year, C: Subtotal in Ton/year Exchange rate in 1998: 1.0 US\$= 1,426.35 Col\$ (pesos)

**Table A.1.6 Health Establishments in the Study Area (1998)**

| Municipalities  | Hospitals |            | Health Centers |          | Health Offices |            | Others* |        |
|-----------------|-----------|------------|----------------|----------|----------------|------------|---------|--------|
|                 | Number    | Beds       | Number         | Beds     | Number         | Number     | Number  | Number |
| 1.C.de Carupa   | 1         | 17         |                |          |                | 2          |         | 7      |
| 2.Ubate         | 1         | 95         |                |          |                | 1          |         | 10     |
| 3.Tausa         |           |            |                |          |                | 1          |         |        |
| 4.Sutatausa     |           |            |                |          |                | 2          |         | 4      |
| 5.Cucunuba      |           |            |                |          |                | 1          |         | 5      |
| 6. Suesca       |           |            | 1              |          |                | 2          |         | 8      |
| 7. Villapinzon  |           |            | 1              |          |                | 1          |         | 10     |
| 8.Lenguazaque   |           |            |                |          |                | 1          |         | 11     |
| 9.Guacheta      | 1         | 29         |                |          |                | 2          |         | 16     |
| 10.S.M.de Sema  |           |            | 1              |          |                | 1          |         | 11     |
| 11.Raquira      |           |            | 1              |          |                |            |         | 13     |
| 12.Fuquene      |           |            |                |          |                | 2          |         | 13     |
| 13.Susa         |           |            | 1              |          |                |            |         | 8      |
| 14.Simijaca     |           |            | 1              |          |                |            |         | 10     |
| 15.Caldas       |           |            |                |          |                |            | 2       | 18     |
| 16.Chiquinquirá | 1         | 81         |                |          |                | 1          |         | 73     |
| 17.Saboya       |           |            | 1              |          |                | 4          |         | 16     |
| <b>Total</b>    | <b>4</b>  | <b>222</b> | <b>7</b>       | <b>0</b> | <b>23</b>      | <b>233</b> |         |        |

\*Colombian Institute for Familiar Welfare

**Table A.1.7 Structure of Gross Domestic Product**

|                                       | 1987   | 1988   | 1989   | 1990   | 1991   | 1992   | 1993   | 1994   | 1995   | 1996   | 1997   |
|---------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                       |        |        |        |        |        |        |        |        |        |        |        |
| Agriculture                           | 25.75  | 26.00  | 27.72  | 28.47  | 28.89  | 28.63  | 31.21  | 31.67  | 31.15  | 31.59  | 32.27  |
| Livestock                             | 14.54  | 13.68  | 12.98  | 13.82  | 13.18  | 12.12  | 13.22  | 12.73  | 11.77  | 11.48  | 11.73  |
| Forestry                              | 1.50   | 1.39   | 1.35   | 1.44   | 1.43   | 1.31   | 1.35   | 1.50   | 1.44   | 1.35   | 1.40   |
| Pisciculture                          | 0.15   | 0.14   | 0.13   | 0.14   | 0.14   | 0.13   | 0.14   | 0.12   | 0.11   | 0.10   | 0.10   |
| Sub-total                             | 41.94  | 41.20  | 42.19  | 43.87  | 43.63  | 42.19  | 45.92  | 46.01  | 44.48  | 44.52  | 45.49  |
| Mining                                | 3.34   | 2.99   | 2.86   | 2.70   | 2.61   | 2.74   | 2.41   | 2.29   | 1.82   | 1.56   | 1.74   |
| Manufacturing                         | 22.46  | 21.31  | 20.55  | 21.01  | 19.64  | 19.09  | 22.32  | 17.69  | 24.04  | 22.55  | 21.47  |
| Construction and Public works         | 4.22   | 3.75   | 3.55   | 2.16   | 2.64   | 3.55   | 3.95   | 3.78   | 2.30   | 2.01   | 2.55   |
| Subtotal                              | 30.03  | 28.05  | 26.96  | 25.87  | 24.90  | 25.38  | 28.68  | 23.76  | 28.16  | 26.11  | 25.76  |
| Total Production                      | 71.96  | 69.25  | 69.15  | 69.74  | 68.53  | 67.56  | 74.60  | 69.77  | 72.64  | 70.64  | 71.25  |
| Electricity, gas and water            | 0.30   | 0.26   | 0.22   | 0.19   | 0.16   | 0.15   | 0.15   | 0.11   | 0.09   | 0.10   | 0.08   |
| Transport and storage                 | 2.90   | 2.67   | 2.56   | 2.40   | 2.40   | 2.41   | 2.49   | 1.68   | 1.64   | 2.04   | 1.79   |
| Communication                         | 0.14   | 0.18   | 0.15   | 0.18   | 0.19   | 0.19   | 0.20   | 0.10   | 0.09   | 0.09   | 0.11   |
| Subtotal                              | 3.34   | 3.11   | 2.92   | 2.77   | 2.76   | 2.75   | 2.84   | 1.89   | 1.82   | 2.24   | 1.98   |
| Commerce                              | 15.46  | 15.70  | 15.14  | 16.26  | 17.85  | 19.28  | 15.41  | 16.47  | 16.39  | 17.35  | 17.23  |
| Restaurants & hotels                  | 1.12   | 1.14   | 1.07   | 1.09   | 1.02   | 0.93   | 0.97   | 0.89   | 0.89   | 0.81   | 0.83   |
| Banks, Insurances, ect.               | 1.27   | 1.10   | 1.45   | 1.14   | 1.22   | 1.44   | 1.59   | 1.48   | 2.29   | 1.82   | 1.92   |
| Rental of housing                     | 0.65   | 0.59   | 0.57   | 0.59   | 0.51   | 0.52   | 0.54   | 0.50   | 0.48   | 0.47   | 0.46   |
| Personal services except Rest.&Hotel  | 1.53   | 1.58   | 1.37   | 1.41   | 1.41   | 1.34   | 1.40   | 1.43   | 1.49   | 1.45   | 1.42   |
| Government                            | 1.72   | 1.58   | 1.53   | 1.45   | 1.18   | 0.99   | 1.21   | 1.33   | 1.56   | 1.73   | 1.43   |
| Domestic services                     | 0.55   | 0.46   | 0.44   | 0.45   | 0.43   | 0.39   | 0.40   | 0.37   | 0.35   | 0.34   | 0.33   |
| Deduction of imputed Bank services    | -1.10  | -1.24  | -1.38  | -0.99  | -1.07  | -1.37  | -1.46  | -1.45  | -2.08  | -1.32  | -1.63  |
| More rights and tax on imported goods | 3.50   | 6.74   | 7.74   | 6.09   | 6.16   | 6.16   | 2.51   | 7.31   | 4.17   | 4.49   | 4.77   |
| Subtotal                              | 24.69  | 27.64  | 27.93  | 27.49  | 28.71  | 29.69  | 22.56  | 28.34  | 25.54  | 27.13  | 26.77  |
| Total services                        | 28.04  | 30.75  | 30.85  | 30.26  | 31.47  | 32.44  | 25.40  | 30.23  | 27.36  | 29.36  | 28.75  |
|                                       |        |        |        |        |        |        |        |        |        |        |        |
| Gross Domestic Product                | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Source: Cuentas Economicas Departamentales. Year 1996: provisional; Year 1997: projected

Table A.1.8 Rate of Growth of Gross Domestic Product by Sector in Cundinamarca

Unit: %

|                                       | 1988   | 1989   | 1990   | 1991   | 1992  | 1993   | 1994   | 1995   | 1996   | 1997   |
|---------------------------------------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|
| Agriculture                           | 13.55  | 14.31  | 1.77   | 9.02   | 11.60 | 7.68   | 11.97  | 5.60   | 7.23   | 4.57   |
| Livestock                             | 5.82   | 1.74   | 5.50   | 2.46   | 3.61  | 7.75   | 6.23   | -0.70  | 3.10   | 4.57   |
| Forestry                              | 4.57   | 4.12   | 5.90   | 6.22   | 3.07  | 2.19   | 22.49  | 3.39   | -0.91  | 5.60   |
| Pisciculture                          | 5.92   | 2.64   | 3.56   | 5.45   | 6.35  | 5.46   | -6.87  | 4.60   | -10.04 | 4.52   |
| Sub-total                             | 10.52  | 9.76   | 3.06   | 6.85   | 8.89  | 7.53   | 10.57  | 3.79   | 5.83   | 4.60   |
| Mining                                | 0.74   | 2.34   | -6.45  | 4.13   | 18.18 | -13.25 | 4.95   | -14.77 | -9.55  | 14.81  |
| Manufacturing                         | 6.71   | 3.39   | 1.29   | 0.46   | 9.44  | 15.54  | -12.56 | 45.90  | -0.81  | -2.57  |
| Construction and Public works         | -0.04  | 1.42   | -39.55 | 31.18  | 51.10 | 9.90   | 5.65   | -34.61 | -7.83  | 30.01  |
| Subtotal                              | 5.09   | 3.01   | -4.91  | 3.41   | 14.78 | 11.64  | -8.59  | 27.25  | -1.95  | 0.97   |
| Total Production                      | 8.26   | 7.03   | -0.05  | 5.57   | 11.03 | 9.07   | 3.21   | 11.78  | 2.81   | 3.26   |
| Electricity, gas and water            | -2.68  | -10.78 | -11.83 | -9.92  | 7.29  | -5.28  | -16.64 | -14.01 | 24.92  | -24.89 |
| Transport and storage                 | 3.59   | 2.81   | -7.12  | 7.52   | 12.83 | 2.28   | -25.55 | 4.67   | 31.68  | -9.99  |
| Communication                         | 40.58  | -12.30 | 20.95  | 15.61  | 10.10 | 5.90   | -47.60 | 4.63   | 0.91   | 25.32  |
| Subtotal                              | 4.63   | 0.81   | -6.05  | 6.84   | 12.32 | 2.11   | -26.67 | 3.57   | 29.76  | -9.27  |
| Commerce                              | 14.21  | 3.40   | 6.41   | 17.97  | 21.64 | -21.07 | 17.99  | 6.80   | 11.91  | 1.71   |
| Restaurants & hotels                  | 14.52  | 0.51   | 0.91   | 0.96   | 2.82  | 2.99   | 0.54   | 7.97   | -4.31  | 5.14   |
| Banks, Insurances, ect.               | -2.59  | 41.58  | -21.74 | 14.98  | 32.56 | 8.74   | 3.26   | 66.06  | -16.21 | 8.21   |
| Rental of housing                     | 3.22   | 3.12   | 3.03   | -8.37  | 15.54 | 2.78   | 2.70   | 2.63   | 2.56   | 1.86   |
| Personal services except Rest.&Hotel  | 15.84  | -6.84  | 2.14   | 6.94   | 7.03  | 3.40   | 13.26  | 11.12  | 3.14   | 0.39   |
| Government                            | 2.99   | 3.95   | -6.14  | -12.27 | -5.23 | 20.29  | 21.29  | 25.83  | 17.29  | -15.60 |
| Domestic services                     | -6.16  | 2.00   | 2.02   | 2.01   | 2.03  | 1.96   | 2.04   | 2.00   | 1.98   | 0.16   |
| Deduction of imputed Bank services    | 26.47  | 19.17  | -28.57 | 15.77  | 43.81 | 5.79   | 9.75   | 53.65  | -32.97 | 26.46  |
| More rights and tax on imported goods | 116.63 | 23.20  | -22.04 | 8.61   | 12.65 | -59.77 | 221.62 | -38.80 | 13.98  | 8.70   |
| Subtotal                              | 25.90  | 8.33   | -2.46  | 12.19  | 16.46 | -24.93 | 38.62  | -3.26  | 12.32  | 1.01   |
| Total services                        | 23.37  | 7.57   | -2.80  | 11.70  | 16.10 | -22.64 | 31.31  | -2.83  | 13.48  | 0.23   |
| Gross Domestic Product                | 12.49  | 7.19   | -0.90  | 7.43   | 12.62 | -1.21  | 10.35  | 7.36   | 5.73   | 2.37   |

Source: Cuentas Economicas Departamentales. Year 1996: provisional; Year 1997: projected

Table A.1.9 Gross Domestic Product at Market Price by Sector

Unit: Millions Constant 1987 Col\$

|                                       | 1987    | 1988    | 1989    | 1990    | 1991    | 1992    | 1993    | 1994    | 1995      | 1996      | 1997      |
|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|-----------|
| Agriculture                           | 160,930 | 182,734 | 208,892 | 212,584 | 231,750 | 258,630 | 278,503 | 311,851 | 329,329   | 353,141   | 369,266   |
| Livestock                             | 90,843  | 96,126  | 97,799  | 103,182 | 105,720 | 109,537 | 118,027 | 125,376 | 124,498   | 128,333   | 134,214   |
| Forestry                              | 9,349   | 9,776   | 10,179  | 10,780  | 11,450  | 11,802  | 12,060  | 14,772  | 15,273    | 15,134    | 15,981    |
| Pisciculture                          | 929     | 984     | 1,010   | 1,046   | 1,103   | 1,173   | 1,237   | 1,152   | 1,205     | 1,084     | 1,133     |
| Sub-total                             | 262,051 | 289,620 | 317,880 | 327,592 | 350,023 | 381,142 | 409,827 | 453,151 | 470,305   | 497,712   | 520,594   |
| Mining                                | 20,875  | 21,029  | 21,522  | 20,133  | 20,965  | 24,777  | 21,493  | 22,557  | 19,226    | 17,390    | 19,966    |
| Manufacturing                         | 140,370 | 149,785 | 154,861 | 156,860 | 157,582 | 172,450 | 199,241 | 174,212 | 254,179   | 252,121   | 245,652   |
| Construction and Public works         | 26,378  | 26,367  | 26,742  | 16,165  | 21,206  | 32,042  | 35,214  | 37,205  | 24,330    | 22,426    | 29,156    |
| Subtotal                              | 187,623 | 197,181 | 203,125 | 193,158 | 199,753 | 229,269 | 255,948 | 233,974 | 297,735   | 291,937   | 294,774   |
| Total Production                      | 449,674 | 486,801 | 521,005 | 520,750 | 549,776 | 610,411 | 665,775 | 687,125 | 768,040   | 789,649   | 815,368   |
| Electricity, gas and water            | 1,869   | 1,819   | 1,623   | 1,431   | 1,289   | 1,383   | 1,310   | 1,092   | 939       | 1,173     | 881       |
| Transport and storage                 | 18,114  | 18,765  | 19,293  | 17,920  | 19,268  | 21,741  | 22,236  | 16,554  | 17,327    | 22,816    | 20,536    |
| Communication                         | 902     | 1,268   | 1,112   | 1,345   | 1,555   | 1,712   | 1,813   | 950     | 994       | 1,003     | 1,257     |
| Subtotal                              | 20,885  | 21,852  | 22,028  | 20,696  | 22,112  | 24,836  | 25,359  | 18,596  | 19,260    | 24,992    | 22,674    |
| Commerce                              | 96,620  | 110,350 | 114,099 | 121,409 | 143,222 | 174,218 | 137,515 | 162,249 | 173,280   | 193,915   | 197,229   |
| Restaurants & hotels                  | 6,984   | 7,998   | 8,039   | 8,112   | 8,190   | 8,421   | 8,673   | 8,720   | 9,415     | 9,009     | 9,472     |
| Banks, Insurances, ect.               | 7,909   | 7,704   | 10,907  | 8,536   | 9,815   | 13,011  | 14,148  | 14,609  | 24,260    | 20,328    | 21,996    |
| Rental of housing                     | 4,033   | 4,163   | 4,293   | 4,423   | 4,053   | 4,683   | 4,813   | 4,943   | 5,073     | 5,203     | 5,300     |
| Personal services except Rest.&Hotel  | 9,565   | 11,080  | 10,322  | 10,543  | 11,275  | 12,068  | 12,478  | 14,132  | 15,703    | 16,196    | 16,259    |
| Government                            | 10,751  | 11,072  | 11,509  | 10,802  | 9,477   | 8,981   | 10,803  | 13,103  | 16,488    | 19,338    | 16,322    |
| Domestic services                     | 3,457   | 3,244   | 3,309   | 3,376   | 3,444   | 3,514   | 3,583   | 3,656   | 3,729     | 3,803     | 3,809     |
| Deduction of imputed Bank services    | -6,884  | -8,706  | -10,375 | -7,411  | -8,580  | -12,339 | -13,054 | -14,327 | -22,014   | -14,755   | -18,659   |
| More rights and tax on imported goods | 21,865  | 47,366  | 58,353  | 45,491  | 49,408  | 55,658  | 22,393  | 72,021  | 44,075    | 50,235    | 54,606    |
| Subtotal                              | 154,300 | 194,271 | 210,456 | 205,281 | 230,304 | 268,215 | 201,352 | 279,106 | 270,009   | 303,272   | 306,334   |
| Total services                        | 175,185 | 216,123 | 232,484 | 225,977 | 252,416 | 293,051 | 226,711 | 297,702 | 289,269   | 328,264   | 329,008   |
| Gross Domestic Product                | 624,859 | 702,924 | 753,489 | 746,727 | 802,192 | 903,462 | 892,486 | 984,827 | 1,057,309 | 1,117,913 | 1,144,376 |

Source: Cuentas Economicas Departamentales. Year 1996: provisional; Year 1997: projected

Table A.1.10 Rates of Exchanges in Colombia in Col\$/US\$

| Year | Jan.    | Feb.    | March   | April   | May     | June    | July    | Aug.    | Sept.   | Oct.    | Nov.    | Dec.    | Ave     |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1983 | 70.9    | 72.06   | 73.48   | 74.89   | 76.36   | 77.78   | 79.22   | 80.88   | 82.52   | 84.26   | 86.11   | 87.83   | 78.86   |
| 1984 | 89.79   | 91.57   | 93.46   | 95.42   | 97.46   | 99.4    | 101.73  | 103.73  | 105.93  | 108.13  | 110.43  | 112.76  | 100.82  |
| 1985 | 115.17  | 118.25  | 123.15  | 129.62  | 135.95  | 140.73  | 145.51  | 150.03  | 155.3   | 160.26  | 164.58  | 169.19  | 142.31  |
| 1986 | 173.7   | 176.59  | 179.74  | 184.43  | 188.53  | 192.35  | 195.8   | 199.17  | 203.24  | 208.05  | 212.56  | 216.97  | 194.26  |
| 1987 | 221.03  | 224.82  | 229.02  | 233.17  | 237.44  | 241.39  | 245.55  | 249.35  | 252.84  | 255.85  | 258.74  | 262.08  | 242.61  |
| 1988 | 265.82  | 270.91  | 276.92  | 283.45  | 289.96  | 296.36  | 302.36  | 308.4   | 314.85  | 321.07  | 327.01  | 332.97  | 299.17  |
| 1989 | 339.62  | 346.83  | 354.12  | 361.83  | 369.93  | 377.92  | 385.71  | 393.43  | 401.8   | 410.55  | 419.76  | 429.3   | 382.57  |
| 1990 | 440.08  | 451.72  | 463.4   | 474.62  | 485.99  | 497.31  | 508.35  | 519.94  | 530.54  | 540.46  | 551.33  | 563.38  | 502.26  |
| 1991 | 574.09  | 584.07  | 593.75  | 603.72  | 613.76  | 624.15  | 634.4   | 645.56  | 660.52  | 673.84  | 687.59  | 630.38  | 627.15  |
| 1992 | 645.18  | 635.53  | 640.33  | 649.16  | 659.81  | 675.79  | 704.5   | 693.72  | 697.11  | 707.65  | 722.43  | 733.42  | 680.39  |
| 1993 | 745.52  | 749.08  | 764.38  | 771.79  | 779.71  | 784.24  | 795.08  | 804.61  | 809.66  | 814.45  | 814.08  | 803.53  | 786.34  |
| 1994 | 816.15  | 817.67  | 819.76  | 829.87  | 841.4   | 830.94  | 819.06  | 814.82  | 830.06  | 839.32  | 830.03  | 829.19  | 826.52  |
| 1995 | 846.63  | 850.9   | 865.83  | 873.39  | 876.95  | 874.86  | 893.22  | 935.1   | 964.17  | 984.96  | 1000.58 | 988.18  | 912.90  |
| 1996 | 1011.19 | 1029.64 | 1044.98 | 1050.93 | 1066.24 | 1071.96 | 1064.1  | 1044.84 | 1040.84 | 1015.78 | 998.18  | 1000.55 | 1036.60 |
| 1997 | 1027.06 | 1074.24 | 1062.16 | 1060.55 | 1075.18 | 1082.37 | 1102.4  | 1132.7  | 1222.49 | 1262.89 | 1294.56 | 1296.87 | 1141.12 |
| 1998 | 1323.16 | 1346.12 | 1357.1  | 1360.65 | 1386.28 | 1386.61 | 1371.54 | 1390.46 | 1520.52 | 1587.38 | 1562.71 | 1523.64 | 1426.35 |
| 1999 | 1570.01 | 1567.07 | 1550.15 | 1574.67 | 1641.33 |         |         |         |         |         |         |         |         |



Table A.2.1 Projection of the Population in Municipalities of the Study Area (1/3)

| Municipalities   | 1998         |        |         | 1999    |        |         | 2000    |        |         | 2001    |        |         | 2002    |        |         |
|------------------|--------------|--------|---------|---------|--------|---------|---------|--------|---------|---------|--------|---------|---------|--------|---------|
|                  | Total        | Urban  | Rural   | Total   | Urban  | Rural   | Total   | Urban  | Rural   | Total   | Urban  | Rural   | Total   | Urban  | Rural   |
|                  | 1. C. Carupa | 9,770  | 1,511   | 8,259   | 9,892  | 1,570   | 8,322   | 9,997  | 1,619   | 8,378   | 10,114 | 1,687   | 8,427   | 10,214 | 1,745   |
| 2. Ubate         | 39,475       | 16,883 | 22,592  | 40,383  | 17,391 | 22,992  | 41,278  | 17,900 | 23,378  | 42,162  | 18,409 | 23,753  | 43,033  | 18,917 | 24,116  |
| 3. Tausa         | 7,097        | 635    | 6,462   | 7,159   | 671    | 6,488   | 7,214   | 708    | 6,506   | 7,263   | 743    | 6,520   | 7,305   | 779    | 6,526   |
| 4. Sutatausa     | 4,542        | 1,104  | 3,438   | 4,606   | 1,137  | 3,469   | 4,668   | 1,170  | 3,498   | 4,727   | 1,202  | 3,525   | 4,782   | 1,234  | 3,548   |
| 5. Cucumuba      | 9,217        | 1,226  | 7,991   | 9,401   | 1,289  | 8,112   | 9,581   | 1,354  | 8,227   | 9,757   | 1,419  | 8,338   | 9,929   | 1,485  | 8,444   |
| 6. Suesca        | 12,963       | 3,761  | 9,202   | 13,322  | 3,912  | 9,410   | 13,620  | 4,006  | 9,614   | 14,038  | 4,221  | 9,817   | 14,395  | 4,379  | 10,016  |
| 7. Villapinzon   | 15,970       | 5,138  | 10,832  | 16,148  | 5,250  | 10,898  | 16,312  | 5,358  | 10,954  | 16,462  | 5,463  | 10,999  | 16,597  | 5,565  | 11,032  |
| 8. Lenguazaque   | 9,897        | 2,133  | 7,764   | 10,008  | 2,195  | 7,813   | 10,110  | 2,256  | 7,854   | 10,205  | 2,316  | 7,889   | 10,292  | 2,374  | 7,918   |
| 9. Guacheta      | 12,338       | 3,621  | 8,717   | 12,503  | 3,713  | 8,790   | 12,659  | 3,803  | 8,856   | 12,806  | 3,892  | 8,914   | 12,943  | 3,979  | 8,964   |
| 10. S.M.de Sema  | 4,492        | 525    | 3,967   | 4,485   | 543    | 3,942   | 4,478   | 561    | 3,917   | 4,469   | 578    | 3,891   | 4,458   | 595    | 3,863   |
| 11. Raquira      | 12,712       | 1,502  | 11,210  | 12,939  | 1,583  | 11,356  | 13,168  | 1,666  | 11,502  | 13,397  | 1,751  | 11,646  | 13,627  | 1,838  | 11,789  |
| 12. Fuquene      | 5,477        | 348    | 5,129   | 5,541   | 376    | 5,165   | 5,601   | 405    | 5,196   | 5,656   | 434    | 5,222   | 5,708   | 463    | 5,245   |
| 13. Susa         | 6,261        | 1,368  | 4,893   | 6,317   | 1,404  | 4,913   | 6,367   | 1,440  | 4,927   | 6,412   | 1,474  | 4,938   | 6,451   | 1,507  | 4,944   |
| 14. Simijaca     | 9,771        | 4,215  | 5,556   | 9,897   | 4,299  | 5,598   | 10,017  | 4,380  | 5,637   | 10,129  | 4,459  | 5,670   | 10,233  | 4,536  | 5,697   |
| 15. Caldas       | 5,776        | 275    | 5,501   | 5,797   | 302    | 5,495   | 5,817   | 328    | 5,489   | 5,835   | 355    | 5,480   | 5,853   | 383    | 5,470   |
| 16. Chiquinquirá | 49,175       | 41,021 | 8,154   | 49,836  | 41,643 | 8,193   | 50,499  | 42,267 | 8,232   | 51,155  | 42,887 | 8,268   | 51,809  | 43,508 | 8,301   |
| 17. Saboya       | 14,078       | 979    | 13,099  | 14,015  | 1,036  | 12,979  | 13,947  | 1,091  | 12,856  | 13,868  | 1,146  | 12,722  | 13,783  | 1,199  | 12,584  |
| Total            | 229,011      | 86,245 | 142,766 | 232,249 | 88,314 | 143,935 | 235,333 | 90,312 | 145,021 | 238,455 | 92,436 | 146,019 | 241,412 | 94,486 | 146,926 |

**Table A.2.1 Projection of the Population in Municipalities of the Study Area (cont.) (2/3)**

| Municipalities   | 2003           |               |                | 2004           |               |                | 2005           |                |                | 2006           |                |                | 2007           |                |                |
|------------------|----------------|---------------|----------------|----------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                  | Total          | Urban         | Rural          | Total          | Urban         | Rural          | Total          | Urban          | Rural          | Total          | Urban          | Rural          | Total          | Urban          | Rural          |
| 1. C. Carupa     | 10,305         | 1,802         | 8,503          | 10,384         | 1,858         | 8,526          | 10,443         | 1,910          | 8,533          | 10,503         | 1,963          | 8,540          | 10,565         | 2,018          | 8,547          |
| 2. Ubate         | 43,885         | 19,422        | 24,463         | 44,703         | 19,917        | 24,786         | 45,448         | 20,384         | 25,064         | 46,206         | 20,861         | 25,345         | 46,978         | 21,349         | 25,629         |
| 3. Tausa         | 7,341          | 815           | 6,526          | 7,366          | 849           | 6,517          | 7,390          | 883            | 6,507          | 7,416          | 918            | 6,497          | 7,443          | 955            | 6,487          |
| 4. Sutatausa     | 4,835          | 1,265         | 3,570          | 4,882          | 1,295         | 3,587          | 4,921          | 1,324          | 3,597          | 4,960          | 1,353          | 3,607          | 4,999          | 1,383          | 3,616          |
| 5. Cucunuba      | 10,096         | 1,551         | 8,545          | 10,254         | 1,618         | 8,636          | 10,394         | 1,683          | 8,711          | 10,536         | 1,750          | 8,786          | 10,682         | 1,820          | 8,861          |
| 6. Suesca        | 14,748         | 4,538         | 10,210         | 15,093         | 4,697         | 10,396         | 15,418         | 4,852          | 10,566         | 15,750         | 5,012          | 10,738         | 16,090         | 5,177          | 10,913         |
| 7. Villapinzon   | 16,717         | 5,661         | 11,056         | 16,814         | 5,751         | 11,063         | 16,876         | 5,830          | 11,046         | 16,939         | 5,910          | 11,029         | 17,004         | 5,991          | 11,013         |
| 8. Lenguazaque   | 10,369         | 2,432         | 7,937          | 10,433         | 2,486         | 7,947          | 10,477         | 2,536          | 7,941          | 10,522         | 2,587          | 7,935          | 10,568         | 2,638          | 7,930          |
| 9. Guacheta      | 13,069         | 4,064         | 9,005          | 13,181         | 4,145         | 9,036          | 13,267         | 4,218          | 9,049          | 13,354         | 4,292          | 9,062          | 13,442         | 4,368          | 9,074          |
| 10. S.M.de Sema  | 4,446          | 612           | 3,834          | 4,433          | 629           | 3,804          | 4,416          | 645            | 3,771          | 4,465          | 661            | 3,803          | 4,514          | 678            | 3,836          |
| 11. Raquira      | 13,859         | 1,927         | 11,932         | 14,090         | 2,018         | 12,072         | 14,317         | 2,111          | 12,206         | 14,548         | 2,208          | 12,340         | 14,786         | 2,310          | 12,476         |
| 12. Fuquene      | 5,754          | 492           | 5,262          | 5,794          | 521           | 5,273          | 5,828          | 549            | 5,279          | 5,863          | 578            | 5,285          | 5,900          | 610            | 5,291          |
| 13. Susa         | 6,485          | 1,540         | 4,945          | 6,509          | 1,570         | 4,939          | 6,534          | 1,601          | 4,933          | 6,560          | 1,633          | 4,927          | 6,586          | 1,665          | 4,921          |
| 14. Simijaca     | 10,330         | 4,609         | 5,721          | 10,414         | 4,677         | 5,737          | 10,478         | 4,737          | 5,741          | 10,543         | 4,798          | 5,745          | 10,608         | 4,859          | 5,749          |
| 15. Caldas       | 5,869          | 410           | 5,459          | 5,882          | 437           | 5,445          | 5,893          | 464            | 5,429          | 5,905          | 492            | 5,413          | 5,919          | 521            | 5,398          |
| 16. Chiquinquirá | 52,460         | 44,128        | 8,332          | 53,100         | 44,741        | 8,359          | 53,721         | 45,339         | 8,382          | 54,333         | 45,928         | 8,405          | 54,953         | 46,525         | 8,427          |
| 17. Saboya       | 13,690         | 1,251         | 12,439         | 13,586         | 1,300         | 12,286         | 13,471         | 1,348          | 12,123         | 13,361         | 1,398          | 11,963         | 13,254         | 1,449          | 11,805         |
| <b>Total</b>     | <b>244,258</b> | <b>96,519</b> | <b>147,739</b> | <b>246,918</b> | <b>98,509</b> | <b>148,409</b> | <b>249,292</b> | <b>100,414</b> | <b>148,878</b> | <b>251,763</b> | <b>102,342</b> | <b>149,421</b> | <b>254,290</b> | <b>104,316</b> | <b>149,974</b> |

**Table A.2.1 Projection of the Population in Municipalities of the Study Area (cont.) (3/3)**

| Municipalities   | 2008         |         |         | 2009    |         |         | 2010    |         |         |
|------------------|--------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                  | Total        | Urban   | Rural   | Total   | Urban   | Rural   | Total   | Urban   | Rural   |
|                  | 1. C. Carupa | 10,628  | 2,074   | 8,553   | 10,693  | 2,132   | 8,560   | 10,759  | 2,192   |
| 2. Ubate         | 47,764       | 21,849  | 25,916  | 48,566  | 22,360  | 26,206  | 49,383  | 22,883  | 26,499  |
| 3. Tausa         | 7,471        | 993     | 6,478   | 7,501   | 1,033   | 6,468   | 7,533   | 1,074   | 6,458   |
| 4. Sutatausa     | 5,040        | 1,413   | 3,626   | 5,080   | 1,444   | 3,636   | 5,122   | 1,476   | 3,646   |
| 5. Cucumuba      | 10,831       | 1,893   | 8,938   | 10,983  | 1,969   | 9,015   | 11,140  | 2,048   | 9,092   |
| 6. Suesca        | 16,438       | 5,347   | 11,091  | 16,795  | 5,523   | 11,272  | 17,160  | 5,704   | 11,456  |
| 7. Villapinzon   | 17,069       | 6,073   | 10,996  | 17,136  | 6,156   | 10,980  | 17,204  | 6,240   | 10,963  |
| 8. Lenguazaque   | 10,616       | 2,691   | 7,924   | 10,664  | 2,745   | 7,919   | 10,713  | 2,800   | 7,913   |
| 9. Guacheta      | 13,532       | 4,445   | 9,087   | 13,623  | 4,523   | 9,100   | 13,715  | 4,602   | 9,113   |
| 10. S.M.de Sema  | 4,564        | 695     | 3,869   | 4,614   | 712     | 3,902   | 4,666   | 730     | 3,936   |
| 11. Raquira      | 15,029       | 2,416   | 12,613  | 15,279  | 2,527   | 12,752  | 15,536  | 2,643   | 12,892  |
| 12. Fuquene      | 5,939        | 642     | 5,296   | 5,979   | 677     | 5,302   | 6,021   | 713     | 5,308   |
| 13. Susa         | 6,613        | 1,697   | 4,915   | 6,640   | 1,731   | 4,909   | 6,669   | 1,765   | 4,903   |
| 14. Simijaca     | 10,674       | 4,921   | 5,753   | 10,741  | 4,984   | 5,757   | 10,809  | 5,048   | 5,761   |
| 15. Caldas       | 5,935        | 553     | 5,382   | 5,952   | 586     | 5,366   | 5,972   | 621     | 5,351   |
| 16. Chiquinquirá | 55,580       | 47,130  | 8,450   | 56,216  | 47,743  | 8,473   | 56,859  | 48,364  | 8,496   |
| 17. Saboya       | 13,152       | 1,503   | 11,649  | 13,054  | 1,558   | 11,495  | 12,959  | 1,616   | 11,344  |
| Total            | 256,874      | 106,336 | 150,538 | 259,516 | 108,403 | 151,113 | 262,218 | 110,520 | 151,699 |