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Material Flow Accounting of Mexico (1970-2003)

Sources and Methods

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This technical background paper describes the methods applied and data sources used in the compilation of the 1980-2003 data set for material flow accounts of the Mexican economy and presents the data set. It is organised in four parts: the first part gives an overview of the Material Flow Accounting (MFA) methodology. The second part presents the main material flows of the Mexican economy including biomass, fossil fuels, metal ores, industrial minerals and, construction minerals. The aim of this part is to explain the procedures and methods followed, the data sources used as well as providing a brief evaluation of the quality and reliability of the information used and the accounts established. Finally, some conclusions will be provided.

I. Material Flow Accounting (MFA) methodology

MFA is a new approach in environmental accounting focussing on the flow of materials caused by economic activities. By accounting the material inputs into an economy, the material accumulation within the economy and outputs to other economies or back to nature, the accounting provides an empirical picture of the physical dimension of an economic system, usually expressed in tons (Figure 1). Furthermore, by producing national accounts in material terms, MFA complements the system of national accounts expressed in monetary terms. In so far, material flow accounting is considered as a satellite account to the SNA. In order to ensure compatibility to the SNA, a close mapping between monetary and physical flows is aimed at as far as possible.

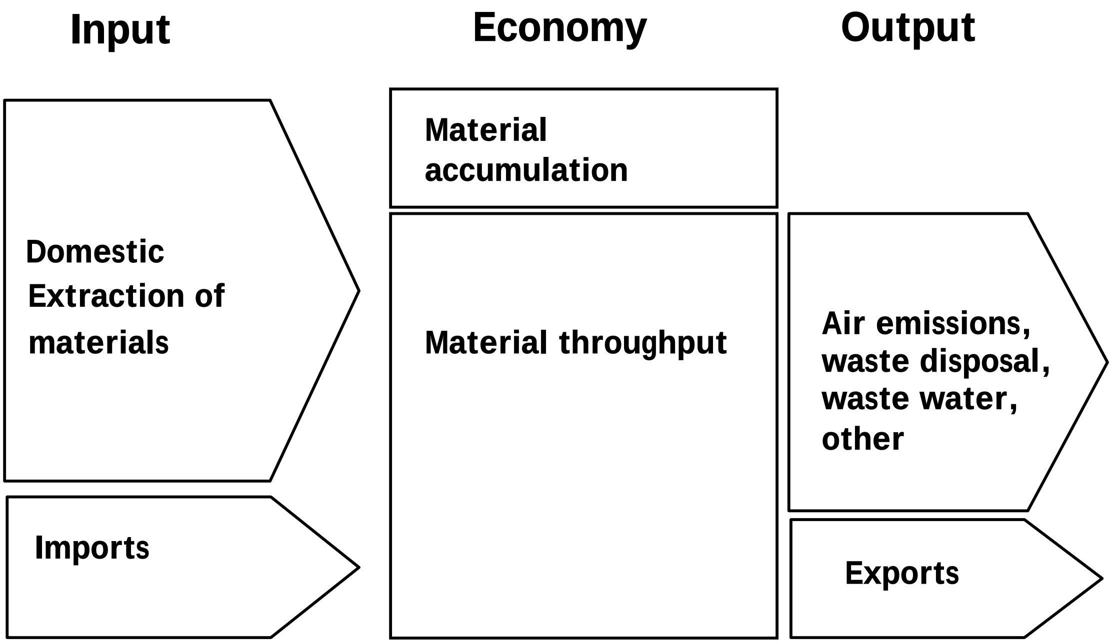
The methodology implemented here is conceptually based on the notion of *societal metabolism* (Fischer-Kowalski,1998), which metaphorically sees modern economies as living organisms whose impacts on their surrounding environment can be measured by the size of the metabolic throughput - the amount of materials these “organisms” appropriate from their environment and return back to it in an altered form (EUROSTAT ,2001, p.11) . Thus, material flow accounting represents a pressure indicator and can be considered as an indirect measure for environmental impacts originating from economic activities and the related use of natural resources.

Applying MF accounting methodology means, that all materials inputs of a national economy are accounted, apart from water and air. In order to obtain consistent data, the socio-economic system boundaries have to be clearly defined. According to the most up-to date methodological standard (EUROSTAT, 2001, p. 17), the system boundary is defined in the following way:

I By the extraction of primary (i.e. raw, crude, or virgin) materials from the national environment and the discharge of materials to the national environment.

II By the political (administrative) borders that determine material flows to and from the rest of the world (imports and exports). Natural flows into and out of a geographical territory are excluded.

Figure 1. Scope of economy-wide material flow accounts



Source: Adapted from Eurostat, 2001

In this approach, raw materials comprise agriculture and timber harvest reported in national agricultural and timber statistics. Livestock is considered part of the economic system and thus, production from livestock (such as meat and milk) is considered as an internal flow in the economy. As a consequence, uptake of grass from permanent pastures for fodder is accounted as material input. Table 1 provides a straightforward classification of the materials accounted in the MFA framework.

As in traditional National Accounts, MFA aggregated indicators can be derived from the material flow data set. The macro indicators from physical accounting presented in this analysis are all either input indicators or crude balancing indicators focussing mainly on the input side of the economy. The aggregated indicators are described as follows:

Domestic Extraction (DE) expresses the annual amount of raw materials extracted from the national territory in order to be used as material factor in the economic system. As mentioned before, water and air are not accounted for. Biomass, fossil fuels, metal ores and industrial minerals as well as construction minerals are the main categories of materials extracted in the national territory. Domestic extraction is mainly related to the activities of primary industries and refers to the step, when a natural resource is transformed to a commodity.

Table 1. MFA categories and subcategories

Material categories	Subcategories	Items comprised
Biomass	Food	All potentially edible biomass from cropland. In exports and imports all traded agricultural goods and final products from agriculture plants are included
	Fodder	All biomass from cropland, permanent pastures and by-products of harvest used to feed livestock. In exports and imports all traded fodder is comprised
	Animals	Biomass from hunting and fishing activities. In imports and exports all traded live animals and agricultural animal products(including fish) are comprised.
	Timber	Harvested timber for industrial products and fuel wood. In imports and exports the following goods are comprised: harvested timber, forestry products, wood based products such as paper, cork products and products predominantly from wood such as music instruments.
	Other biomass	Fibres and other non-timber products. In imports and exports, traded fibres products such as clothing as well as other products predominantly from biomass such as natural fertilizers are comprised
Fossil fuels	Coal	All types of coal
	Oil	All types of oil
	Natural	All types of natural gas
	Other fossils	Peat. In imports and exports, all manufactured traded products predominantly from fossil fuels such as plastics, pharmaceutics, nitrogen fertilisers are also comprised.
Minerals	Industrial minerals	All non-metallic minerals used predominantly for industrial processes (excluding fossil fuels)
	Metal ores	Metal ores. In imports and exports all metal- based products and products predominantly from metals are also considered.
	Construction minerals	All minerals used in construction

Source: adapted from Weisz et al.,2006.

Domestic Material Input (DMI) measures all materials of economic value used in production and consumption activities. Therefore, DMI sums up domestic extraction and imports. It is a measure for the overall material input into an economic system used to produced a certain added value.

Domestic Material Consumption (DMC) measures the total amount of material directly used in an economy. DMC equals domestic extraction plus imports minus exports. Here, the term “consumption” refers to “apparent consumption” and not “final consumption”. This consumption indicator is the closest equivalent to GDP (C+I+G+X-M) and can be considered as the physical equivalent to GDP (C+I+G+M-X). It is worth to note, that the difference between monetary GDP and physical GDP is that in the monetary approach, exports are added and imports deducted whereas in the latter, imports are added and exports deducted. This is because usually “money and physical goods flow in opposite directions in economic transactions” (EUROSTAT ,2001, p.38).

Physical imports and physical exports refers to all imports and exports from raw materials to final goods, expressed in tonnes of traded flows when they cross the national boundary.

Physical trade Balance (PTB) is accounted by deducting exports from imports. Thus, PTB is the reverse of the monetary trade balance. A positive figure for PTB would refer to a net importer while a negative figure would indicate a net exporter of materials.

II. Main material flows of the Mexican Economy

The following table provides an overview of the size and relative share of the main material flows in Mexico at the beginning and end of the period under study.

Table 2: Main material flow categories for Mexico in 1970 and 2003

	1970		2003	
	Magnitude (million t)	**% of total DE**	**Magnitude (million t)**	**% of total DE**
DE biomass	204.2	59	295.6	26
DE fossil fuels	40.7	12	230.4	20
DE minerals	104.1	30	622.1	54
TOTAL DE	**349.1**	**100**	**1148.2**	**100**
TOTAL IMPORTS	**8.5**	**2**	**185.1**	**16**
TOTAL EXPORTS	**14.1**	**4**	**243.7**	**21**

Source: own calculations

Domestic extraction of materials of 349 million tonnes in 1970 is showing an significant increase to 1,148 million in 2003. This implies that DE has tripled within three decades.

Also, the composition of DE has undergone an important change between 1970 and 2003. While in 1970, DE of biomass was clearly the dominating fraction with a share of 59% of total DE; in 2003 the dominating fractions of DE are minerals with a share of 54% of total DE. In addition, DE of fossil fuels has gained importance during this period and has passed from a 12% share in 1970 to a 20% share in 2003.

While biomass extraction shows moderate growth, the most pronounced fact is the considerable rise of minerals and fossil fuels domestically extracted since 1970. Both categories have grown nearly six-folded during these three decades. As a consequence, biomass extraction has seen its relative importance drop from 59% to 26%.

Beside these considerable growth dynamics in the use of natural resources also the integration into the world economy expressed by the amount of materials traded is impressive. Trade flows have shown a dramatic rise in terms of weight during the period under study. Imports have passed from 8.5 to 185 million tonnes whilst exports have grown from 14 to 243 million tonnes; registering a yearly growth rate of 2,1% and 1,6% respectively.

As for the relative importance of trade flows, imports in 1970 represented 2% of material input while in 2003 imported materials amounted to 16% of direct material input. Showing the same trend, exports amounted to 14% of DMI in 1970 and 21% of DMI 2003.

II.1 Domestic extraction of biomass

Biomass extraction is composed of the subcategories food, animal fodder, animals, wood and other biomass. In the following table, shares of each component as well as the magnitude for the year 1970 and 2003 are shown.

Table 3: Biomass domestic extraction in Mexico in 1970 and 2003

	1970		2003	
	Magnitude (1000 t)	**% of biomass DE**	**Magnitude (1000 t)**	**% of biomass DE**
Food	61,930	30.0	106,405	36.0
Fodder	124,823	61.1	161,559	54.5
Animals	308	0.2	1,565	0.5
Wood	15,645	7.7	23,533	8.0
Other biomass	1,551	0.8	2,606	1.0

Source: own calculations

In Mexico, domestic extraction of biomass has been dominated by fodder over the whole period, despite a slight decrease of its share. In 1970, fodder accounted for 61% of biomass extraction while in 2003 this was 55%. The second largest biomass flow is agricultural production for human consumption (food crops). This flow does not show an important increase over the whole period (2% average growth and with negative growth rates in some years) despite the dynamic population growth (2,5% average growth rate). Food crops passed from 30% share of biomass extraction to 36%. It seems that agricultural production could more or less grow with population growth although a certain amount of human nutrition had to be increasingly supplied by imports.

Timber is the third largest flow but accounts for a small fraction of only 8% and shows little variation over the period under analysis. Finally, *other biomass* such as fibres and non-timber products account only for 1% of biomass extraction whilst *animals* (mainly fish) represents only 0.5%, both figures are for 2003.

II.1.1 Domestic extraction of biomass: food

Domestic extraction of food is based on agriculture production statistics. Primary crops production used as human food include cereals, roots and tubers, pulses, oil crops, vegetables, fruits, tree nuts and other crops.

There are two national data sources, namely the Agriculture Information System called *SIACON* (SAGARPA, 2005) which is the main data source for the period 1980-2003. The second source covering the period from 1970-1979 is the printed version of the Historical Statistics database (*Estadísticas Históricas de México*) (INEGI, 1999) where long historical time series on crops production are available.

No inconsistencies or differences in magnitude were found when comparing national databases with FAOSTAT data (FAO, 2006a).

Additionally, crops and agricultural production arising from subsistence activities are accounted for in this calculation. According to an expert for agricultural statistics of the Ministry of Agriculture[1], crops production in Mexico is recorded directly from the field plots by applying assumptions for average yield to planted area. In addition, FAOSTAT clarifies with regard to subsistence production on its website as follows: “crop production data refer to the actual harvested production from the field or orchard and gardens, excluding harvesting and threshing losses and that part of crop not harvested for any reason. Production therefore includes the quantities of the commodity sold in the market (marketed production) and the quantities consumed or used by the producers (auto-consumption)” (FAOSTAT, 2006b). This is of particular importance since smallholder production is an important mainstay of the rural economy in countries such as Mexico. As it has been shown in several field studies, the biggest part of the maize production in Mexico is carried out for self-consumption purposes in small field plots (Escobar,

[1] Interview by mail with Mr. José Luis Campos Leal, Deputy Director of Agriculture Information and Statistics. Ministry of Agriculture (SAGARPA). In Mexico City on the 5th of October, 2006.

2006; Ortiz , 2005). The same situation occurs with bean crops. According to Government sources, 20% of total production of beans is destined to self-consumption (SAGARPA, 2006).

In Mexico, the share of food biomass in the total DE of biomass was 30% at the beginning and 36% at the end of the investigated period. Compared to total domestic extraction, the share of agricultural biomass dropped from 17% to 9% between 1970 and 2003.

Due to the fact that the information used here includes subsistence production, we can be confident about the reliability of our food estimations.

II.1.2 Domestic Extraction of biomass: fodder

Fodder for livestock accounts for the biggest part of biomass extraction in Mexico. It is composed of three subcategories:
1) primary crops destined entirely to feeding animals,
2) food uptake from permanent pastures (grazing),
3) fodder as by-product of harvest.

Primary crops

In Mexico, several crops are destined to produce forage and silage for livestock feeding the most important of them being alfalfa. In addition, crops like turnips and beets are solely used as fodder. The data source for these crops is FAOSTAT (FAO, 2006a) , where data is reported as fresh weight (with approximately 80% of water content). For reasons of consistency, the water content of fodder crops have been standardised to 15% water content using the procedure suggested in EUROSTAT (2001). The standardisation of the water content of livestock fodder is necessary to avoid a wrongful difference between stable feeding and feeding on pastures. In general, for reasons of consistency all grass categories should be included in the material flows accounts with 15% standardised water content (EUROSTAT , 2002, p.56).

Table 4 Agricultural products with 80% water content in primary data

Product name	FAO classification
Maize for forage and silage	
Sorghum for forage and silage	
Rye grass for forage and silage	638
Grasses nes for forage and silage	639
Clover for forage and silage	640
Alfalfa for forage and silage	641
Mixed grasses and legumes	645

Source: FAO, 2006a

Grazing

In addition to grass harvest, direct grass uptake by ruminants on permanent pastures was included in the MFA account for domestic extraction. Because direct fodder uptake is usually not reported in agricultural statistics, the amount of grazed biomass had to be estimated. As already explained for grass crops, grazing has to be reported in hay weight.

Given the fact that this category can have considerably influence on the amount of biomass extraction, special care has to be taken to narrow down the range of uncertainty. In order to do so, (EUROSTAT , 2002) suggests calculating demand and supply of animal fodder from permanent pastures and use the lower value for the MF account.

For the fodder supply estimation, the standard procedure is to multiply the area destined to grazing with annual yield coefficients. Given the territorial extension of Mexico, 1,964,375 km2 (INEGI, 2006), climate conditions vary considerably in each region. Grazing is carried out in different regions with different climate conditions and therefore, different grass productivities are found from the bush areas to the tropical forest. However, grazing predominates mainly in two areas: permanent pastures (praderas) and bush areas (matorrales) (SEMARNAT, 2006).

Only grazing in these two areas is considered in this estimate. The extensions were obtained from (SEMARNAT, 2006) whose database is built with information provided by COTECOCA. The annual yield coefficients were obtained directly from several COTECOCA publications (COTECOCA, 1987; Jaramillo, 1994a; Jaramillo,1994b; Jaramillo ,1994c).

COTECOCA is the government organisation in charge of grazing and livestock raising activities. In the seventies it calculated “carrying capacity coefficients” for several grazing areas in Mexico. COTECOCA has calculated a minimum and a maximum yield coefficient for each type of predominant vegetation in permanent pastures and bush areas. In order to simplify the analysis, we calculate the average values. The minimum coefficient was applied to each area.

Table 5: Pasture Forage Yields for Mexico

Forage Yields Tonnes Dry Matter/ha/year		
Zone	**lowest value**	**highest value**
Permanent pastures	1,17	11,3
Bush area	1,75	18,8

Source: own calculations based on COTECOCA, 1987; Jaramillo, 1994a; Jaramillo, 1994b; Jaramillo, 1994c.

The results show, that the total supply of pasture did not rise considerably over the period. In 1970, grass from pasture was around 99 million tonnes of dry matter (DM) while in 2003 it was around 106 million tonnes. The biggest share was obtained from permanent pastures areas (73%).

Fodder demand was calculated by multiplying total stock of ruminants with the unitary demand of fodder per year. The animals included in the fodder demand account are cattle, horses, sheep and goats. Data was taken from the Historical Statistics database (*Estadísticas Históricas de México*) (INEGI, 1999) for the period 1970-1979 and from the Agriculture Information System called *SIACON*

(SAGARPA, 2005) for the period 1980-onwards. The coefficients applied are shown in table 6 in dry matter (DM) and were taken from EUROSTAT (2002, p.57).

Table 6: Fodder demand of ruminants

Coefficients Kg Dry Matter/ head/ day	
Species	**Average fodder demand**
Cattle	9
Goats	1
Horses	11
Sheep	1

Source: Eurostat, 2002, p. 57.

Fodder demand has increased more than potential supply from pastures during this period. In 1970, fodder demand was nearly 108 million tonnes whilst in 2003, it was 134 million tonnes. Supply estimations were used in this study as they were the lowest values.

By-products of harvest

The use of by products from harvest as forage is a widely spread practice in Mexico. Residues that would be thrown away in Europe, are generally kept for feeding animals in Mexican agriculture. The use of straw from crops such as sesame, cotton, safflower seed, soybeans, beans for feeding cattle is well documented (Jímenez, 1989). Straw from peanuts and strawberry crops are also be used as animal fodder as well as is the case for by-products such as sugar cane bagasse and beer production residues (Jaramillo, 1992). In this study, only by-products from the main grain crops are included in the account. This refers to residues from barley, sorghum, wheat, rice and maize, mainly straw of these crops. Maize straw is by far the most important residue in terms of quantity produced.

Culturally and economically speaking, maize is one of the most important crops since the Mexican diet is based on maize being the main staple food. While the grain is used for human consumption, the straw and the rachis are destined for animal feeding. Therefore, 100% of the plant is used. The relation of maize grain production to forage production can vary depending on the region. While in the central semi-humid region this relation between crop and residue is one to one[2] in other regions this relation goes up to 2,25:1 considering the use of both residues, straw and rachis (Jimenez ,1989). In the current study, an average relation of 1,9:1 was applied.

Most of the coefficients applied in this study come from Mexican sources and only if such information was absent coefficients from international studies were used. The main international reference with regard to agriculture and livestock raising used in this study was Wirsenius (2000).

Table 7: Straw coefficients for Mexico

Crops	Relation
Maize	1.9
Sesame	0,6
Rice	1,3
Sunflower seed	0,8
Barley	1,0
Sorghum	1,1
Soybean	0,6
Wheat	0,7
Beans	0,7
Green peas	1,0

Source: adapted from Jimenez, 1989; Gonzalez, 2006; Jaramillo, 1992

Table 8: International straw coefficients

Crops	Relation
Canary seed	0,5
Millet	0,5
Oats	0,5
Rye	0,5
Triticale	0,5

Source: Wirsenius, 2000.

[2] Interview with Prof. Carlos González Esquivel. CICA, Autonomous University of the State of mexico (UAEM) in Toluca, State of Mexico on the 15th of March, 2006.

The share of fodder in total DE of biomass was 61% in 1970 and 55% in 2003, respectively. Compared with total domestic extraction (all domestic materials), fodder biomass share dropped considerably, from 33% to 14%.

In general, data quality for fodder estimations is good apart from grazing estimations where the level of uncertainty is considerably higher. Improvements in grazing estimates can be made in future work. Firstly, a more detailed calculation can be carried out by type of vegetation including other grazing areas apart from bush areas and permanent pastures. Secondly, yield coefficients should be updated since the ones available date from the seventies. Also, it is worth noting that biomass and especially, the food and fodder outcomes are highly dependent on climate variations.

II.1.3 Domestic Extraction of biomass: animals

Biomass from hunting and fishing activities are accounted for in this category. However, in this study, only biomass extraction from fishing was estimated since data on hunting was not available. Nevertheless, hunting activities should only account for a very small fraction compared with other biomass flows.

Data for fish catch were obtained from Mexican statistics and compared with FAO data. There are two Mexican sources: for the period 1970-1989 data were collected from the Historical Statistics database (*Estadísticas Históricas de México)* (INEGI ,1999). From 1990 onwards, the President annual report (*Anexo Estadístico del 5o. Informe de Gobierno*) (Presidencia de la República ,2005) was the source used. Important deviations were found when Mexican data was compared to FAO data. For the period 1970-1990, FAOSTAT time series seem to be overestimated by a range from 2,5% to 28%. From 1993 onwards FAO data is underestimated by approximately 3%.

Since fish catch is provided in annual tonnes, there is no need for any conversion. Fish biomass accounted for the smallest part in the total DE of biomass during the period. In 1970 its share was only 0,2%, showing a very small increase in 2003 to 0,5%. The quality of data, however, can be considered as reliable.

II.1.4 Domestic Extraction of biomass: wood

Wood extraction is composed of two main categories: wood for forestry products and wood fuels. While forestry products time series are rather easy to obtain in main national data sources (INEGI ,1999; Presidencia de la República ,2005) there is a lack of reliable information on wood fuels extraction at the national level.

The forestry products appraised in this study are: wood-based panels, cellulose pulpwood, plywood and fibreboard, posts and stakes, sleepers and charcoal and fuel wood. All these products are classified in coniferous and non-coniferous. It is worth noting that values for charcoal fuel wood provided in the national statistics only correspond to the amount sold in the markets and therefore, were registered as timber products. These values represent only a very small fraction of the total fuel wood consumption in the country.

The lack of reliable fuel wood estimations is an important bias when accounting for material flows in developing countries. Wood remains the main source of energy of rural households. In the case of Mexico, one out of four inhabitants, around 25 million people, uses wood for cooking (Masera et al., 2005); and fuel wood actually covers 80% of the rural household energy supply (Díaz ,2000). When accounting for the extraction of this energetic resource, the troublesome fact is that the biggest part is collected directly by the consumers and therefore, not accounted in the national statistics. According to FAO (FAO, 2006c) approximately 80 to 96% of the fuel wood consumers in Mexico collect this energy resource directly.

Moreover, fuel wood accounts for the biggest part of total round wood production and it is by far, the most important use of wood. Estimations done with FAOSTAT data (FAO ,2006b) reveal that total fuel wood use in Mexico accounts for three times the total commercial timber legally harvested in the country.

Several case studies have been carried out in order to obtain estimates of fuel wood consumption per capita. It has been found that consumption of this natural resource varies considerably depending on availability in a range between 1,48-2,97 kg per day (Masera et al., 2005). Nevertheless, there is a lack of an overall estimation at the national level. In this sense, FAOSTAT is the only database that provides a time series for overall fuel wood consumption estimated through a model. Details on the modelling procedure can be found in (Whiteman et al., 2002). Absent better sources of information, in this study fuel wood consumption is based on FAOSTAT (FAO, 2006a).

Both, timber products and fuel wood data are presented in cubic meters. To convert forestry data from cubic meters into tonnes, conversion factors for coniferous and non-coniferous wood were applied depending on the region where wood was obtained from. We assumed that pine, beech and other coniferous grow mainly in boreal regions while oak and other foliages are found in temperate regions. Precious and other tropical species such as mahogany and teakwood are assumed to be produced in tropical regions.

Table 9: Forestry factors

Transformation factors T per green volume [t dm / m³] Oven dry biomass per cubic metre green volume			
Region	Factor		
		C	**NC**
Tropical	America	0,43	0,60
Temperate	America	0,41	0,58
Boreal	America	0,44	0,45

Source: Adapted from (Brown ,1997, Penman et al. ,2003)

The wood density coefficients above, convert the production data from volume to mass dry matter. To allow for international comparability of results we apply the recommendation of Eurostat to report timber extraction at 15% water content.

Although wood is the third most important biomass flow, it accounts only for 8% of the total DE of biomass in Mexico over the whole period. Timber extraction, however, should be bigger given the high rates of deforestation in the country. According to the Ministry of the Environment (SEMARNAT, 2006) a great part of timber extraction is carried out under illegal conditions. Following the report, between 1990 and 2000, Mexico had lost nine million ha of forest.

Hence, current estimations are incomplete and should be improved in the future by using geographical information systems (GIS) and cartography. GIS can be a good tool to obtain information on the quantity of illegal wood extraction. Another remaining problem is the need to access direct fuel wood estimations since the ones available are generated through models. Given the huge quantity of fuel wood use and the high rates of deforestation due to illegal logging, current estimations should be taken as a conservative measure of timber extraction.

Extraction of biomass: other biomass

Other biomass is composed by agriculture products such as fibres and non-timber products. Apart from fibres – cotton, sisal, agave, other agriculture products included in this group are gums and natural rubbers. The non-timber products accounted for are resins, fibres, rubbers, waxes, rhizomes and soil.

Data for *other biomass* was taken from the same sources as for *food biomass*: The Agriculture Information System *SIACON* (SAGARPA, 2005) and the printed version of the Historical Statistics database (*Estadísticas Históricas de México*) (INEGI, 1999). Non-timber products were obtained from the same sources we used for forest products (INEGI, 1999; Presidencia de la República ,2005). All data was reported in tonnes and no conversion was necessary.

Non-timber products account for a very small part of total biomass, only 1% and have not varied through the whole period. However, it is worth pointing out that non-timber products reported in the national statistics do not comprise products gathered directly by consumers. Here, we face the same problem as explained for fuel wood. According to field studies in indigenous communities, a big number of plant species and other non timber forest products are used as food, medicine, fodder, and building materials. Moreover, these species have a great importance, both culturally and economically speaking (Camou, 2004; Casas et al. 1994, Panayotou and Ashton, 1992). Thus, we conclude that the estimates of *other biomass* presented here are incomplete and should be taken as minimum values, making further improvements in future research necessary.

II.2 Domestic Extraction of fossil fuels

In Mexico, the extractive industry of fossil fuels is based mainly on three material categories: crude oil, natural gas and hard coal. As it has been shown in table 2, domestic extraction of fossil fuels is the least important fraction of domestic extraction in terms of magnitude in Mexico despite a rise observed during the period. In 1970, 40 million tonnes of fossil fuels were extracted whilst in 2003 extraction increased up to 230 million tonnes. Fossil fuel extraction nearly six-folded in three decades and should further increase in the future.

Table 10: Fossil fuel extraction

	1970		**2003**	
	Magnitude (1000 t)	**% of fossil fuels DE**	**Magnitude (1000 t)**	**% of fossil fuels DE**
Total	40,741	100	230,456	100
Coal	2,959	7	6,648	3
Crude oil	24,223	59	190,333	83
Natural gas	13,559	33	33,475	15

Source: own calculations

According to table 10, crude oil has been by far the most important fossil fuel in the whole period. Its contribution to total extraction of fossil fuels increased considerably from 59% in 1970 to 83% in 2003. The quantity extracted today is eight times higher than in the 1970s. It increased from 24 to 190 million tonnes. Natural gas is the second most important fossil fuel extracted In Mexico. However, its contribution is small when compared to oil: in 1970 it had a share of 33% but only a share of 15% in 2003. Coal represents a tiny part of fossil fuel extraction: 7% in 1970 and 3% in 2003, respectively.

Data for fossil fuels were gathered from Mexican databases. For reasons of comparison IEA data (IEA, 2004) and data from the US Geological Survey- Mineral yearbooks (USGS, 2004) were used for the period 1990-2003, when both data sets had information available for Mexico.

Mexican sources used are the Historical Statistics database (*Estadísticas Históricas de México* (INEGI ,1999) for the period 1970-1995. From 1996 onwards data were collected from the national yearbooks (INEGI, 1993; INEGI, 2000) and the President Report (*Anexo Estadístico del 5o. Informe de Gobierno*) (Presidencia de la República, 2005). Comparing Mexican data with IEA data, we found that IEA is showing smaller production at a range of 2% up to 8% in the case of crude oil whereas for natural gas the difference can go up to as much as 25% for some years. USGS- Mineral yearbook data generally coincided with Mexican data.

We carried out some conversions in order to obtain fossil fuels data in tonnes. For instance, hard coal is provided in annual tonnes while crude oil is provided in thousand of barrels per year. The conversion factor used is 1 barrel = 0.15899 cubic meters. A density of Mexican crude oil of 973kg/m^3 was obtained in a web source (www.farm.net, 2005). Natural gas was converted from cubic meters into tonnes using a density of 0,72kg/m^3 (Gaz de France, 2005) the density of natural gas in vaporous state.

Data quality and reliability can be considered very good since fossil fuels production data is permanently collected and supplied to the public due to the economic importance of these natural resources for the Mexican economy.

II.3 Domestic Extraction of minerals

Minerals are disaggregated into: metal ores, industrial minerals and construction minerals (EUROSTAT, 2001). Minerals extraction in Mexico is shown in table 11:

Table 11: Minerals extraction composition

	1970		2003	
	Magnitude (1000 t)	**% of minerals DE**	**Magnitude (1000 t)**	**% of minerals DE**
Total	131,359	100	622,109	100
Mineral Ores	27,239	21	79,610	13
Industrial	3,125	2	20,906	3
Construction	100,994	77	521,591	84

Source: own calculations

Minerals extraction has experienced a dramatic rise in the last three decades, becoming the dominating category of domestic extraction in recent years. In 2003, half of the whole materials extracted in Mexico were minerals whereas in the seventies, minerals represented roughly 30%. Within this category, construction minerals have been the most extracted, showing a considerable rise during this period because of considerable infrastructure up-built. Construction minerals extraction five folded and its contribution to total mineral extraction grew from 77% to 84%. On the contrary, mineral ores have decreased their share from 21% in 1970 to 13% in 2003. As for industrial minerals, even though that their extracted quantity increased six times, their contribution to total mineral extraction only increased from 2 to 3%.

II.3.1. Metal ores and industrial minerals

15 metal ores and 24 industrial minerals were accounted for Mexico. Certain minerals such as aluminium were left out despite that they are reported as national

production in the Mexican statistics. This is due to the fact that they are produced with imported raw materials, such as bauxite in the case of aluminium.

In the case of industrial minerals, in addition to the categories listed in the EUROSTAT guidebook (2001), minerals such as wollastonite and vermiculite were added. Clays and abrasives were also included in the account. The minerals data set built up for Mexico was based mainly on Mexican sources. These are the Mexican Mining Yearbooks (*Informes de la Minería Mexicana)* published by the Geological National Service (*Servicio Geológico Mexicano*) *(SGM, 2003; SGM, 2002; SGM, 2001; SGM, 2000; SGM, 1999; SGM, 1998; SGM, 1993*). The second reference used was the Historical Statistics database (*Estadísticas Históricas de México)* (INEGI,1999). For some minor minerals not registered in the national sources such as magnesia, natural abrasives and sodium compounds, the Minerals Yearbooks (USGS, 2004) published by the United States Geological Survey were used as data source. These yearbooks provide data only for the period 1989-2003, therefore the industrial minerals taken from this source were included only for this period.

Metal and non-ferrous minerals are reported in the statistics as the net content of the mineral. Following the international MFA convention, the total crude mineral extracted should be accounted instead of the net mineral content. This is the "run of mine" approach. This implies that the data reported in the statistics have to be multiplied by a factor reflecting the concentration of the metal in crude ores. The following table shows the factors used in our estimations and their source.

Through interviews with experts[3], we learnt that there is a risk of double counting when applying factors since crude metal ores in many cases contain several metals. The metals produced in Mexico that frequently occur as by-products of other ores are: arsenic, bismuth, cadmium, selenium. These metals were not

[3] Interview with Sergio Rendón Medina, Director of Mining Statistics and Analysis in the Ministry of Economy. In Mexico City on 17th of March, 2006.

multiplied by their respective factor. For the specific case of lead and zinc that may occur in the same crude ore, we may have a problem of double counting since concentration factors were applied to both. Ores and industrial minerals are in general reported in tonnes, thus no particular conversion was needed apart from the respective ores listed in table 12.

Table 12: Metals conversion factors

Metals ores or concentrates	Metal contents in crude ores or concentrates as %	Factor (multiplier) to convert metal contents into total crude ore in metric tonnes (t)
Antimony ore	9,0	11,11
Copper ores	0,8	125,00
Gold ores	0,0001	1000000,00
Iron ores	58,0	1,72
Lead ores	8,75	11,43
Manganese ores	30,0	3,33
Mercury concentrates	50,0	2,00
Molybdenum ores	0,2	500,00
Silver ores	0,03	3333,33
Tin ores	0,3604	277,47
Tungsten ores	1,09	91,71
Zinc ores	12,2	8,20

Source: UNSTATS ,2001.

Mineral ores data reliability can be considered high since under the *Minerals Law*, annual reporting of data by mines is compulsory. As for the industrial minerals data, we can differentiate two periods: in the period 1975-onwards, information can be considered good while data quality for the first half of the seventies is rather low since there is a lack of data for some industrial minerals such as salt, celestite (strontium sulphate), calcite, bentonite and feldspar.

Further improvements can be made by checking for double counting for ores such as zinc, lead as well as copper. It would be a valuable next activity to improve the reliability of the result.

II.3.2 Domestic Extraction of construction minerals

Construction minerals are raw materials extracted from nature that are used for construction directly or that are used for the production of construction minerals like bricks or tiles (EUROSTAT, 2002). For Mexico, data on domestic extraction of marble, clays, dolomite, limestone are available and were taken from the Mexican Mining Yearbooks (*Informes de la Minería Mexicana)(SGM, 2003; SGM, 2002; SGM, 2001; SGM, 2000; SGM, 1999; SGM, 1998; SGM, 1993*).

Nevertheless, there is a gap in sand and gravel statistics, a common problem not only found in developing countries but also in industrialised countries. In general, coverage of construction minerals is unsatisfactory in industrialised countries (Bringezu and Schutz, 2001; EUROSTAT 2002) because of several reasons: prices of these minerals are generally very low and building and cement companies extract these minerals directly, not buying these materials in the market. In the special case of Mexico, another explanation is that in the *Mining Law*, annual reporting of industrial minerals and ores extraction by mines has been compulsory which not the case for construction minerals is. Extraction of construction minerals is not monitored by the government. Therefore, there are no statistics of such minerals but incomplete data collected by the Mexican Geologic Services and only from the year 1981 onwards.

In addition, there is no agreed methodology for calculating indirectly sand & gravel extraction and several methods have been used. For instance, in the MOSUS project, the estimation procedure used was calculating levels of per capita extraction of construction minerals depending on the income level. The assumption behind this procedure is that construction minerals extraction increases, when population grows and the absolute level is determined by GDP/capita levels (Giljum et al., 2005).

In this paper, the annual quantity of sand and gravel used in the economy was calculated from the quantity of cement consumed. According to this method, the relation cement to sand and gravel for producing concrete is 1:4, that is, for each tonne of cement domestically consumed, 4 tonnes of sand and gravel are needed. In addition, the relation of sand& gravel for concrete production to the use of sand and gravel as a filling material is estimated to be 1:2,5. Once having calculated the quantity of sand and gravel with this methodology, the estimation obtained was summed up to the rest of construction minerals available as shown in table 13.

Table 13: Construction minerals in Mexico

	1970		2003	
	Magnitude (1000 t)	**Const. min / capita tonnes**	**Magnitude (1000 t)**	**Const. min / capita tonnes**
Sand & gravel (estimate)	100,520		448,000	
Other construction minerals	474		73,591	
TOTAL	100,994	2	521,591	5

Source: own calculations

The results are totally consistent with the level of per capita extraction, calculated for a country such as Mexico in other studies. Mexico in the seventies had a per capita construction mineral extraction of 2 tonnes which is within the range observed in developing countries. In 2003, Mexico reached the level of 5 tonnes per capita which corresponds to a middle income country (see the MOSUS project website for further details on levels of extraction per capita based on income. http://www.mosus.net//).

Due to the lack of data on this type of minerals, it is rather unlikely that improvements can be made in the near future using direct information. However, we would recommend trying other indirect methods of estimations and comparisons between national case studies.

II.4 Foreign trade: Imports and Exports

Foreign trade in Mexico has shown a dramatic change during the last two decades. While in the seventies, the Mexican economy was hardly present at international markets in 1986 trade barriers and tariffs were suppressed, making Mexico one of the most economic open countries in the world. This trend has been reflected in both, the incoming and outgoing trade flows during the period under analysis.

Table 14: Mexico: Imports and Exports

(1000 t)	1970	2003
Imports	8,516	185,117
Exports	14,180	243,770
Physical trade Balance	-5,654	-58,663

Source: own calculations

Imports in 2003 were nearly 22 times bigger than in 1970. Exports followed the same trend: in 2003 they were 17 times bigger than in 1970. Data on imports and exports for Mexico stem from different national databases. The Physical Trade Balance (PTB) is negative in both years, which means that Mexico has been a net exporter of materials. However, there have been some years when a positive PTB was registered along the period under study. It is of great relevance the fact that in 1994 the North American Free Trade Agreement (NAFTA) was put into action and from then on the PTB has been mainly positive meaning that Mexico has been a net importer of materials in the last decade.

For the period between 1970-1974, data was extracted from the Mexican Foreign Trade Yearbooks published by the Ministry of Industry and Commerce (SPP,1971; SPP, 1973; SPP,1975) where data on imports and exports are provided in tonnes, classified in 9 sections: food, beverages and tobacco, raw materials, fuels, lubricants, chemical products, manufactured products, machinery, diverse final products and arms and weapons.

For the period 1975-1993, historical time series of imports and exports were taken from the database *(Estadísticas Históricas del Comercio Exterior de México)*

(INEGI ,1998). This database is divided into two periods. In the first period up to 1987, commodities were classified using the “old classification”, the Brussels Commodity Nomenclature. In Mexico, this classification was used from 1965 until the first semester of 1988. From the second semester of 1988 it was substituted by the HS “harmonized commodity description and Coding System”. Therefore, the second period from 1988 up to 1993 is classified following this international convention. The primary sources of this historical database are the Mexican Foreign Trade Yearbooks, quoted in precedent lines. In addition, two important facts concerning this database are that information is disaggregated to 6 digits, and an important quantity of items are provided in several different units of measurement – especially metal final products- are provided either in units (pieces, pairs) while fabrics are provided in squared meters. Therefore, all these items has to be converted into tonnes using coefficients.

Finally, for the last period (1993-2003), the database World Trade Atlas (BANCOMEXT, 2002; BANCOMEXT, 2004) was used. This is a modern and easy to access database provided by *BANCOMEXT* which is the government institution that deals with foreign trade. The primary source of the information compiled in this database is the Ministry of Economy *(SECOFI, Secretaría de Comercio y Fomento Industrial*). As in the previous period, a great quantity of metal items was provided mainly in pieces in this database. Also in this case, coefficients were applied for converting all these items into tonnes.

The *maquila* industry

Whether the imports and exports flows arising from the maquila industry in Mexico are accounted in this calculation is of great relevance due to the increasing economic importance of these activities in Mexico.

Maquila industry are assembly plants that use imported foreign parts and semi-finished products to produce final products for exports, taking advantage of the big pool of cheap labour in developing countries. In 1966 the first maquila activities started in the northern border region of Mexico (Carrillo and de la O, 2003). However, it was not before 1990, when the maquila industry gained economic relevance due to the dramatic growth and increasing contribution both in the economy and employment registered in this decade. In 2000, the maquila industry produced 48% of the total manufactured exports (De la Garza, E., 2005) and according to foreign trade statistics (BANCOMEXT ,2004) the maquila exports share was 47,7% of total Mexican exports and 35,3% of total Mexican imports, both in monetary terms.

For the long period between 1970 up to 1992, the maquila foreign trade flows should be accounted for in the Mexican Foreign Trade Yearbooks although these flows are not differentiated from the rest of the flows arising from the national industry. Since we could not find information on whether these flows are accounted, in this paper we assumed that the imports and exports arising from the maquila activities in Mexico were considered in this period's total imports as well as in total exports. We assumed so, due to a footnote found in the Foreign Trade Yearbooks, published by the Ministry of Industry and Commerce (SPP,1971; SPP, 1973; SPP,1975), where it was mentioned that the import and export figures reported in these publications are those declared by the importers and exporters in the corresponding customs documents. Importers and exporters are obliged to declare.

From 1993 onwards, all foreign trade databases offer: 1) the maquila figures separately from 2) the national industry *figures* and 3) the total were both concepts are summed up. Hence, the total imports and exports were used in our calculations.

This is the first time that a disaggregated exports and imports times series data is calculated in tonnes for Mexico using national databases. Harmonisation of the diverse databases has implied a great deal of effort. However, further improvements can be made in the conversion step into tonnes, being more precise in the weights applied. For instance, washing machines are available in different sizes and weights. Here in this study we applied an average weight. However, the biggest part of the items needing to be converted account for a very small fraction of total trade flows.

III. Conclusions

This is the first Material Flow Account for Mexico carried out for a thirty years period and based mainly on national data sources. The results show the important rise of materials domestically extracted in Mexico and particularly, of considerable increases of fossil fuels and construction minerals. Regarding imports and exports, both have shown a dramatic rise in terms of weight during the period under study. Imports have passed from 8.5 to 185 million tonnes whilst exports have grown from 14 to 243 million tonnes; registering an annual average growth rate of 2,1% and 1,6% respectively.

In general, quality and reliability of the information used for estimating the main material flows is good. Our biomass extraction figures comprise most of the materials used in the economy and can be considered a reliable estimate. Fossil fuels estimates and metal ores and industrial minerals can also be considered of good reliability.

However, the calculations presented in this study can be improved in two directions. On the one hand, in the biomass flow by a) calculating an overall figure of fuel wood extraction by means of direct methodologies, b) including wood illegally extracted, c) including estimates of non-timber products collected directly by the consumers.

On the other hand, important improvements can be carried out with regard to mineral flows and particularly, for construction minerals by including data on sand and gravel obtained directly or by investing in more sophisticated modelling of such flows. Nevertheless, it is rather unlikely that improvements can be made in the near future since generating data through direct methods, such as census and surveys, imply a great deal of time and money. However, we would recommend comparing the Mexican results to material flow data for other countries in the region to see communalities and variations.

It is also the first time that a disaggregated physical export and import time-series were calculated in tonnes for Mexico using national databases. Harmonisation of the diverse databases has implied a great deal of effort. Although further improvements in data quality can be made, these will not necessarily change the overall trends considerably.

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Annex. Detailed tables

Part I

Mexico

Unit: 1000 tonnes

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
DOMESTIC EXTRACTION	**376.357**	**376.125**	**396.777**	**420.327**	**443.156**	**472.752**	**487.744**	**521.854**	**580.452**	**608.569**
Biomass	**204.257**	**204.724**	**204.212**	**206.654**	**207.311**	**213.860**	**207.504**	**215.987**	**227.185**	**218.069**
Food crops	61.930	61.609	61.168	62.867	63.551	67.062	61.986	63.732	72.363	68.554
Fodder	124.823	125.961	125.292	125.710	125.062	128.242	126.656	131.221	133.331	127.704
Animals	308	286	302	358	390	451	526	562	704	850
Timber	15.645	15.377	15.881	16.049	16.475	16.746	17.049	19.083	19.385	19.819
Non edible biomass	1.551	1.491	1.569	1.671	1.832	1.359	1.286	1.390	1.403	1.142
Minerals	**131.359**	**132.389**	**152.243**	**172.283**	**185.948**	**200.047**	**216.817**	**232.560**	**263.090**	**283.638**
Construction minerals	100.994	103.527	120.917	140.378	152.355	167.663	181.401	190.434	219.853	237.162
Industrial minerals	3.125	3.334	3.396	3.683	4.034	4.020	3.689	8.727	10.170	10.600
Ores	27.239	25.527	27.930	28.221	29.559	28.364	31.728	33.398	33.067	35.876
Fossil fuels	**40.741**	**39.013**	**40.322**	**41.390**	**49.898**	**58.846**	**63.423**	**73.307**	**90.176**	**106.862**
Coal and products	2.959	1.776	1.899	2.082	2.252	2.344	2.344	2.685	2.646	2.654
Crude oil and products	24.223	24.119	24.963	25.511	32.463	40.466	45.344	55.395	68.469	82.503
Natural gas and products	13.559	13.118	13.461	13.798	15.183	16.035	15.736	15.227	19.061	21.704
Products from fossils										
IMPORTS	**8.516**	**9.226**	**10.725**	**15.997**	**13.985**	**15.902**	**11.782**	**12.460**	**16.877**	**17.229**
Biomass	**2.261**	**1.712**	**2.797**	**3.861**	**5.454**	**5.255**	**2.763**	**5.885**	**5.890**	**6.194**
Food crops	1.021	391	1.263	2.236	3.651	3.098	1.450	2.986	3.141	1.987
Fodder	-	-	-	-	-	880	111	731	788	857
Animals	236	262	282	298	374	132	152	168	188	287
Timber	539	420	420	511	550	735	692	734	793	1.029
Non edible biomass	465	639	832	816	879	410	357	1.266	980	2.034
Minerals	**3.151**	**2.874**	**3.115**	**4.258**	**4.516**	**7.303**	**5.882**	**4.840**	**8.328**	**8.812**
Construction minerals						230	196	67	118	246
Industrial minerals	1.648	1.697	1.772	1.925	2.040	3.712	3.417	2.982	4.455	4.274
Ores	1.503	1.177	1.344	2.333	2.477	3.361	2.269	1.792	3.754	4.292
Fossil fuels	**3.104**	**4.640**	**4.813**	**7.879**	**4.014**	**3.344**	**3.137**	**1.735**	**2.659**	**2.223**
Coal and products	-	-	-	-	-	563	190	92	472	435
Crude oil and products	-	-	-	-	-	2.126	2.220	793	1.215	826
Natural gas and products	-	-	-	-	-	1	1	1	0	0
Products from fossils	-	-	-	-	-	654	726	849	972	961
EXPORTS	**14.180**	**14.587**	**15.873**	**13.778**	**16.403**	**17.669**	**19.922**	**27.976**	**38.541**	**45.915**
Biomass	**2.952**	**3.479**	**4.016**	**3.323**	**3.207**	**2.380**	**2.585**	**3.317**	**3.772**	**3.490**
Food crops	2.090	2.673	2.962	2.598	2.493	1.854	1.832	2.279	2.368	2.498
Fodder	-	-	-	-	-	3	4	2	2	2
Animals	260	231	286	213	167	128	213	242	302	177
Timber	62	59	82	68	72	96	211	480	703	404
Non edible biomass	540	516	685	444	474	299	325	314	397	409
Minerals	**7.398**	**8.288**	**9.814**	**8.672**	**10.605**	**9.025**	**10.323**	**12.805**	**14.534**	**13.000**
Construction minerals	6.339	7.062	8.223	7.351	9.042	490	719	1.922	1.708	824
Industrial minerals	214	289	436	443	459	6.633	6.549	6.950	8.704	8.225
Ores	844	938	1.155	877	1.104	1.901	3.055	3.933	4.122	3.951
Fossil fuels	**3.831**	**2.819**	**2.043**	**1.784**	**2.591**	**6.264**	**7.014**	**11.854**	**20.235**	**29.425**
Coal and products	-	-	-	-	-	16	0	0	44	68
Crude oil and products	-	-	-	-	-	6.125	6.822	11.613	19.729	28.894
Natural gas and products	-	-	-	-	-	10	0	52	201	201
Products from fossils	-	-	-	-	-	113	192	188	261	261

Source: Own estimates based on national data sources

Annex. Detailed tables

Part II

Mexico

Unit: 1000 tonnes

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
DOMESTIC EXTRACTION	**688.515**	**751.757**	**790.176**	**756.532**	**775.626**	**816.170**	**787.835**	**834.841**	**834.809**	**851.482**
Biomass	**233.131**	**241.678**	**231.577**	**238.152**	**241.178**	**250.832**	**249.401**	**255.285**	**247.243**	**249.308**
Food crops	74.843	76.932	75.479	76.598	79.412	82.823	87.780	91.155	85.696	86.952
Fodder	136.339	142.387	133.706	138.904	138.626	144.337	138.023	139.589	136.609	137.833
Animals	1.059	1.364	1.160	973	993	1.099	1.177	1.281	1.237	1.336
Timber	19.909	19.965	20.321	20.656	21.154	21.584	21.597	22.228	22.274	22.243
Non edible biomass	982	1.030	910	1.022	994	989	824	1.032	1.428	944
Minerals	**318.906**	**348.070**	**371.140**	**335.890**	**352.240**	**387.556**	**372.147**	**405.822**	**415.482**	**429.439**
Construction minerals	259.418	291.223	311.767	274.880	287.862	321.196	306.316	337.394	344.327	356.729
Industrial minerals	13.795	9.354	12.005	12.738	14.206	15.051	14.421	14.653	15.448	16.420
Ores	45.693	47.493	47.368	48.272	50.173	51.309	51.410	53.775	55.708	56.290
Fossil fuels	**136.478**	**162.008**	**187.458**	**182.490**	**182.207**	**177.782**	**166.287**	**173.734**	**172.083**	**172.735**
Coal and products	408	1.237	786	1.818	2.215	2.440	3.678	4.252	4.211	4.244
Crude oil and products	109.594	130.552	155.071	150.506	151.990	148.524	137.076	143.451	141.919	141.910
Natural gas and products	26.476	30.219	31.601	30.166	28.002	26.817	25.533	26.031	25.953	26.582
Products from fossils										
IMPORTS	**41.493**	**39.017**	**25.545**	**30.588**	**29.543**	**33.604**	**19.354**	**23.911**	**51.382**	**99.468**
Biomass	**22.417**	**16.019**	**9.256**	**21.941**	**17.270**	**13.422**	**7.481**	**10.213**	**12.350**	**27.669**
Food crops	13.668	8.167	3.808	13.490	9.648	6.548	3.813	6.013	3.825	7.073
Fodder	3.812	2.940	2.589	6.340	5.144	3.475	794	789	802	3.114
Animals	513	537	330	336	304	486	375	390	544	843
Timber	1.774	1.779	1.005	1.274	1.302	1.771	1.312	1.726	6.575	14.569
Non edible biomass	2.649	2.596	1.524	502	872	1.141	1.187	1.296	604	2.070
Minerals	**15.281**	**19.520**	**12.334**	**6.580**	**9.393**	**14.374**	**8.010**	**9.269**	**35.916**	**64.429**
Construction minerals	585	889	430	52	76	98	62	72	110	272
Industrial minerals	5.079	8.387	7.948	4.307	6.237	7.504	4.737	4.820	1.925	3.716
Ores	9.617	10.244	3.957	2.221	3.080	6.772	3.212	4.377	33.881	60.442
Fossil fuels	**3.795**	**3.478**	**3.955**	**2.067**	**2.880**	**5.808**	**3.863**	**4.430**	**3.116**	**7.370**
Coal and products	1.620	951	1.253	331	446	1.222	325	112	98	10
Crude oil and products	601	722	1.326	610	1.033	2.317	1.984	2.859	2.167	5.413
Natural gas and products	1	0	0	0	1	1	1	1	1	1
Products from fossils	1.573	1.805	1.376	1.125	1.401	2.267	1.553	1.458	851	1.946
EXPORTS	**77.978**	**94.679**	**112.273**	**125.143**	**135.515**	**128.280**	**108.789**	**130.021**	**104.508**	**132.680**
Biomass	**3.387**	**2.512**	**3.062**	**3.495**	**4.726**	**4.094**	**7.010**	**7.091**	**4.107**	**5.440**
Food crops	2.764	1.901	2.329	1.940	3.180	3.271	3.062	4.143	2.822	4.056
Fodder	5	2	9	2	2	2	3	7	4	44
Animals	161	149	180	269	174	218	357	377	211	559
Timber	154	145	280	1.020	986	314	3.208	2.114	826	549
Non edible biomass	303	316	264	265	384	288	380	450	243	231
Minerals	**23.037**	**24.059**	**21.065**	**31.441**	**36.944**	**34.174**	**25.422**	**43.394**	**24.608**	**47.623**
Construction minerals	805	590	820	2.577	4.782	5.322	4.194	4.812	2.266	4.709
Industrial minerals	18.247	17.462	14.589	16.181	17.322	15.828	9.030	10.188	5.396	11.647
Ores	3.986	6.007	5.657	12.683	14.840	13.025	12.199	28.394	16.946	31.267
Fossil fuels	**51.554**	**68.107**	**88.146**	**90.207**	**93.845**	**90.012**	**76.357**	**79.536**	**75.793**	**79.617**
Coal and products	14	0	35	0	0	164	25	64	143	58
Crude oil and products	48.558	65.468	85.526	87.579	91.377	88.317	74.780	77.898	74.062	77.220
Natural gas and products	2.747	2.390	2.222	1.887	1.454	616	593	517	1.023	971
Products from fossils	234	249	363	741	1.014	915	959	1.056	564	1.367

Source: Own estimates based on national data sources

Annex. Detailed tables

Mexico

Part III

Unit: Thousand metric tons

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
DOMESTIC EXTRACTION	**875.920**	**897.633**	**938.303**	**952.513**	**999.204**	**924.228**	**980.748**	**1.030.056**	**1.046.058**	**1.061.465**
Biomass	**259.991**	**255.374**	**265.811**	**266.359**	**269.012**	**275.806**	**283.870**	**281.889**	**287.953**	**281.810**
Food crops	87.939	84.950	89.903	90.499	90.486	95.894	100.944	100.486	104.912	100.333
Fodder	146.354	145.081	150.959	151.371	154.096	154.873	157.508	155.427	156.956	154.754
Animals	1.447	1.453	1.246	1.192	1.260	1.404	1.530	1.571	1.233	1.286
Timber	22.056	21.965	22.128	21.789	21.885	22.320	22.741	23.240	23.590	23.801
Non edible biomass	2.196	1.925	1.575	1.509	1.284	1.313	1.147	1.167	1.261	1.635
Minerals	**440.663**	**459.265**	**489.648**	**502.875**	**545.213**	**465.282**	**494.963**	**535.771**	**541.251**	**571.152**
Construction minerals	365.938	385.918	413.661	424.844	462.666	373.965	398.430	435.876	439.839	472.356
Industrial minerals	16.797	16.042	16.156	15.518	15.963	16.570	18.093	18.233	18.919	18.808
Ores	57.929	57.304	59.831	62.513	66.584	74.747	78.440	81.661	82.493	79.989
Fossil fuels	**175.266**	**182.993**	**182.844**	**183.279**	**184.979**	**183.141**	**201.915**	**212.396**	**216.854**	**208.502**
Coal and products	4.220	4.865	5.060	5.718	6.393	7.391	8.780	8.510	7.832	8.765
Crude oil and products	143.869	151.085	151.040	150.950	151.610	147.776	161.832	170.644	173.369	164.085
Natural gas and products	27.177	27.043	26.744	26.611	26.976	27.973	31.303	33.242	35.653	35.653
Products from fossils										
IMPORTS	**90.953**	**167.544**	**173.966**	**140.407**	**127.688**	**106.083**	**134.758**	**169.826**	**203.372**	**246.742**
Biomass	**53.116**	**68.461**	**98.499**	**54.560**	**67.348**	**36.685**	**38.034**	**33.520**	**37.064**	**40.325**
Food crops	9.231	6.133	7.894	7.181	10.062	8.578	14.799	11.504	15.292	16.919
Fodder	3.312	3.803	5.545	4.330	4.268	2.648	2.491	2.557	3.585	5.222
Animals	11.101	1.023	1.361	1.275	1.343	842	1.114	1.410	1.557	1.659
Timber	27.919	55.482	81.421	39.187	47.912	20.985	12.829	12.867	9.529	10.411
Non edible biomass	1.552	2.021	2.278	2.588	3.764	3.632	6.802	5.183	7.100	6.115
Minerals	**30.012**	**89.390**	**62.290**	**74.405**	**45.252**	**55.192**	**83.303**	**104.945**	**136.516**	**181.050**
Construction minerals	318	393	743	809	961	509	467	900	1.279	1.283
Industrial minerals	4.825	4.479	3.996	3.393	9.631	6.369	7.333	9.756	11.369	11.063
Ores	24.868	84.518	57.551	70.203	34.660	48.314	75.503	94.289	123.868	168.704
Fossil fuels	**7.825**	**9.693**	**13.177**	**11.442**	**15.088**	**14.205**	**13.421**	**31.361**	**29.792**	**25.366**
Coal and products	277	135	614	824	877	1.708	1.979	2.777	2.958	2.808
Crude oil and products	5.554	7.009	9.006	7.932	8.785	8.099	7.403	12.351	15.293	15.554
Natural gas and products	1	1	1	1	1	1	2	2	2	3
Products from fossils	1.993	2.549	3.556	2.685	5.425	4.397	4.036	16.230	11.539	7.001
EXPORTS	**131.456**	**109.364**	**115.752**	**108.617**	**151.858**	**126.914**	**137.647**	**147.598**	**150.205**	**147.142**
Biomass	**4.606**	**5.310**	**5.275**	**5.599**	**6.815**	**10.412**	**9.555**	**10.418**	**12.501**	**14.572**
Food crops	3.288	4.096	3.507	3.804	4.313	6.691	6.674	7.266	9.047	8.402
Fodder	36	41	57	43	34	72	43	61	37	73
Animals	686	565	511	627	524	811	412	479	466	611
Timber	441	422	1.018	675	1.358	1.662	1.283	1.259	1.417	1.496
Non edible biomass	155	187	182	450	586	1.177	1.143	1.352	1.533	3.989
Minerals	**49.037**	**20.520**	**26.648**	**25.756**	**65.513**	**40.806**	**43.646**	**43.531**	**42.394**	**44.132**
Construction minerals	3.196	3.856	6.053	6.358	6.472	10.231	13.213	12.201	10.952	10.562
Industrial minerals	10.562	12.528	11.887	12.148	14.334	16.379	17.156	16.880	15.758	16.231
Ores	35.280	4.137	8.707	7.250	44.707	14.197	13.278	14.450	15.684	17.339
Fossil fuels	**77.812**	**83.533**	**83.829**	**77.262**	**79.530**	**75.696**	**84.446**	**93.650**	**95.310**	**88.438**
Coal and products	10	30	0	5	1	1	15	1	3	70
Crude oil and products	74.127	78.999	79.783	73.474	71.416	71.527	80.475	90.269	91.508	83.619
Natural gas and products	1.603	1.226	636	628	1.038	1.021	1.018	463	392	1.240
Products from fossils	2.072	3.278	3.410	3.155	7.075	3.147	2.938	2.917	3.407	3.509

Source: Own estimates based on national data sources

Annex. Detailed tables

Part IV

Mexico

Unit: Thousand metric tons

	2000	2001	2002	2003
DOMESTIC EXTRACTION	**1.117.592**	**1.118.517**	**1.119.185**	**1.148.232**
Biomass	**288.038**	**297.880**	**289.335**	**295.667**
Food crops	104.698	108.496	103.688	106.405
Fodder	155.054	161.104	159.293	161.559
Animals	1.403	1.521	1.554	1.565
Timber	24.379	23.862	23.295	23.533
Non edible biomass	2.505	2.897	1.505	2.606
Minerals	**616.435**	**603.523**	**611.171**	**622.109**
Construction minerals	512.833	500.955	511.717	521.591
Industrial minerals	19.740	21.379	20.024	20.907
Ores	83.862	81.189	79.430	79.611
Fossil fuels	**213.118**	**217.114**	**218.679**	**230.456**
Coal and products	8.230	6.986	6.371	6.648
Crude oil and products	170.066	176.562	179.390	190.333
Natural gas and products	34.822	33.566	32.918	33.475
Products from fossils				
IMPORTS	**251.063**	**244.297**	**298.021**	**185.117**
Biomass	**41.080**	**67.132**	**97.246**	**46.636**
Food crops	17.284	20.022	20.033	21.327
Fodder	5.693	5.731	5.651	4.604
Animals	1.902	2.043	2.120	2.089
Timber	9.705	11.065	60.925	11.635
Non edible biomass	6.495	28.271	8.517	6.981
Minerals	**178.975**	**147.920**	**167.448**	**119.184**
Construction minerals	1.511	1.167	1.367	1.202
Industrial minerals	23.900	9.491	11.495	10.246
Ores	153.564	137.262	154.587	107.736
Fossil fuels	**31.007**	**29.245**	**33.326**	**19.297**
Coal and products	3.067	3.853	6.294	7.748
Crude oil and products	20.168	17.616	7.246	2.504
Natural gas and products	4	3	3	3
Products from fossils	7.768	7.773	19.783	9.042
EXPORTS	**158.835**	**166.015**	**212.654**	**243.770**
Biomass	**15.539**	**23.805**	**33.935**	**15.309**
Food crops	8.525	8.961	10.194	8.528
Fodder	58	78	60	147
Animals	719	656	586	670
Timber	2.069	1.422	1.709	2.274
Non edible biomass	4.169	12.687	21.386	3.691
Minerals	**46.733**	**44.810**	**72.412**	**106.039**
Construction minerals	11.168	11.663	10.283	11.257
Industrial minerals	14.598	13.072	11.616	11.954
Ores	20.967	20.074	50.513	82.828
Fossil fuels	**96.563**	**97.400**	**106.307**	**122.421**
Coal and products	6	9	4	2
Crude oil and products	92.087	93.107	95.032	106.137
Natural gas and products	363	289	48	9
Products from fossils	4.107	3.995	11.223	16.273

Source: Own estimates based on national data sources

Annex. Detailed tables

Part I

Mexico- Material Input Extensive Indicators

Unit: Thousand metric tons

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
DE	**376.357**	**376.125**	**396.777**	**420.327**	**443.156**	**472.752**	**487.744**	**521.854**	**580.452**	**608.569**	**688.515**
Biomass	204.257	204.724	204.212	206.654	207.311	213.860	207.504	215.987	227.185	218.069	233.131
Minerals	131.359	132.389	152.243	172.283	185.948	200.047	216.817	232.560	263.090	283.638	318.906
Fossil fuels	40.741	39.013	40.322	41.390	49.898	58.846	63.423	73.307	90.176	106.862	136.478
DMI	**384.873**	**385.351**	**407.502**	**436.325**	**457.141**	**488.654**	**499.526**	**534.314**	**597.328**	**625.798**	**730.009**
Biomass	206.518	206.436	207.008	210.515	212.764	219.114	210.267	221.872	233.075	224.263	255.549
Minerals	134.509	135.262	155.358	176.540	190.464	207.350	222.699	237.400	271.418	292.450	334.187
Fossil Fuels	43.845	43.653	45.135	49.269	53.912	62.190	66.560	75.042	92.835	109.084	140.273
DMC	**370.693**	**370.764**	**391.629**	**422.546**	**440.738**	**470.985**	**479.604**	**506.337**	**558.788**	**579.883**	**652.030**
Biomass	203.566	202.957	202.993	207.193	209.558	216.734	207.681	218.554	229.303	220.773	252.161
Minerals	127.112	126.974	145.545	167.869	179.859	198.325	212.377	224.595	256.885	279.450	311.149
Fossil Fuels	40.015	40.834	43.092	47.485	51.321	55.926	59.546	63.188	72.600	79.659	88.719
PTB	**-5.664**	**-5.361**	**-5.148**	**2.219**	**-2.418**	**-1.767**	**-8.140**	**-15.517**	**-21.664**	**-28.686**	**-36.485**
Biomass	-691	-1.767	-1.219	538	2.247	2.875	178	2.567	2.118	2.704	19.030
Minerals	-4.247	-5.415	-6.698	-4.414	-6.088	-1.722	-4.440	-7.965	-6.206	-4.188	-7.756
Fossil fuels	-726	1.821	2.769	6.095	1.423	-2.919	-3.877	-10.119	-17.576	-27.203	-47.759

Mexico- Material Input Intensive Indicators

Unit: tonnes per capita

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
DE	**7,4**	**7,2**	**7,4**	**7,6**	**7,7**	**8,0**	**8,0**	**8,3**	**9,0**	**9,2**	**10,2**
Biomass	4,0	3,9	3,8	3,7	3,6	3,6	3,4	3,5	3,5	3,3	3,5
Minerals	2,6	2,5	2,8	3,1	3,2	3,4	3,6	3,7	4,1	4,3	4,7
Fossil fuels	0,8	0,7	0,7	0,7	0,9	1,0	1,0	1,2	1,4	1,6	2,0
DMI	**7,6**	**7,4**	**7,6**	**7,8**	**8,0**	**8,3**	**8,2**	**8,5**	**9,3**	**9,5**	**10,8**
Biomass	4,1	4,0	3,8	3,8	3,7	3,7	3,5	3,5	3,6	3,4	3,8
Minerals	2,7	2,6	2,9	3,2	3,3	3,5	3,7	3,8	4,2	4,4	4,9
Fossil Fuels	0,9	0,8	0,8	0,9	0,9	1,1	1,1	1,2	1,4	1,7	2,1
DMC	**7,3**	**7,1**	**7,3**	**7,6**	**7,7**	**8,0**	**7,9**	**8,1**	**8,7**	**8,8**	**9,6**
Biomass	4,0	3,9	3,8	3,7	3,7	3,7	3,4	3,5	3,6	3,3	3,7
Minerals	2,5	2,4	2,7	3,0	3,1	3,4	3,5	3,6	4,0	4,2	4,6
Fossil Fuels	0,79	0,78	0,80	0,85	0,89	0,95	0,98	1,01	1,13	1,21	1,31

Mexico- Material Input Intensive Indicators

Unit: tonnes per 1000 US dlls (constant 2000)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
DE	**2,08**	**2,00**	**1,95**	**1,92**	**1,91**	**1,93**	**1,90**	**1,97**	**2,01**	**1,92**	**1,99**
Biomass	1,13	1,09	1,00	0,94	0,89	0,87	0,81	0,81	0,79	0,69	0,67
Minerals	0,72	0,70	0,75	0,78	0,80	0,81	0,85	0,88	0,91	0,90	0,92
Fossil fuels	0,22	0,21	0,20	0,19	0,21	0,24	0,25	0,28	0,31	0,34	0,39
DMI	**2,1**	**2,0**	**2,0**	**2,0**	**2,0**	**2,0**	**1,9**	**2,0**	**2,1**	**2,0**	**2,1**
Biomass	1,1	1,1	1,0	1,0	0,9	0,9	0,8	0,8	0,8	0,7	0,7
Minerals	0,7	0,7	0,8	0,8	0,8	0,8	0,9	0,9	0,9	0,9	1,0
Fossil Fuels	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,4
DMC	**2,0**	**2,0**	**1,9**	**1,9**	**1,9**	**1,9**	**1,9**	**1,9**	**1,9**	**1,8**	**1,9**
Biomass	1,1	1,1	1,0	0,9	0,9	0,9	0,8	0,8	0,8	0,7	0,7
Minerals	0,7	0,7	0,7	0,8	0,8	0,8	0,8	0,8	0,9	0,9	0,9
Fossil Fuels	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3

Source: Own estimates based on national data sources. Source for population is Presidencia de la República (2005) and for GDP is WB (2005).

Annex. Detailed tables

Part II

Mexico- Material Input Extensive Indicators

Unit: Thousand metric tons

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
DE	**751.757**	**790.176**	**756.532**	**775.626**	**816.170**	**787.835**	**834.841**	**834.809**	**851.482**	**875.920**	**897.633**
Biomass	241.678	231.577	238.152	241.178	250.832	249.401	255.285	247.243	249.308	259.991	255.374
Minerals	348.070	371.140	335.890	352.240	387.556	372.147	405.822	415.482	429.439	440.663	459.265
Fossil fuels	162.008	187.458	182.490	182.207	177.782	166.287	173.734	172.083	172.735	175.266	182.993
DMI	**790.774**	**815.720**	**787.120**	**805.169**	**849.773**	**807.189**	**858.753**	**886.191**	**950.951**	**966.873**	**1.065.177**
Biomass	257.697	240.833	260.093	258.448	264.254	256.882	265.498	259.593	276.977	313.107	323.836
Minerals	367.590	383.474	342.470	361.634	401.930	380.157	415.091	451.398	493.868	470.675	548.655
Fossil Fuels	165.487	191.413	184.557	185.087	183.590	170.150	178.164	175.200	180.106	183.091	192.686
DMC	**696.095**	**703.447**	**661.977**	**669.654**	**721.494**	**698.400**	**728.732**	**781.684**	**818.271**	**835.418**	**955.814**
Biomass	255.185	237.771	256.598	253.722	260.160	249.873	258.407	255.486	271.537	308.501	318.526
Minerals	343.530	362.409	311.029	324.690	367.756	354.735	371.697	426.791	446.245	421.638	528.135
Fossil Fuels	97.380	103.267	94.350	91.242	93.578	93.793	98.628	99.407	100.489	105.279	109.153
PTB	**-55.662**	**-86.729**	**-94.555**	**-105.972**	**-94.676**	**-89.434**	**-106.109**	**-53.125**	**-33.211**	**-40.503**	**58.181**
Biomass	13.507	6.193	18.446	12.544	9.328	472	3.121	8.243	22.230	48.510	63.151
Minerals	-4.540	-8.731	-24.860	-27.551	-19.800	-17.412	-34.125	11.308	16.806	-19.026	68.870
Fossil fuels	-64.629	-84.191	-88.140	-90.965	-84.204	-72.493	-75.106	-72.677	-72.247	-69.987	-73.840

Mexico- Material Input Intensive Indicators

Unit: tonnes per capita

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
DE	**10,9**	**11,2**	**10,5**	**10,5**	**10,8**	**10,2**	**10,6**	**10,4**	**10,4**	**10,5**	**10,6**
Biomass	3,5	3,3	3,3	3,3	3,3	3,2	3,2	3,1	3,1	3,1	3,0
Minerals	5,0	5,2	4,6	4,8	5,1	4,8	5,2	5,2	5,3	5,3	5,4
Fossil fuels	2,3	2,6	2,5	2,5	2,4	2,2	2,2	2,1	2,1	2,1	2,2
DMI	**11,4**	**11,5**	**10,9**	**10,9**	**11,3**	**10,5**	**10,9**	**11,1**	**11,6**	**11,6**	**12,6**
Biomass	3,7	3,4	3,6	3,5	3,5	3,3	3,4	3,2	3,4	3,8	3,8
Minerals	5,3	5,4	4,7	4,9	5,3	4,9	5,3	5,6	6,0	5,7	6,5
Fossil Fuels	2,4	2,7	2,6	2,5	2,4	2,2	2,3	2,2	2,2	2,2	2,3
DMC	**10,1**	**9,9**	**9,1**	**9,1**	**9,6**	**9,1**	**9,3**	**9,8**	**10,0**	**10,0**	**11,3**
Biomass	3,7	3,4	3,5	3,4	3,4	3,2	3,3	3,2	3,3	3,7	3,8
Minerals	5,0	5,1	4,3	4,4	4,9	4,6	4,7	5,3	5,5	5,1	6,2
Fossil Fuels	1,41	1,46	1,30	1,23	1,24	1,22	1,26	1,24	1,23	1,26	1,29

Mexico- Material Input Intensive Indicators

Unit: tonnes per 1000 US dlls (constant 2000)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
DE	**2,00**	**2,11**	**2,11**	**2,09**	**2,14**	**2,15**	**2,24**	**2,21**	**2,16**	**2,12**	**2,08**
Biomass	0,64	0,62	0,66	0,65	0,66	0,68	0,68	0,65	0,63	0,63	0,59
Minerals	0,92	0,99	0,94	0,95	1,02	1,02	1,09	1,10	1,09	1,06	1,06
Fossil fuels	0,43	0,50	0,51	0,49	0,47	0,45	0,47	0,46	0,44	0,42	0,42
DMI	**2,1**	**2,2**	**2,2**	**2,2**	**2,2**	**2,2**	**2,3**	**2,3**	**2,4**	**2,3**	**2,5**
Biomass	0,7	0,6	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,8	0,8
Minerals	1,0	1,0	1,0	1,0	1,1	1,0	1,1	1,2	1,3	1,1	1,3
Fossil Fuels	0,4	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,4	0,4
DMC	**1,8**	**1,9**	**1,8**	**1,8**	**1,9**	**1,9**	**2,0**	**2,1**	**2,1**	**2,0**	**2,2**
Biomass	0,7	0,6	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
Minerals	0,9	1,0	0,9	0,9	1,0	1,0	1,0	1,1	1,1	1,0	1,2
Fossil Fuels	0,3	0,3	0,3	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3

Source: Own estimates based on national data sources. Source for population is Presidencia de la República (2005) and for GDP is WB (2005).

Annex. Detailed tables

Mexico- Material Input Extensive Indicators

Unit: 1000,000 tonnes

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
DE	**938**	**953**	**999**	**924**	**981**	**1.030**	**1.046**	**1.061**	**1.118**	**1.119**	**1.119**	**1.148**
Biomass	266	266	269	276	284	282	288	282	288	298	289	296
Minerals	490	503	545	465	495	536	541	571	616	604	611	622
Fossil fuels	183	183	185	183	202	212	217	209	213	217	219	230
DMI	**1.112**	**1.093**	**1.127**	**1.030**	**1.116**	**1.200**	**1.249**	**1.308**	**1.369**	**1.363**	**1.417**	**1.333**
Biomass	364	321	336	312	322	315	325	322	329	365	387	342
Minerals	552	577	590	520	578	641	678	752	795	751	779	741
Fossil Fuels	196	195	200	197	215	244	247	234	244	246	252	250
DMC	**997**	**984**	**975**	**903**	**978**	**1.052**	**1.099**	**1.161**	**1.210**	**1.197**	**1.205**	**1.090**
Biomass	359	315	330	302	312	305	313	308	314	341	353	327
Minerals	525	552	525	480	535	597	635	708	749	707	706	635
Fossil Fuels	112	117	121	122	131	150	151	145	148	149	146	127
PTB	**58**	**32**	**-24**	**-21**	**-3**	**22**	**53**	**100**	**92**	**78**	**85**	**-59**
Biomass	93	49	61	26	28	23	25	26	26	43	63	31
Minerals	36	49	-20	14	40	61	94	137	132	103	95	13
Fossil fuels	-71	-66	-64	-61	-71	-62	-66	-63	-66	-68	-73	-103

Mexico- Material Input Intensive Indicators

Unit: tonnes per capita

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
DE	**10,9**	**10,8**	**11,2**	**10,1**	**10,6**	**11,0**	**11,0**	**11,0**	**11,4**	**11,3**	**11,1**	**11,2**
Biomass	3,1	3,0	3,0	3,0	3,1	3,0	3,0	2,9	2,9	3,0	2,9	2,9
Minerals	5,7	5,7	6,1	5,1	5,3	5,7	5,7	5,9	6,3	6,1	6,1	6,1
Fossil fuels	2,1	2,1	2,1	2,0	2,2	2,3	2,3	2,2	2,2	2,2	2,2	2,3
DMI	**12,9**	**12,4**	**12,6**	**11,3**	**12,1**	**12,8**	**13,1**	**13,5**	**14,0**	**13,7**	**14,1**	**13,0**
Biomass	4,2	3,6	3,8	3,4	3,5	3,4	3,4	3,3	3,4	3,7	3,8	3,3
Minerals	6,4	6,6	6,6	5,7	6,2	6,8	7,1	7,8	8,1	7,6	7,7	7,2
Fossil Fuels	2,3	2,2	2,2	2,2	2,3	2,6	2,6	2,4	2,5	2,5	2,5	2,4
DMC	**11,5**	**11,2**	**10,9**	**9,9**	**10,6**	**11,2**	**11,5**	**12,0**	**12,3**	**12,0**	**11,9**	**10,7**
Biomass	4,2	3,6	3,7	3,3	3,4	3,2	3,3	3,2	3,2	3,4	3,5	3,2
Minerals	6,1	6,3	5,9	5,3	5,8	6,4	6,7	7,3	7,6	7,1	7,0	6,2
Fossil Fuels	1,30	1,34	1,35	1,33	1,41	1,60	1,59	1,51	1,51	1,50	1,45	1,24

Mexico- Material Input Intensive Indicators

Unit: tonnes per 1000 US dlls (constant 2000)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
DE	**2,10**	**2,09**	**2,10**	**2,07**	**2,09**	**2,06**	**1,99**	**1,95**	**1,92**	**1,93**	**1,91**	**1,94**
Biomass	0,59	0,58	0,57	0,62	0,60	0,56	0,55	0,52	0,50	0,51	0,49	0,50
Minerals	1,10	1,10	1,15	1,04	1,05	1,07	1,03	1,05	1,06	1,04	1,04	1,05
Fossil fuels	0,41	0,40	0,39	0,41	0,43	0,42	0,41	0,38	0,37	0,37	0,37	0,39
DMI	**2,5**	**2,4**	**2,4**	**2,3**	**2,4**	**2,4**	**2,4**	**2,4**	**2,4**	**2,3**	**2,4**	**2,3**
Biomass	0,8	0,7	0,7	0,7	0,7	0,6	0,6	0,6	0,6	0,6	0,7	0,6
Minerals	1,2	1,3	1,2	1,2	1,2	1,3	1,3	1,4	1,4	1,3	1,3	1,3
Fossil Fuels	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,4	0,4	0,4	0,4	0,4
DMC	**2,2**	**2,2**	**2,0**	**2,0**	**2,1**	**2,1**	**2,1**	**2,1**	**2,1**	**2,1**	**2,1**	**1,8**
Biomass	0,8	0,7	0,7	0,7	0,7	0,6	0,6	0,6	0,5	0,6	0,6	0,6
Minerals	1,2	1,2	1,1	1,1	1,1	1,2	1,2	1,3	1,3	1,2	1,2	1,1
Fossil Fuels	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,2	0,2

Source: Own estimates based on national data sources. Source for population is Presidencia de la República (2005) and for GDP is WB (2005).