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Economic and Sustainability Indications from Trends in Material Flows in the Philippines, 1981 to 2002

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INTRODUCTION

In 2003, the first and very rudimentary economy-wide material flow accounts of the Philippines were completed. The accounts covered the years 1981 to 2000. These accounts were the output of the Southeast Asia in Transition Project (SEATRANS) that was funded by the European Union. It was a collaborative project involving universities and research institutions in Europe (Austria, the Netherlands, Italy, and Spain) and Southeast Asia (the Philippines, Thailand, Vietnam and Laos). The material flow accounts were developed in the context of society's metabolism. This was the first time that an accounting of this type was attempted and also the first time that the notion of society's metabolism was discussed or used as a research framework in the country.

Society's metabolism had been defined as the sum of energetic and material exchange relationships between a society and its natural environments from a macro perspective (Fischer-Kowalski, 2002). Fischer-Kowalski further states that, when applied to society, the boundaries of the biological connotations of the term 'metabolism' have to be expanded beyond cellular anabolism and catabolism.

Accordingly, as reported by Fischer-Kowalski (2002), Sir Patrick Geddes, co-founder of the British Sociological Society, appears to be the first scientist to empirically describe society's metabolism on a macroeconomic level. In his input-output table in physical terms, Geddes illustrated this metabolism by showing the sources of energy and materials used in the economy and how these materials and energy go through the stages of extraction, manufacture, transport and exchange. In addition, he noted that between each of these stages losses occur and that the final product may be smaller when compared to the overall input (Geddes, 1885 as cited by Fischer-Kowalski, 2002).

Fischer-Kowalski further noted that during the past six decades, Geddes' concept had been operationalized by many scientists and researchers. Furthermore, materials making up the inputs and outputs had been defined in detail, depending on the purposes of the accounting. Thus, literature today refers to material flow accounting (MFA), substance flow accounting (SFA) and life cycle analysis (LCA) among other approaches. (For a very comprehensive review of all these efforts, see Part I and Part II of "A Handbook of Industrial Ecology", Ayres and Ayres, editors, 2002.)

The Philippine material flow accounts were patterned after the accounts that were established by Schandl and Schulz (2002) for the United Kingdom. For the period under study, Philippine data on inputs of energy and materials into the economy and on the resulting outputs were collected, processed and organized into the material flow accounts. However, time and funding constraints in conjunction with the massive data required for an economy-wide time series MFA made it impossible to establish accounts that show all of society's metabolic exchanges. Thus, the Philippine accounts do not show inputs and outputs

of water and air. Nor do they include the so-called hidden flows, that is, the materials that are not used, hence not reported as products, but are produced nonetheless as a consequence of producing the desired product. Accounts for emissions and wastes to air, water and land were not established either.

The Philippine MFA classified total material flows into domestic production, imports and exports. Domestic production is made up of biomass, crude minerals and mineral materials, and crude fossil and energy materials. Imports and exports are made up of biomass, crude minerals and mineral materials, crude fossil and energy materials, and semi-manufactured/ final products.

The general trend in material flows during the period of study was influenced largely by the trend in domestic production. However, extreme changes in either imports or exports also imparted effects on the dips and peaks of the total material flows' curve.

In consonance with the general framework of the SEATRANS Project, the author correlated the trends of these material flows with those of major Philippine metabolic events and socio-economic indicators during the period of study (1981 to 2000). These events and indicators were population size and growth rate, accession to the GATT-WTO, real gross domestic product (GDP), peso-to-dollar exchange rate, El Nino episodes, trade liberalization and the Asian financial crisis (SEATRANS Project Draft Country Report, Philippines' Component, 2004, unpublished)..

The economic and sustainability indications of these flows and their trends were not addressed directly by the SEATRANS project due to time, money and data constraints. This current report hopes to remedy this situation by focusing mainly on the economic and sustainability indications from materials flows in the Philippines. The time series was extended to include 2001 and 2002 because data for these years became available since the SEATRANS Project. The current report makes use of material flows data for the period 1981 to 2000 from the SEATRANS report. The economic data series and all other data were obtained from various new secondary sources.

The main objective of this research work was to determine whether the trends in material flows in the Philippines are significantly correlated with major macro indicators of economic performance. In addition, the project aimed to assess the potentials for sustainable development that are indicated by these flows.

REVIEW OF LITERATURE

Different Forms of Material Flow Accounts

Material flow accounts (MFA) arise from material flow accounting and make possible the process of material flow analysis. These accounts of inputs to and outputs of societal or industrial metabolism are in physical terms and are usually expressed in tons. Comprehensive material flow accounts at the economy-wide level give a picture of the physical flows that gave rise to the monetary accounts. Moreover, by indicating where the inputs came from and where the outputs went to, material flow accounts form a basis for the derivation of environmental and sustainability indicators (Berkhout, 1999; Jimenez-Beltran, 1998, as cited by Bringezu and Moriguchi, 2002).

According to Fischer-Kowalski (2002), the full outline of a material flow analysis of national economies was first presented by Robert Ayres and Allen Kneese in 1969. Ayres and Kneese were concerned with the uncompensated externalities in the use of air and water for waste disposal as if these resources were free goods. The authors reportedly presented a first crude material flow analysis for the United States for the years 1963 to 1965. They also proposed that environmental pollution and its control be regarded as a materials balance problem for the entire economy.

At present, there are many forms of MFAs. The forms depend on the intended purposes of the accounts and the methodological approach that is employed. However, all of them are based on the basic concept that the industrial system and its societal interactions are embedded in the biogeosphere system. In addition, the concept says that the industrial system depends on factors that are critical for the coexistence of the two systems (Bringezu and Moriguchi, 2002, citing Ayres and Simonis, 1994; Baccini and Brunner, 1991). Bringezu and Moriguchi (2002) enumerated and described the following main forms of MFAs:

Substance flow accounts (SFA) take note of the resultant concentrations of pollutants and other materials of interest in the environment. The timing and locations of these concentrations are important aspects of these accounts.

Bulk material flow accounts are made for specific materials such as ores, timber, construction aggregates, that are normally included in a standard economy-wide MFA.

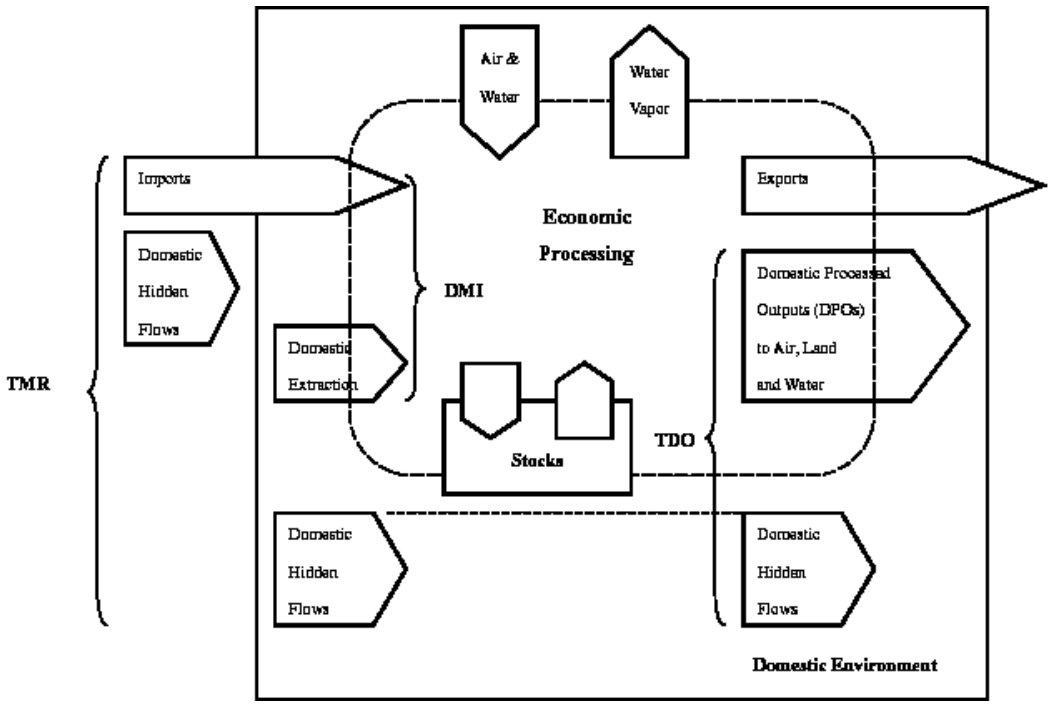
Life cycle assessment is employed when the environmental impacts of a specific product during its service life are of interest. MFA of a firm, a household, an industrial sector or region may also be constructed if the firm or sector wants to determine how its metabolism affects the environment. MFA of an entire economy is constructed usually in the pursuit of sustainable industrial and societal growth.

Importance of Material Flow Accounts

The MFAs are important because of the indicators that may be derived from them. Matthews et al (2000) presented a diagram of economy-wide material flows (Figure 1).

Using this illustration, five groups of society's metabolic indicators were defined by Bringezu and Moriguchi (2002) as follows:

Figure 1. Schematic diagram of economy-wide material flows



Source: Matthews et al. (2000)

Input Indicators

Direct material input (DMI) is the sum of imports and domestic extraction. DMI refers only to materials that are of economic value, meaning, those that are used in production and/or consumption activities. Materials that were produced as a result of extracting materials with economic value but which themselves were not used in production or consumption are termed *'hidden flows'* following Adriaanse (1997). Hidden flows are not part of DMI.

Total (domestic) material input (TMI) is the sum of DMI and domestic hidden flows.

Total material requirement (TMR) is the sum of TMI and the hidden flows associated with imports from other countries. These hidden flows are found in the exporting countries.

TMR therefore represents the total material requirements of the economy for a given period.

Output Indicators

Domestic processed output (DPO) is the sum of materials imported from other countries plus those extracted domestically and used in the economy, and, later deposited into the domestic environment. These deposits or flows occur during the processing, manufacturing, use, and final disposal phases of the economic production-consumption process. DPO includes emission to air due to energy combustion and other industrial processes, industrial and household solid wastes in landfills, material loads in wastewater, dissipative flows and emissions from incineration plants (Matthews et al, 2000). Exports and materials recycled in industry are not counted as part of DPO: the first because they do not stay in the domestic environment and the second because they are not deposited into the domestic environment just yet.

Total domestic output (TDO) is the total amount of materials released into the domestic environment as a result of economic activity. It is the sum of DPO and domestic hidden flows being disposed of.

Direct material output (DMO) is the sum of DPO and exports. It is the total amount of materials that leaves the economy after being used.

Total material output (TMO) is the sum of TDO and exports. It is the sum total of materials that leaves the economy.

Consumption Indicators

Domestic material consumption (DMC) is the total amount of materials used in the economy and is equal to DMI less exports.

Total material consumption (TMC) is TMR minus exports and their associated hidden flows. TMC is thus the total amount of material associated with domestic consumption.

Balance Indicators

Net additions to stock (NAS) may be estimated by adding together DMI plus air inputs (for oxidation purposes, for example) less the total of DPO, water vapor and exports. NAS measures the physical growth of the economy.

Physical trade balance (PTB) is equal to physical imports less physical exports.

Efficiency Indicators

Value-added in specific industry sectors or the gross domestic product (GDP) itself may

be related to input or output indicators (for example, DMI, TDO) in order to derive efficiency measures.

Material Flow Accounts and the Economy

Different aspects of the linkage between physical material flow accounts and the economy had been studied by many authors in the recent decade. Topics include environmental accounting and material flow analysis, material flow analysis and economic modeling, dematerialization, transmaterialization, rematerialization, and optimal resource extraction. For a detailed presentation, see Part III of Ayres and Ayres, 2002.

Bartelmus (2002) discusses environmental accounting and material flow analysis by presenting the System of Integrated Environmental and Economic Accounting (SEEA) of the United Nations. It is a 'satellite' system of the worldwide adopted System of National Accounts (SNA). It tries to incorporate the key functions of natural capital or resource supply, waste absorption and use of space into the asset and production accounts of the SNA.

Environmental components are added by incorporating environmental assets and asset changes in the asset accounts. Natural resource depletion and environmental quality degradation are additional environmental costs and thus recorded in the natural asset use accounts. Environmental costs are consumption of natural capital and are recorded in both asset (stock) and use (flow) accounts (Bartelmus, 2002).

Environmental accounting is a method for determining the rate of natural resource and environmental depletion. It is hoped to add impetus to efforts toward eco-efficiency and dematerialization.

Dematerialization means reducing total material requirements in production and consumption and ultimately aims to de-link economic growth from generation of environmental impacts (Bartelmus, 2002; Labys, 2002; de Bruyn, 2002). Dematerialization is said to have occurred when there is a permanent decline in the use of materials in industrial production.

Many times, societies' demand for certain materials go down, not because they are dematerializing but because they are transmaterializing. Transmaterialization occurs because society has found newer and more technically advanced and possibly more productive materials (Labys, 2002).

Sander de Bruyn (2002) agrees with Labys but he uses a different term – rematerialization. He stated that the pattern of relationship between material and energy consumption and GDP over time (with GDP at the X-axis) is N-shaped in the medium term and saw-toothed in the very long term, based on actual data. He justified this observation by saying that when the economy is in an equilibrium phase, economic growth results in equiproportional increase in throughput. Thus, materials and energy intensities are more or

less constant and move slightly around a certain attractor point.

According to De Bruyn (2002), during times of extreme shifts in technological and institutional directions, the equilibrium relationships may be altered discontinuously. This results in rapidly falling material intensities and declining throughputs or what would appear as dematerialization until the economy stabilizes around a new attractor point. When this happens, the positive relationship between economic growth and material consumption will be restored. GDP and throughput will again grow at about the same rate until the time when the equilibrium will be disturbed another time.

Economy-wide Material Flow Accounts

Bringezu and Moriguchi (2002), citing several other authors, reported that economy-wide domestic material flow accounts had been established for Austria, Japan and Germany. They also reported that national material accounts exist for Austria, Denmark, Germany, Finland, Italy, Japan, the Netherlands, Sweden, the United Kingdom and the United States. As of 2002, they further reported that work toward similar accounts were ongoing for Australia, China, Egypt and the Amazonia.

Adriaanse et al. (1997) published a report on the material flows of Germany, Japan, the Netherlands and the United States from 1975 to 1994. The report was based on a study that focused on broad categories of materials instead of the usual sectors of the economy in these four highly industrialized countries. The most important results that were presented were:

1. Germany, the Netherlands and the United States had TMR per capita that appeared to level off between 75 to 85 metric tons per year. Japan's TMR per capita has followed the gradually rising patterns of Germany and the Netherlands but at significantly lower levels of 45 metric tons per year.
2. Patterns of natural resource use and the composition of TMR by major categories of materials varied significantly. The single exception was fossil fuel use which was the overwhelming major contributor to the TMR of the US and Germany and second largest contributor in Japan and the Netherlands in 1991.
3. In 1991, hidden material flows, made up of ancillary and excavated and/or disturbed material flows, ranged from 55 to 75 percent of TMR. Japan and the Netherlands had comparatively lower proportions of hidden flows. The US and Germany had hidden flows that were easily at least three times their direct material inputs.
4. About 35 percent of Germany's TMR, more than 50 percent of Japan's, and more than 70 percent of the Netherlands' were imported. The US imports very little of its TMR.
5. TMR/GDP ratios showed a declining pattern of overall material intensity in the four countries. This implies that some decoupling of economic activity from natural resource use was taking place from 1975 to 1994. In addition, DMI/GDP ratios showed a leveling

off trend in direct material intensity over the last decade of the study. This means that direct inputs of natural resources were growing at more or less the same rate as the GDP during the period.

Rogich and Matos (2002) presented data (Table 1) that compare overall world intensity of use of processed physical goods with that of the US. Overall, and on a per capita basis, the US uses more than six times as much as the world average and this does not even include hidden flows. The authors noted further that, for the US, and the rest of world as well, flows of material for processed physical goods from 1970 to 1996 have increased at the same rate as population.

Bringezu and Schutz (2001), as cited by Bringezu (2002), reported that in 1995, the 15 countries of the European Union (EU-15) had a total TMR of 18.1 billion tons, equal to 49 tons per capita. Seventy-two percent of these flows were due to fossils fuels, metals and minerals. Energy carriers and their hidden flows constituted 29 percent of the TMR. Meanwhile, mineral extraction amounted to 10.7 tons per capita. Biomass represented 12 percent of the TMR, giving an equivalent of six tons per capita.

Between 1988 and 1997, the DMI of the EU-15 had a moderate reduction in absolute terms of five percent. This resulted in a decline in DMI per capita from 21.2 tons to 19.5 tons.

Moriguchi (2002) reported that material flow analysis was studied in Japan mainly to address domestic issues of increasing solid wastes. He reports that a flow chart describing Japan's macroscopic material flow balance had been published annually since 1992 in the annual Quality of the Environment report.

Accordingly, about a third of Japan's DMI and half of the TMR are imported commodities. Import dependency is particularly high for metal ores and fossil fuels. Japan also has a high dependence on imported timber. Domestic material flows, on the other hand, are dominated by construction activities that require domestic minerals such as limestone, crushed stone and sand and gravel.

Table 1. Comparative use of processed physical goods by source category, USA vs the rest of the world, 1996

	Total	Minerals	Metals	Forestry	Non-renewable Organics	Agri-culture
World (mt/capita)	1.71	1.39	0.14	0.13	0.05	0.01
USA (mt/capita)	11.14	9.52	0.53	0.63	0.44	0.02
Ratio: USA/World	6.51	6.87	3.75	4.87	9.50	2.24

Source: Rogich and Matos (2002) in Ayres and Ayres, 2002 (Table 22.5, page 276)

Japan's TMR (about 45 tons per capita) is much lower than that of the US, the Netherlands or Germany. However, its DMI per capita (about 17 tons) is just a little bit lower than that of the US (20 tons) and that of Germany (22 tons).

The material aspect of industrial metabolism of the United Kingdom was studied and reported by Schandl and Schulz (2002). They applied material accounting to material inputs into the UK while taking consideration of exports from the economy. Their account presented materials that were aggregated into biomass (plant harvest, timber removals, fishing, hunting), mineral materials (ores, industrial materials, construction materials), fossil fuels (coal, crude oil, natural gas) and products (finished and semi-manufactured).

Schandl and Schulz's work did not follow closely the economy-wide material flow framework of Matthews et al. (2000) (see Figure 1) in that they did not expressly account for input and output flows of air and water. However, in their account, the methodology of which had been detailed in Schandl and Schulz (2000), mass of materials reflects the water content of those materials when they were marketed. Two exceptions were made. One is for grazing where mass is reported at a standard moisture content of 14 percent. The other is for timber where mass is reported at the time of removal from the forest, i.e., green weight of timber.

Schandl and Schulz (2002) noted several characteristics of industrial metabolism. The first one is the extremely large volume of throughput compared to final output. According to the authors, this is because of construction intensity, nutrition habits, energy requirements and transport. A second observation is that only a small number of materials dominate the metabolic profile of industrial societies. Citing Schandl et al. (1999), the authors reported that water accounts for around 87 percent of yearly mass throughputs, with air contributing eight percent, and all the other materials being responsible for only around five percent. Even among the other materials, some materials also tend to dominate, for example, sand and gravel, or some other material.

The authors further stated that industrial society seems to have limitless energetic resources but it has a low capacity for recycling. They reported that as of 2002, much less than 10 percent of yearly throughput gets recycled. Another feature of industrial societies is the overuse of the atmosphere as a sink.

The authors presented data showing that various industrial economies even have more or less the same per capita material consumption in 1991. This information is in Table 2.

The authors pointed out that UK's lower values could be explained more by data inadequacy than by a different metabolic profile.

Following the methodology that was employed by Schandl and Schulz (2000) for the UK, Rapera established preliminary material flow accounts for the Philippines for the period 1981 to 2000 (Rapera, 2004). The accounts focused on domestic production, imports and exports of biomass, minerals, fossil fuels and semi-manufactured and finished products.

Only commodity flows were recorded in these accounts. Hidden flows were not included in the study nor were air and water input and output flows. Gross and per capita figures for

domestic material input and domestic material consumption were computed.

The study also correlated the trends in these material flows with the major metabolic events in the country for the period of study. These events were the El Nino episodes, trade liberalization, accession to the GATT-WTO, the Asian financial crisis, and the peso-to-dollar exchange rate.

Table 2. Per capita material consumption in several industrial economies, 1991

(in tons)

	Austria	Germany	Japan	Nether-lands	USA	M*	UK
Biomass	4.8	2.6	1.5	4.3	3.0	2.9	1.5
Minerals	10.6	10.7	11.8	5.9	8.0	8.7	5.3
Fossil fuels	3.0	6.2	3.3	6.4	7.7	5.1	4.2
Products	0.1						0.2
Domestic material consumption	18.5	19.5	16.6	16.6	18.7	16.8	11.1
Population (millions)	7.8	80.0	124.0	15.0	252.8		57.8

*Arithmetic mean of five preceding countries
Source: Schandl and Schulz (2002) in Ayres and Ayres, 2002 (Table 26.6, page 332)

CONCEPTUAL FRAMEWORK

Figure 2 shows that society's metabolism gets materials from imports and domestic extraction. Both sources have hidden flows. Domestic hidden flows are in the domestic environment while hidden flows associated with imports are left behind in the exporting countries. The diagram also shows that society gets air and water from the domestic environment for metabolic and economic processing.

As a result of metabolism, aside from hidden flows, society generates exports, domestic processed outputs (DPOs), water vapor, and additional stocks. Recycling in the society is implied in the graph. Whatever part of DPO is recycled is first taken in by society via 'domestic extraction' from the domestic environment.

Material flows form the physical basis of monetary or economic accounts. Thus, intuitively, their trend should coincide with that of monetary accounts. However, material flows of modern society are made up of many materials in much the same way that monetary accounts have different components. They differ significantly in that material flows are inextricately linked to the natural environment while money is intrinsically neutral as far as the environment is concerned. For example, $1,000 from the 'sale' of a physician's services would have the same effect on GDP as $1,000 from the sale of iron ore.

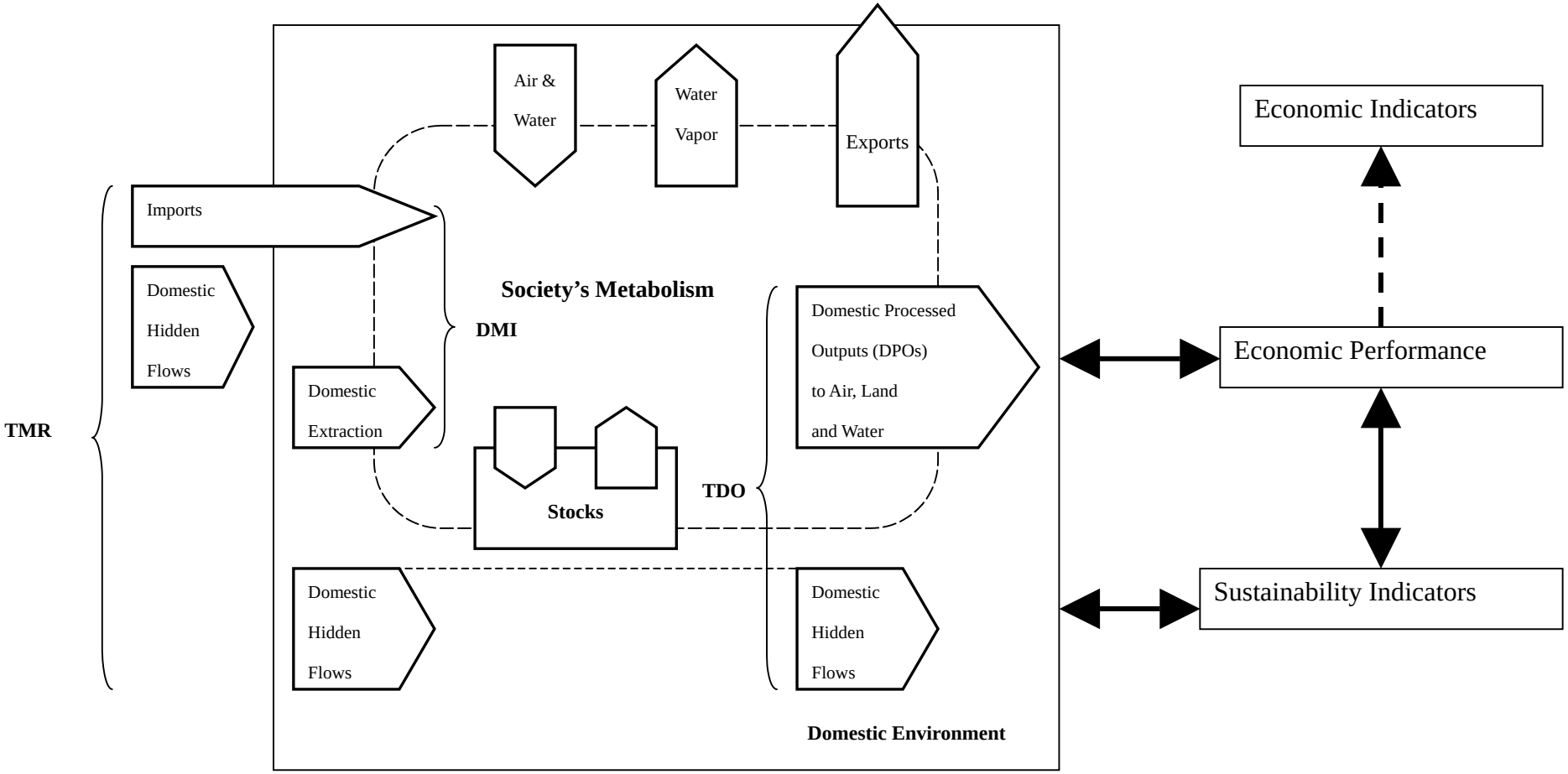
Yet, from the environment's point of view, the iron ore was produced with much more environmental impacts than were the doctor's services. It is of interest therefore to determine if the major material flows correspond with the major determinants of monetary/economic indicators and vice versa. If such a relationship could be established, the economic indicators themselves may then be used as sources of preliminary indications of the composition of material flows, and perhaps, of rough indications of environmental implications.

Figure 2 indicates that TMR, stocks, and DPOs hold the key to environmental and metabolic sustainability. Basically, sustainable society's metabolism requires that in both the short and long terms, TMR is met. As indicated, TMR comes from imports from other socio-economies and domestic extraction. The ability of society to meet its TMR is influenced greatly by metabolic output – its quantity, quality, timing of release back to its appropriate domestic environment, and what society does with it.

If DPO is low, other things being equal, this implies that stocks of society increased. This increase would in turn need resources for upkeep and development, thereby increasing TMR in succeeding periods. Even when DPO is high, if very little of it is recycled, TMR of virgin inputs would still be high.

Aside from absolute DPO levels, the manner of disposal impacts even more on the domestic environment's ability of provide higher volumes of TMR. A specific example is that of untreated effluents that eventually contaminate surface and groundwater sources thereby rendering water from these sources unfit as inputs to society's metabolic processes in the

Figure 2. Schematic diagram of the relationship among economy-wide material flows and economic and sustainability indicators



Source: Adapted from Matthews et al. 2000

future.

The volume and characteristics of hidden flows are another serious concern of sustainability. By their nature and as they are defined, the problems attendant to hidden flows can only be alleviated by reductions in DMI. This is known as dematerialization or the lessening of material use per unit of service output (de Bruyn, 2002). Thus, indicators from material flows are derived in order to determine if metabolic processes are trending toward bio-physical and environmental sustainability.

The report at hand does not adhere to the foregoing conceptual framework entirely. Due to paucity of data, the study did not explicitly include input and output flows of air and water. Hidden flows in both domestic and exporting-country environments were not estimated either. Aside from these, data and information on DPOs are very scanty. Thus, not all indicators suggested by Adriaanse et al. (1997) and Matthews et al. (2000) could be estimated.

Meanwhile, the study focused on the following economic indicators:

a. real gross domestic product (GDP),
b. personal consumption expenditure (PCE),
c. real gross value added (GVA) in major industries,
d. total labor productivity,
e. labor productivity in major industries,
f. number of new buildings being constructed,
g. gross domestic investment, and,
h. gross capital formation.

The sustainability indicators may be grouped into input, consumption, balance, and efficiency indicators. In this study, levels and main components of domestic production, imports and DMI comprise the input indicators. Domestic material consumption (DMC) is the consumption indicator. The difference between physical imports and exports is the balance indicator. The ratios of GDP to some input and output indicators constitute the efficiency indicators.

METHODOLOGY

A. Data Requirements

The basic data required for material flows accounting in this study were of five main groups of time series data from 1981 to 2002. These were data on domestic production, imports, exports, DPOs and indicator data on environmental sustainability. All of these data should be expressed in a common physical unit such as kg, ton, cu m or other appropriate units. In this study, figures were expressed in tons.

Domestic production directly from nature in the Philippines was grouped into biomass, crude minerals, and crude fossil materials. Imports and exports of the country were grouped into biomass, crude mineral materials, crude fossil materials, and semi-manufactured/final products. Each of these groups can be broken down further into more details as shown in the tables in Appendix B.

Data for the economic indicators were also in time series from 1981 to 2002. These were data for real GDP, personal consumption expenditure (PCE), real GVA in major industries, total labor productivity, labor productivity in major industries, number of new buildings being constructed, and gross capital formation (Appendix C).

B. Data Sources

Economic data series were taken entirely from the annual Philippine Statistical Yearbook (PSY) from 1981 to 2004. Data series for material flows from 1981 to 2000 were taken from the Philippines' Country Report of the Southeast Asia in Transition (SEATRANS) project from 1981 to 2000 that was funded by the European Union. Data for 2001 up to 2002 were taken from other secondary sources.

Data for domestic production of biomass came mostly from the website of the United Nations Food and Agriculture Organization (FAO) because it publishes these data in much greater detail than does the Philippine Statistical Yearbook (PSY) of the National Statistical Coordination Board (NSCB). However, the PSY was the main source of data for crude minerals and crude fossil energy materials. Data for imports and exports came from the annual Foreign Trade Statistics published by the National Statistics Office (NSO).

C. Data Processing

Data were processed in order for them to be in the form needed for the material flow

accounts (MFA). The required type of processing varied across commodities and materials. Processing involved either conversion of original units to the required units in the MFA, correction of values that were obviously erroneous, or derivation of basis for determining missing values. In addition, adjustment of values of most domestic production material flows to correct for systematic exclusions and omissions in the data became a major undertaking.

For this current study, only data from 2001 to 2002 needed processing since the series from 1981 to 2000 were taken from SEATRANS. For consistency, data for years 2001 and 2002 were processed using the protocols that had been set in the SEATRANS project.

D. Analytical Techniques

Due to the fact that the study is mainly focused on historical trends in material flows and indicators of economic performance, it relied heavily on graphical and textual descriptions of the results. However, simple correlation was done among the major material flows and economic indicators where the procedure was appropriate.

After the material flow and economic accounts from 1981 to 2002 had been established, correlation among material flow determinants and economic indicators were estimated. Values of relevant indicators as discussed in the conceptual framework were then determined.

Values of indicators derived from Philippine data were compared with the reported values applicable to other countries. This made possible the comparison of society's metabolism in highly industrialized countries with that in a developing country.

RESULTS AND DISCUSSION

A. Material Flows in the Philippines, 1981 to 2002

Following the work of Schandl and Schulz (2000), this study did not include inputs and output of air and water, hidden flows and DPOs. Hence, material flows were composed only of commodities from domestic production, imports and exports. Domestic production was made up of biomass, crude minerals and mineral materials, and crude fossil and energy materials. Imports and exports were made up of biomass, crude minerals and mineral materials, crude fossil and energy materials, and semi-manufactured/final products.

1. Trends in Material Flows

Table 3 shows the general account of material flows in the Philippines from 1981 to 2002. The trends in these flows are shown by Figure 3. Appendix A contains the material flow accounts of the Philippines (MFA). Further data details are in Appendix Table B.1 for domestic production, Table B.2 for imports and Table B.3 for exports.

Figure 3. Total material flows in the Philippines, 1981 to 2002

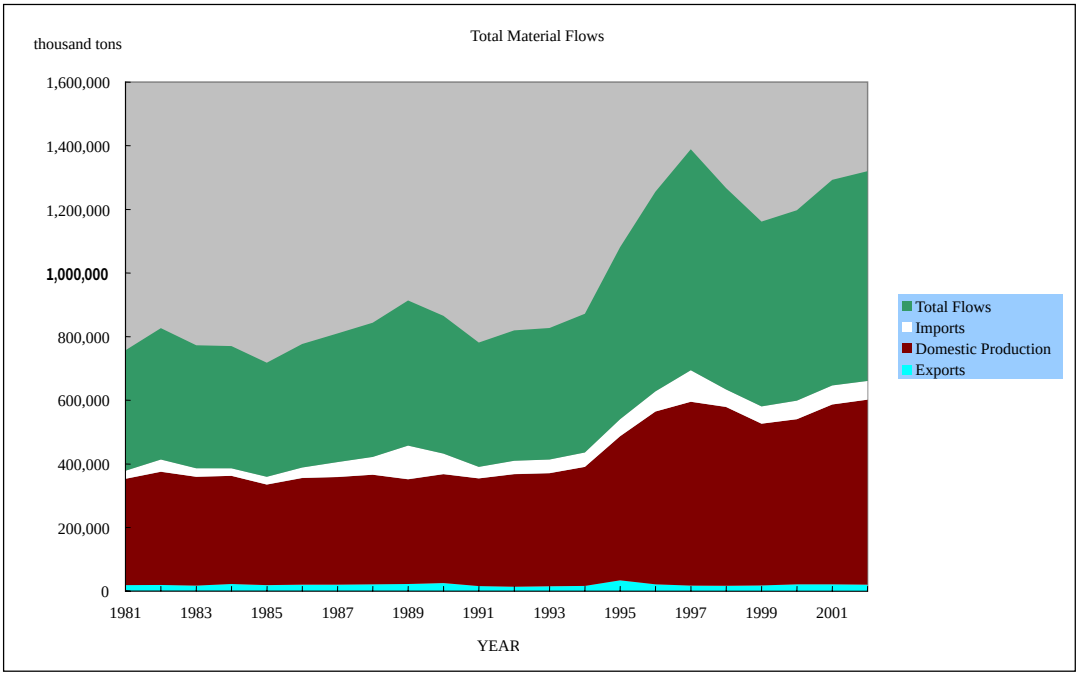


Table 3a. Population data and gross and per capita material flows in the Philippines, 1981 to 1988

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
A. DOMESTIC PRODUCTION								
(thousand tons)	334,587.63	355,747.72	341,972.05	340,181.18	316,808.68	335,198.23	337,944.98	344,523.34
Biomass	129,114.75	133,513.45	119,306.81	126,585.58	115,280.92	119,080.01	114,549.22	115,733.79
Agricultural Biomass	99,699.71	104,901.32	90,364.91	98,179.77	87,348.42	91,191.54	85,841.53	87,342.47
Forest Biomass	25,759.88	24,775.18	24,695.82	24,319.34	23,961.10	23,761.07	24,494.73	24,131.54
Fishery Biomass	3,655.16	3,836.94	4,246.08	4,086.47	3,971.40	4,127.39	4,212.96	4,259.78
Crude Minerals/Mineral Materials	204,899.91	221,188.48	220,978.53	211,846.33	199,873.00	214,537.52	221,947.14	227,155.23
Ores, assorted kinds	82,675.80	85,585.94	82,529.02	77,780.71	95,670.59	98,312.57	93,660.64	89,736.17
Sand and Gravel	116,137.61	129,476.46	132,066.03	127,609.39	97,427.93	109,215.31	120,575.00	129,869.86
Other Mass Minerals	6,086.50	6,126.07	6,383.49	6,456.23	6,774.48	7,009.64	7,711.50	7,549.20
Crude Fossil/Energy Materials	572.96	1,045.80	1,686.71	1,749.27	1,654.76	1,580.71	1,448.62	1,634.32
Coal	318.17	556.76	1,019.59	1,216.39	1,258.87	1,235.50	1,169.17	1,335.69
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crude oil	254.79	489.04	667.12	532.88	395.89	345.21	279.45	298.63
B. IMPORTS								
(thousand tons)	25,425.36	38,320.84	27,220.61	23,054.40	24,021.89	33,232.80	46,736.25	56,121.27
Biomass, Total	2,333.59	2,834.63	2,724.57	2,401.32	2,677.58	3,102.21	3,092.23	4,253.21
Food Biomass	2,045.48	2,611.46	2,453.50	2,176.60	2,463.92	2,773.29	2,738.20	3,810.94
Non-Food Biomass	288.11	223.17	271.07	224.72	213.66	328.92	354.04	442.27
Crude Minerals/Mineral Materials	479.19	744.88	651.18	452.42	896.55	2,231.06	2,124.92	1,967.37
Crude Fossil/Energy Materials	10,337.90	9,355.26	10,426.45	9,602.73	9,223.80	9,303.67	11,044.37	13,159.91
Semi-Manufactured/Final Products	12,274.68	25,386.06	13,418.41	10,597.94	11,223.96	18,595.85	30,474.73	36,740.77
C. EXPORTS								
(thousand tons)	18,453.15	19,280.20	16,925.32	21,992.94	18,040.51	19,738.29	20,401.01	21,129.21
Biomass, Total	7,650.76	7,927.45	7,307.78	6,829.55	5,894.19	6,375.64	5,847.63	5,230.04
Food Biomass	4,666.11	4,726.89	4,019.62	4,165.92	3,546.80	3,473.61	3,249.05	3,036.98
Non-Food Biomass	2,984.65	3,200.56	3,288.15	2,663.62	2,347.39	2,902.03	2,598.58	2,193.06
Crude Minerals/Mineral Materials	2,676.02	2,555.34	1,947.87	1,956.25	1,867.47	1,600.59	1,807.72	1,897.81
Crude Fossil/Energy Materials	3.99	0.68	0.00	0.00	0.00	0.00	0.00	0.00
Semi-Manufactured/Final Products	8,101.68	8,627.19	7,636.07	10,478.68	9,253.47	11,381.22	12,662.91	13,988.56
DMI = Domestic Production + Imports								
(thousand tons)	360,012.99	394,068.56	369,192.67	363,235.58	340,830.57	368,431.02	384,681.23	400,644.60
DMC = DMI – Exports								
(thousand tons)	341,580.55	374,957.90	352,300.95	344,225.55	323,815.44	349,076.29	364,364.00	379,529.35
Population, **(millions)**	49,307.00	50,523.00	51,745.00	52,989.00	54,266.00	55,578.00	56,921.00	58,293.00
DMI per capita, **(tons)**	7.30	7.80	7.13	6.85	6.28	6.63	6.76	6.87
DMC per capita, **(tons)**	6.93	7.42	6.81	6.50	5.97	6.28	6.40	6.51

Table 3b. Population data and gross and per capita material flows in the Philippines, 1989 to 1995

MATERIALS	1989	1990	1991	1992	1993	1994	1995
A. DOMESTIC PRODUCTION							
(thousand tons)	329,136.23	342,617.18	338,618.09	353,189.69	355,597.16	374,356.02	453,022.23
Biomass	122,135.78	122,840.53	120,372.68	125,047.52	126,882.79	124,388.17	123,467.75
Agricultural Biomass	94,223.54	95,350.31	93,147.92	98,320.10	100,828.96	98,419.08	97,664.72
Forest Biomass	23,470.91	22,816.33	22,362.93	21,908.94	21,366.05	21,246.77	21,046.55
Fishery Biomass	4,441.34	4,673.90	4,861.83	4,818.48	4,687.78	4,722.32	4,756.48
Crude Minerals/Mineral Materials	205,398.24	218,292.87	216,789.06	226,173.85	226,811.75	248,419.54	328,224.57
Ores, assorted kinds	64,575.68	73,012.94	68,957.49	67,047.27	70,538.16	70,540.32	69,398.31
Sand and Gravel	132,476.05	137,135.86	137,170.16	138,132.66	146,061.30	144,181.19	246,357.04
Other Mass Minerals	8,346.51	8,144.07	10,661.41	20,993.91	10,212.29	33,698.04	12,469.22
Crude Fossil/Energy Materials	1,602.21	1,483.77	1,456.36	1,968.32	1,902.63	1,548.31	1,329.91
Coal	1,344.68	1,246.78	1,307.04	1,521.23	1,447.65	1,314.84	1,194.87
Natural gas	0.00	0.00	0.00	0.00	0.00	4.80	4.62
Crude oil	257.53	236.99	149.32	447.09	454.98	228.67	130.43
B. IMPORTS							
(thousand tons)	105,694.48	65,010.99	36,343.51	42,633.78	42,851.40	45,608.92	53,909.37
Biomass, Total	4,205.67	6,529.22	4,361.53	5,312.32	5,989.20	6,335.92	7,992.91
Food Biomass	3,273.01	5,582.67	3,483.92	4,123.25	4,500.92	4,809.79	6,182.96
Non-Food Biomass	932.65	946.56	877.60	1,189.07	1,488.28	1,526.13	1,809.95
Crude Minerals/Mineral Materials	2,431.34	2,313.58	2,610.68	2,023.69	1,785.41	2,286.19	2,648.08
Crude Fossil/Energy Materials	13,308.71	7,530.88	14,450.60	16,314.04	15,231.78	16,006.20	21,891.19
Semi-Manufactured/Final Products	85,748.75	48,637.30	14,920.71	18,983.74	19,845.00	20,980.61	21,377.19
C. EXPORTS							
(thousand tons)	21,995.93	24,807.87	15,671.45	13,943.82	14,970.06	15,798.01	33,447.55
Biomass, Total	5,287.55	5,414.93	5,035.42	4,674.80	5,422.91	5,063.07	11,271.96
Food Biomass	3,425.31	3,588.79	3,687.09	3,343.24	4,091.21	3,797.99	7,502.18
Non-Food Biomass	1,862.23	1,826.14	1,348.33	1,331.56	1,331.70	1,265.08	3,769.78
Crude Minerals/Mineral Materials	2,041.77	2,119.75	2,373.07	2,196.49	2,075.34	2,137.28	5,012.08
Crude Fossil/Energy Materials	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Semi-Manufactured/Final Products	14,654.04	17,257.59	8,248.97	7,049.04	7,459.43	8,578.91	17,143.20
DMI = Domestic Production + Imports							
(thousand tons)	434,830.71	407,628.16	374,961.61	395,823.47	398,448.56	419,964.94	506,931.60
DMC = DMI – Exports							
(thousand tons)	412,847.44	382,836.23	359,304.14	381,903.13	383,490.88	404,185.74	473,504.43
Population, **(millions)**	59,689.00	61,104.00	62,538.00	63,989.00	65,453.00	66,924.00	68,396.00
DMI per capita, **(tons)**	7.28	6.67	6.00	6.19	6.09	6.28	7.41
DMC per capita, **(tons)**	6.92	6.27	5.75	5.97	5.86	6.04	6.92

Table 3c. Population data and gross and per capita material flows in the Philippines, 1996 to 2002

MATERIALS	1996	1997	1998	1999	2000	2001	2002
A. DOMESTIC PRODUCTION							
(thousand tons)	543,805.09	577,932.79	562,342.69	508,542.21	518,829.32	565,613.76	581,342.53
Biomass	128,860.10	130,521.51	124,029.02	128,059.26	131,775.84	138,011.11	138,014.93
Agricultural Biomass	103,214.80	105,096.92	98,482.45	102,169.23	105,775.51	112,329.05	112,296.90
Forest Biomass	21,085.00	20,811.37	20,876.76	21,108.53	21,174.71	20,719.76	20,538.73
Fishery Biomass	4,560.29	4,613.22	4,669.82	4,781.51	4,825.62	4,962.30	5,179.31
Crude Minerals/Mineral Materials	413,900.85	446,423.71	437,251.35	379,406.35	385,807.74	426,205.21	440,538.13
Ores, assorted kinds	73,431.22	77,676.14	79,062.07	72,082.80	85,980.20	83,809.00	77,487.40
Sand and Gravel	327,654.86	350,263.03	311,734.50	283,677.63	264,670.00	308,506.63	330,521.63
Other Mass Minerals	12,814.77	18,484.54	46,454.78	23,645.92	35,157.54	33,889.58	32,529.10
Crude Fossil/Energy Materials	1,044.15	987.56	1,062.33	1,076.60	1,245.74	1,397.44	2,789.47
Coal	991.31	946.72	1,016.05	1,028.47	1,180.77	1,230.74	1,477.00
Natural gas	7.82	0.00	6.76	5.20	7.72	101.66	1,277.31
Crude oil	45.02	40.85	39.52	42.94	57.25	65.04	35.16
B. IMPORTS							
(thousand tons)	63,291.65	99,250.84	54,651.95	54,368.56	58,584.86	59,849.67	57,932.50
Biomass, Total	11,141.60	8,956.99	9,873.08	9,336.80	10,203.15	10,282.87	11,579.64
Food Biomass	8,465.41	7,078.13	8,171.30	7,108.62	7,977.70	8,264.95	9,612.43
Non-Food Biomass	2,676.19	1,878.86	1,701.78	2,228.18	2,225.45	2,017.92	1,967.21
Crude Minerals/Mineral Materials	2,945.02	2,633.42	2,044.32	3,041.56	2,771.72	3,092.15	2,623.53
Crude Fossil/Energy Materials	24,730.67	26,000.37	24,413.06	24,268.85	23,298.68	23,769.91	20,449.68
Semi-Manufactured/Final Products	24,474.36	61,660.07	18,321.49	17,721.35	22,311.30	22,704.75	23,279.65
C. EXPORTS							
(thousand tons)	20,671.84	16,977.90	16,548.02	17,595.12	21,059.20	20,786.63	20,627.24
Biomass, Total	9,712.83	5,278.48	5,234.66	4,088.19	5,525.78	6,859.50	5,419.72
Food Biomass	7,167.77	3,595.96	3,595.45	3,279.24	3,976.34	4,895.60	4,000.67
Non-Food Biomass	2,545.06	1,682.52	1,639.21	808.96	1,549.44	1,963.90	1,419.05
Crude Minerals/Mineral Materials	5,291.97	2,721.11	4,278.89	4,385.61	4,321.34	3,957.56	4,087.74
Crude Fossil/Energy Materials	0.00	0.03	0.06	0.00	0.00	0.00	374.60
Semi-Manufactured/Final Products	5,626.66	8,943.76	6,983.60	9,087.54	11,167.39	9,932.31	10,695.97
DMI = Domestic Production + Imports							
(thousand tons)	607,096.74	677,183.63	616,994.64	562,910.77	577,414.18	625,463.43	639,275.03
DMC = DMI – Exports							
(thousand tons)	586,465.32	660240.4232	600,497.71	545,349.49	556,441.20	604,715.82	618,699.00
Population, **(millions)**	69,867.00	71,337.00	72,802.00	74,261.00	75,711.00	77,151.00	78,580.00
DMI per capita, **(tons)**	8.69	9.49	8.47	7.58	7.63	8.11	8.14
DMC per capita, **(tons)**	8.39	9.25523113	8.25	7.34	7.35	7.84	7.87

The total material flows from 1981 to 2002 amounted to 10.6 billion tons. Of this total, 9.1 billion tons, or 86%, were due to domestic production. Imports contributed 10 percent or an equivalent of 1.1 billion tons. Only four percent, or 430.9 million tons, was due to exports from the country. One percent of these 430.9 million tons was due to re-exports or goods that had been imported and then exported without undergoing any physical or chemical transformation in the country.

As Figure 3 shows, the general trend in material flows during the period of study was influenced largely by the trend in domestic production. However, extreme changes in either imports or exports caused dips and peaks in the total material flows curve, just like in years 1985, 1989, 1991, 1997 and 1999. These highly significant import volumes were of specialized machinery, road vehicles, electrical machinery, and power generating machinery.

Imports had an average annual growth rate of nine percent while exports grew at almost four percent. Domestic production grew at only 2.9 percent but this rate is very close to that of total material flows' of 3 percent (Table 4).

As shown in Figure 3 and Table 3, domestic production of materials in the country from 1981 up to 1994 was more or less constant in volume from year to year. It started to increase significantly starting from 1995 and reached a peak in 1997 when it slid down until 1999. The level of domestic production in 1999, however, is considerably higher than the level in 1994. Further analysis would show that this significant jump in domestic production was due to high volumes of sand, gravel and limestone.

Imports showed a continuously increasing trend. It had growth spurts in 1988 to 1990 and 1996 to 1998. Exports were almost negligible when compared to domestic production. They increased slightly during the period 1987 to 1990 due to semi-manufactured and final products and 1995 to 1997 due to biomass exports in addition to semi-manufactured and final products.

Table 4. Growth rates in material flows, Philippines, 1981 to 2002

Material Flow	Average Annual Growth Rate (%)	Six-Year Average Growth Rate (%)			
		1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Exports	3.79	2.73	-4.01	11.00	5.99
Imports	9.21	9.80	13.96	9.07	1.55
Domestic Production	2.92	0.17	0.92	8.43	1.06
Total Flows	3.02	0.74	1.11	8.05	1.20

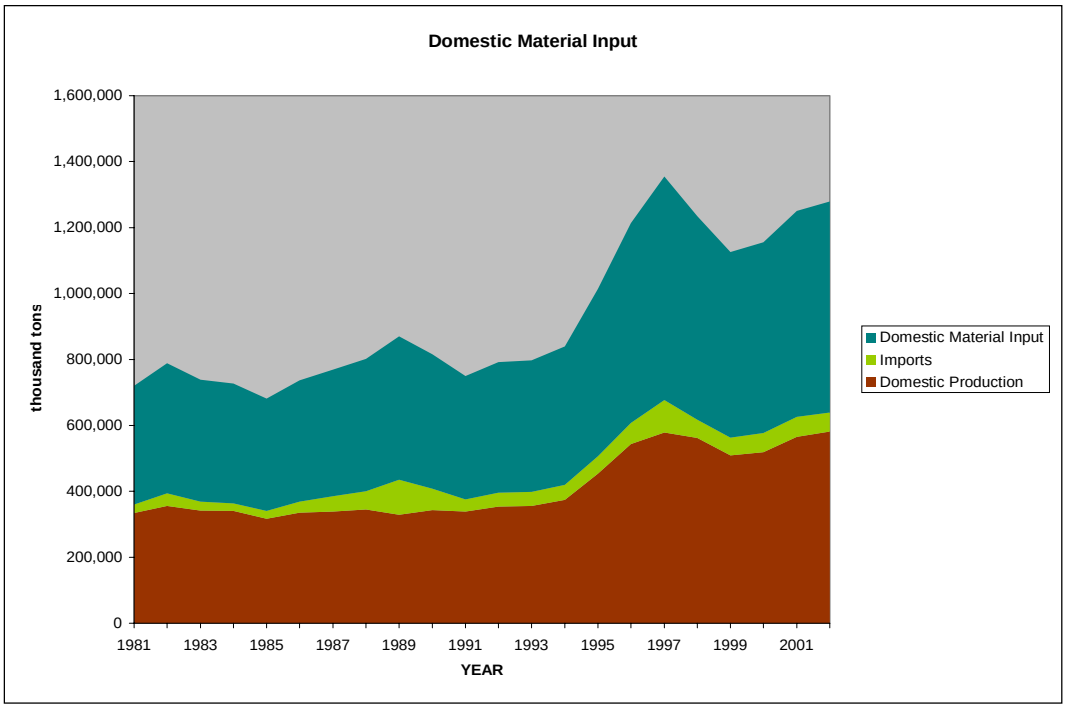
Domestic Material Input into the Philippines, 1981 to 2002

Domestic material input (DMI) is the sum of domestic production and imports into the country in any given year. In the Philippines, the trend in DMI was influenced heavily by the trend in domestic production (Figure 4). This is to be expected considering that domestic inputs constituted from 76 to 94 percent of DMI. However, the graph also shows that while the trend in domestic inputs largely determined the general shape of the DMI curve, its sharp peaks came from the trend in import volumes.

Figure 4 shows that domestic input or production was on a downward trend from 1982 to 1985 while imports were more or less at the same level in that period. Domestic input somewhat stabilized from 1986 to 1994, from which year, it increased sharply up to 1997. From 1997 to 1999, it decreased significantly but has since continued to rise such that 2002 levels are even higher than those in 1999.

Just like with domestic production, DMI was decreasing from 1982 to 1985. However, it showed an increasing trend from 1985 to 1989 because of the effects of increased imports during that period. From 1991 to 1996, the trend in DMI was again largely due to domestic production because import levels during that period were somewhat constant. In 1996 and 1997, increases in both domestic production and imports resulted in a significant increase in DMI.

Figure 4. Domestic material input, Philippines, 1981 to 2002



The six-year average volumes (Table 5) of the DMI into the Philippines had been increasing since 1981. This trend in physical volumes was mainly due to the continuously increasing production of domestic crude minerals and mineral materials. The corresponding values for domestic biomass, domestic fossils, and imports had also been generally increasing except during some years.

Table 5 shows that, in all periods, crude minerals and mineral materials constituted at least 55 percent of DMI. This was followed by biomass that contributed at least 22 percent. Imports had around 10 percent while domestic fossils and energy materials had less than 1 percent during each six-year period.

The contribution of domestic biomass to DMI had steadily gone down from 34 to 22 percent over the last 22 years. Domestic biomass production did not increase in volume significantly until the last six-year period. Imports showed a generally decreasing trend in DMI shares but a more or less constant physical volume.

Figure 5 clearly shows that gross DMI and DMI per capita from 1981 to 2002 had been growing. However, gross DMI grew at high rates while per capita DMI hardly grew at all. The highest per capita DMI was in 1997 at 9.26 tons per person. It had decreased considerably but has since started to increase since 1999. In 2002, DMI per capita stood at 8.14 tons.

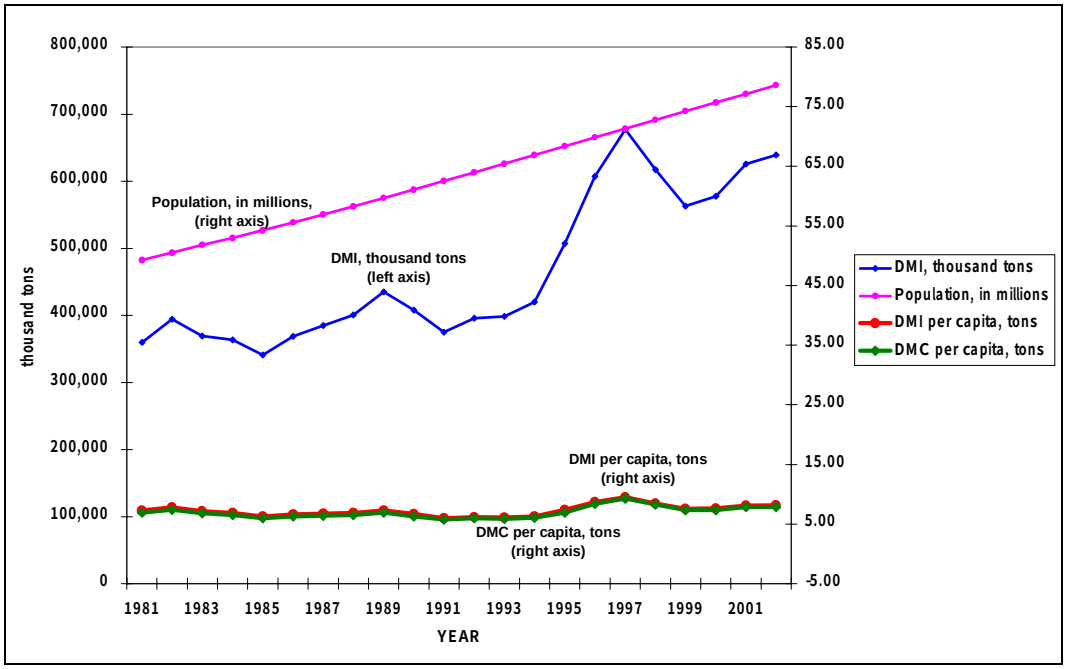
Table 5. Six-year average material inputs to the Philippine economy, 1981 to 2002

(in thousand tons)

Material	1981 - 1986		1987 - 1992		1993 - 1998		1999 – 2002	
	Volume	%*	Volume	%*	Volume	%*	Volume	%*
Domestic Biomass	123,813.59	33.83	120,113.25	30.05	126,358.22	23.50	133,965.29	22.28
Domestic Minerals	212,220.63	57.99	219,292.73	54.86	350,171.96	65.12	407,989.35	67.86
Domestic Fossils	1,381.70	0.38	1,598.93	0.40	1,312.48	0.24	1,627.32	0.27
Imports	28,545.98	7.80	58,756.71	14.70	59,927.35	11.14	57,683.90	9.59
DMI	365,961.90		399,761.63		537,770.02		601,265.85	

DMI is domestic material input.
*Percentage of DMI for the period

Figure 5. Gross and per capita DMI, per capita DMC and population, Philippines, 1981 to 2002



Domestic Material Consumption in the Philippines, 1981 to 2002

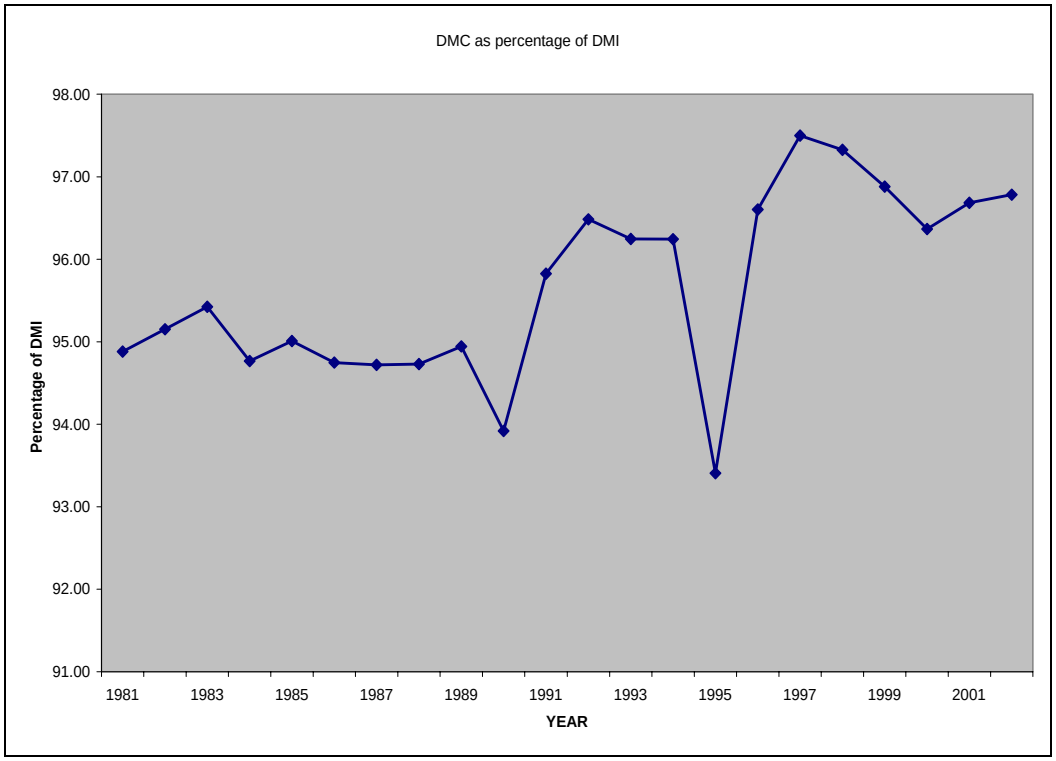
In any given year, domestic material consumption (DMC) is the difference between DMI and exports. The relative proportion of DMC to DMI is depicted in Figure 5. Further, Figure 6 shows DMC as a percentage of DMI for a given year.

From 1981 to 2002, average annual domestic material consumption in the Philippines amounted to almost 96 percent of average DMI. The lowest percentage of the DMC relative to DMI was 93 percent which occurred in 1995 and the highest was 98 percent in 1997. This means that, from 1981 to 2002, exports from the country was, on the average, only four percent of DMI. The highest export percentage was in 1995 (seven percent of the DMI) and the lowest was in 1997 with two percent of DMI.

On the average, if DMC had an annual share in the DMI of 96 percent and if domestic production contributes only 90 percent of DMI annually, this implies that around six percent of annual domestic material consumption had to come from imports. During the period 1981 to 2002, average annual share of imports in DMI was 11 percent. The highest DMC per capita occurred in 1997 at 9.26 tons. In 2002, DMC per capita was 7.87 tons.

Figure 6 shows that DMC as a percentage of DMI had been fluctuating but that it had a

Figure 6. DMC as a percentage of DMI, Philippines, 1981 to 2002



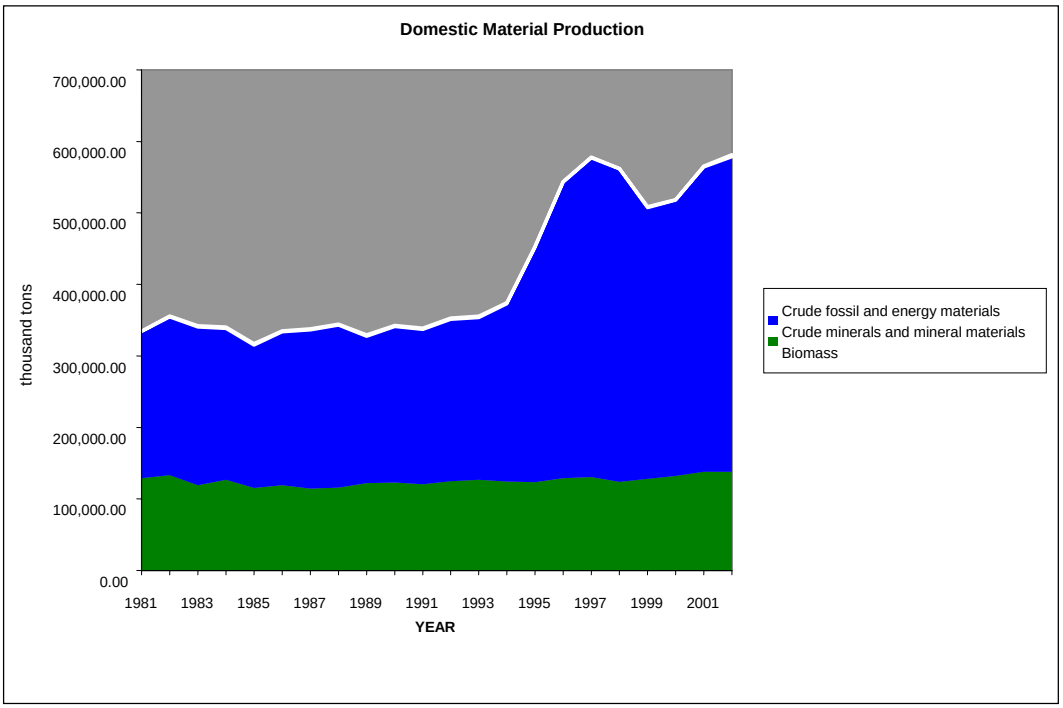
generally increasing trend from 1981 to 1998. From 1999 to 2000, DMC had a decreasing percentage in DMI. This decreasing trend would have implications that are highly dependent on the composition of exports from the country. Comparatively increasing export percentages would further aggravate the stress on the domestic environment if a significant portion of these exports were to come directly from nature, as would be the case with significant biomass exports or if these exports were processed with much damage to the environment.

B. Determinants of Material Flows in the Philippines, 1981 to 2002

1. Domestic Production

As shown in Figure 7, domestic production of biomass and crude minerals exhibits increasing trends while crude fossil and energy materials had a decreasing trend during the entire period. Domestic biomass production grew slowly and in spurts. In physical volume, domestic crude minerals outpaced both biomass and crude fossil and energy materials. Crude minerals and mineral materials were responsible for 69 percent of total domestic production

Figure 7. Total volumes of domestic material production, thousand tons, Philippines, 1981-2002



for the entire period. Biomass took care of 30 percent and crude fossils had much, much less than one percent.

Domestic Production of Crude Minerals and Mineral Materials

Figure 8 and Table 6 show that the trend in total domestic crude minerals follows very closely that of sand and gravel production. Sand and gravel made up 67 percent of total production of crude minerals and mineral materials. Gold and silver ores combined to constitute 27 percent while limestone took care of five percent. Taken together, all four materials composed 99 percent of total crude mineral production in the country for the period.

Sand and gravel had been growing steadily but at moderate rates from 1981 to 1993 with the slump in 1985 as the exception. However, its volume went up from 1994 to 1997 at very high growth rates. It has since gone down but the volume of production in 2002 was still very much higher than its pre-1994 levels.

Limestone was almost negligible in volume but it started increasing in 1992 and had peaks in 1994 and 1998. Volume of gold ore was more or less constant with periods of elevated growth rates in 1985 to 1988 and 1996 to 2000.

Figure 8. Top 99% of total domestic crude minerals, Philippines, 1981 to 2002

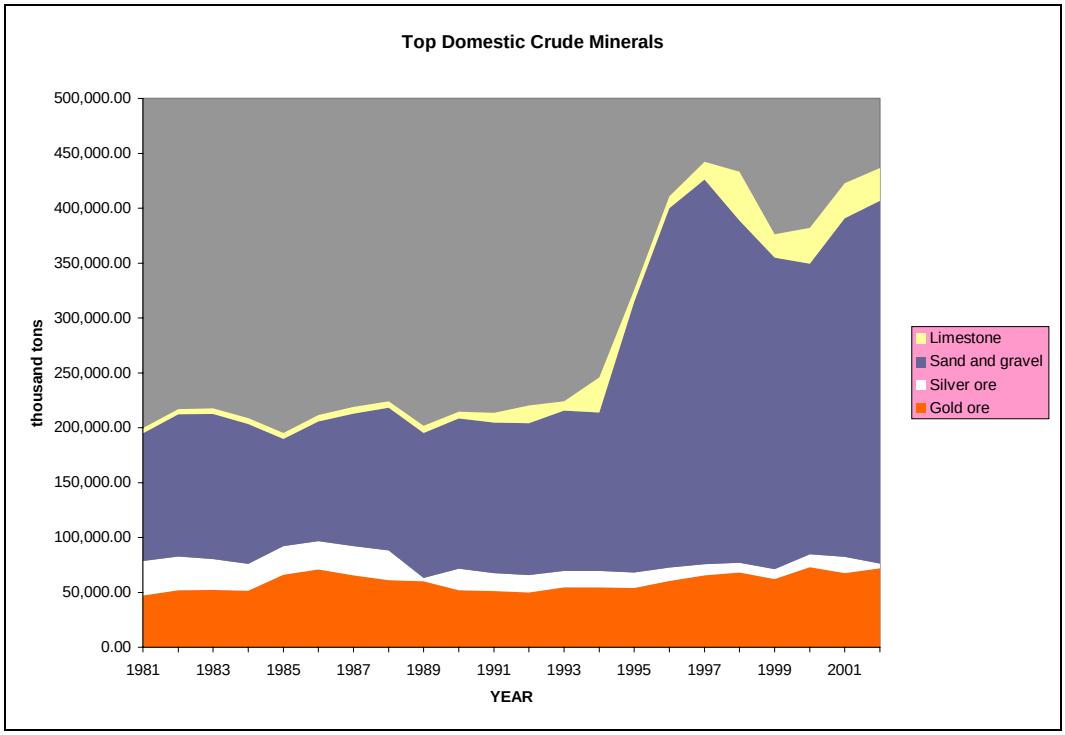


Table 6. Top domestic crude minerals and mineral materials and their corresponding six-year average growth rates, 1981 to 2002

Crude Minerals	Total Volume 1981 to 2002 (000 tons)	Cumulative Percentage of Total Minerals (%)	Six-Year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Sand and gravel	6,322,069.33	67	-0.29	4.06	17.37	2.00
Gold ore	4,220,920.11	87	8.96	-5.59	5.43	1.91
Silver ore	1,310,860.00	94	-3.67	81.97	-8.83	-3.79
Limestone	391,715.00	99	3.75	22.98	63.71	-2.01

Domestic Production of Biomass

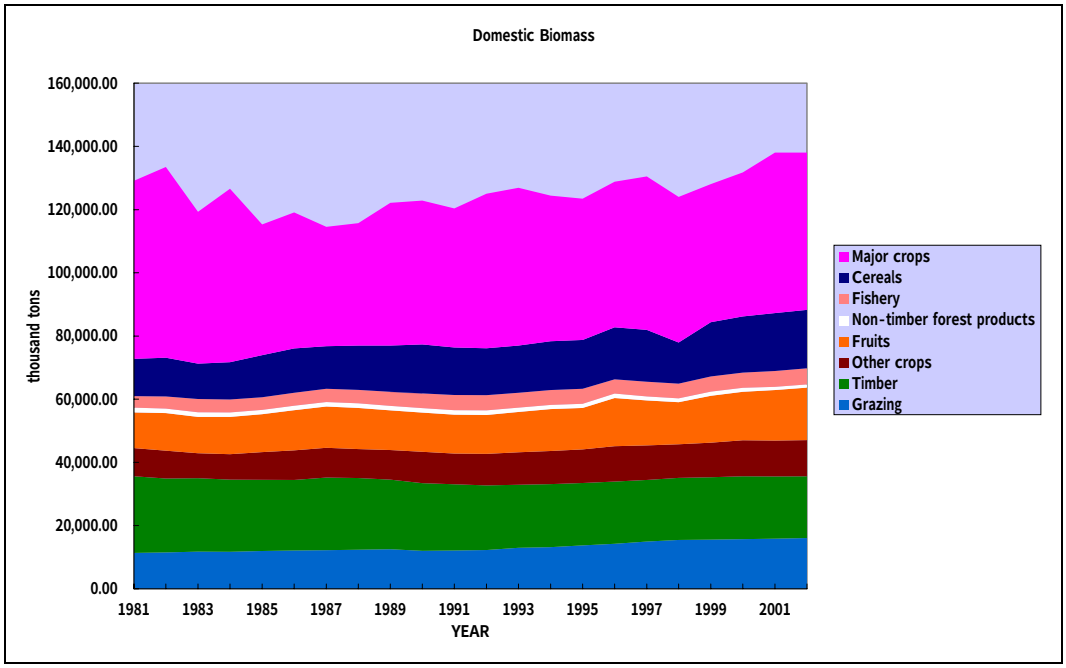
Biomass is the second major contributor to domestic production. Biomass input grew at a very low average rate of 0.2 percent during the period of study and its trend exhibits a general smoothness except for the dips and spurts attributable to fluctuations in the production of Major Crops and Cereals (Figure 7).

The group of Major Crops is composed of coconut, sugarcane, abaca, other fiber crops, coffee, rubber, tobacco and cacao. Palay, corn and sorghum compose the cereals group. Of all these crops, palay, coconut and sugarcane had trends that are closely similar to that of total domestic biomass. Coconut and sugarcane are traditional exports of the country while palay is a staple crop, rice being the staple food of the country.

Figure 7 shows that the top groups in terms of total volume from 1981 to 2002 were Major Crops, Total Timber, Cereals, Fruits, and Grazing. Timber in this analysis is composed of logs, fuelwood and charcoal in its green log weight equivalent. Figure 7 also shows that even though almost all groups showed increasing volumes throughout the period, these increases were almost negligible. Total Timber and Non-Timber Products actually showed decreasing trends.

The ten crops with the highest total volumes are listed in Table 7. The combined volume of these top crops constituted almost 87 percent of total biomass for the period. These were

Figure 9. Total domestic biomass production, Philippines, 1981-2000



mostly traditional crops that have assured domestic and export markets.

Figure 10 shows the trend in production of crops that had traditionally been produced in large volumes for both domestic and export consumption. Their growth rates in production are not as significant as those of crops shown in Figure 11. Figure 11 includes the new performers in biomass production in the country. These crops had been grown before but not in large quantities. In the last ten years, however, tastes and preferences as well as world market conditions have changed in favor of these crops. Examples are mangoes, other fruits and vegetables, and other food crops.

Biomass may be food or nonfood. In terms of relative contribution to the DMI, domestic food biomass had a greater share than domestic non-food biomass. In fact, the trend of domestic biomass was strongly influenced by food biomass. Food biomass, in turn, was greatly affected by six food groups whose volumes, when summed up, amounted to more than 82 percent of total domestic food biomass production (Table 8).

Food crops that compose the top 82 percent of total domestic food biomass production are traditional crops. They also have low growth rates in production.

Figure 12 shows the crop volumes that consistently had high growth rates. Foremost of them are fresh vegetables, mangoes, roots and tubers and eggplants. More importantly, these crops were showing an increasing trend through time. Potatoes and cabbages were also showing high growth rates considering their very low starting levels.

Table 7. Top ten domestic biomass volumes and their corresponding growth rates, Philippines, 1981 to 2002

Crops	Total Volume 1981 to 2002 (000 tons)	Cumulative Percentage of Total Biomass	Six-year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Sugarcane	695,924.66	25	-5.71	6.59	-1.34	1.33
Fuelwood	361,734.86	38	0.13	0.13	0.01	0.09
Coconut	326,304.64	50	0.58	-3.67	0.70	4.24
Grazing	291,279.97	61	1.36	0.15	3.98	0.95
Palay	228,568.22	69	3.63	0.59	-1.05	12.48
Other fruits	124,087.96	74	5.59	2.72	-1.28	3.01
Banana	108,074.81	77	-0.69	-3.81	2.80	11.32
Fishery	98,950.35	81	2.60	2.64	-0.50	2.63
Corn	96,703.84	85	4.64	2.11	-2.82	3.52
Fresh vegetables, nes	76,621.20	87	4.06	2.73	1.05	6.43

Figure 10. Traditional crops with high growth rates in production, Philippines, 1981 to 2002

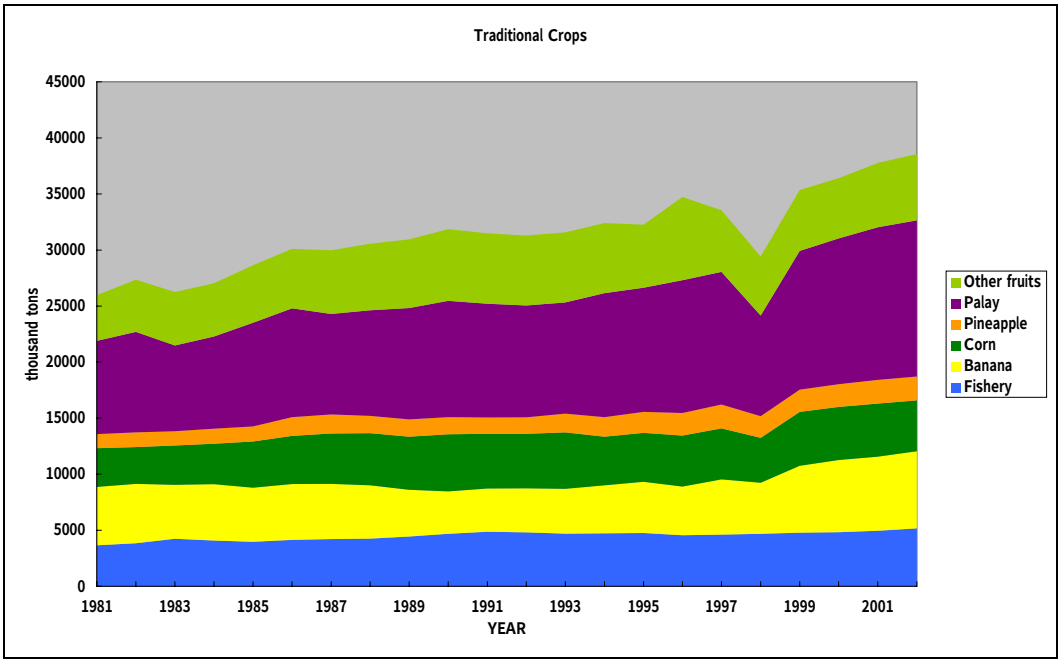


Figure 11. Crops that recently had high production growth rates, Philippines, 1981 to 2002

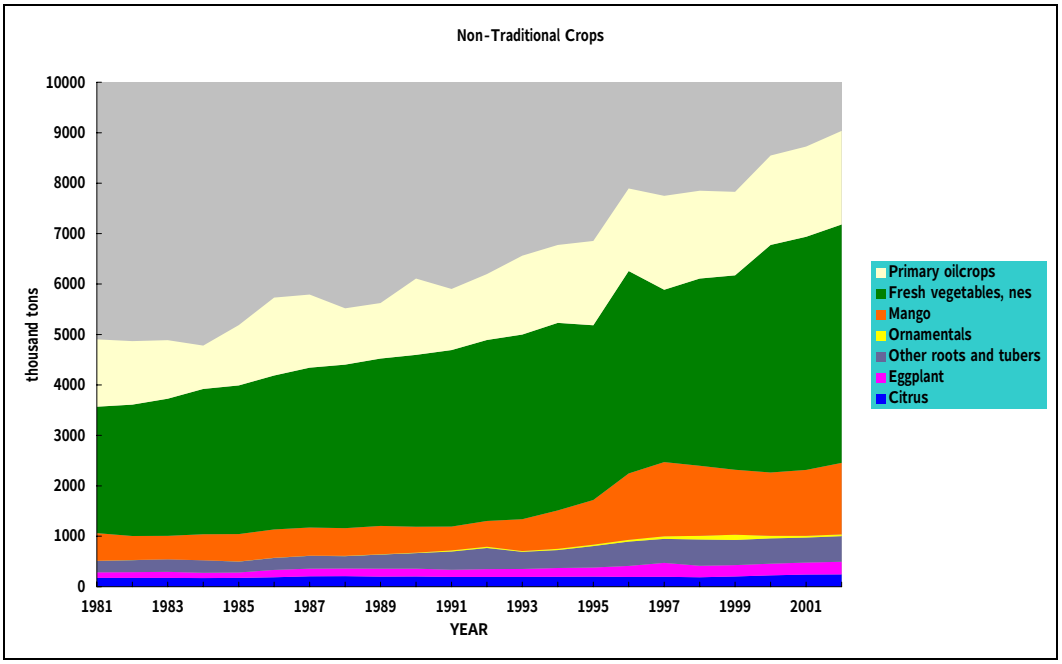
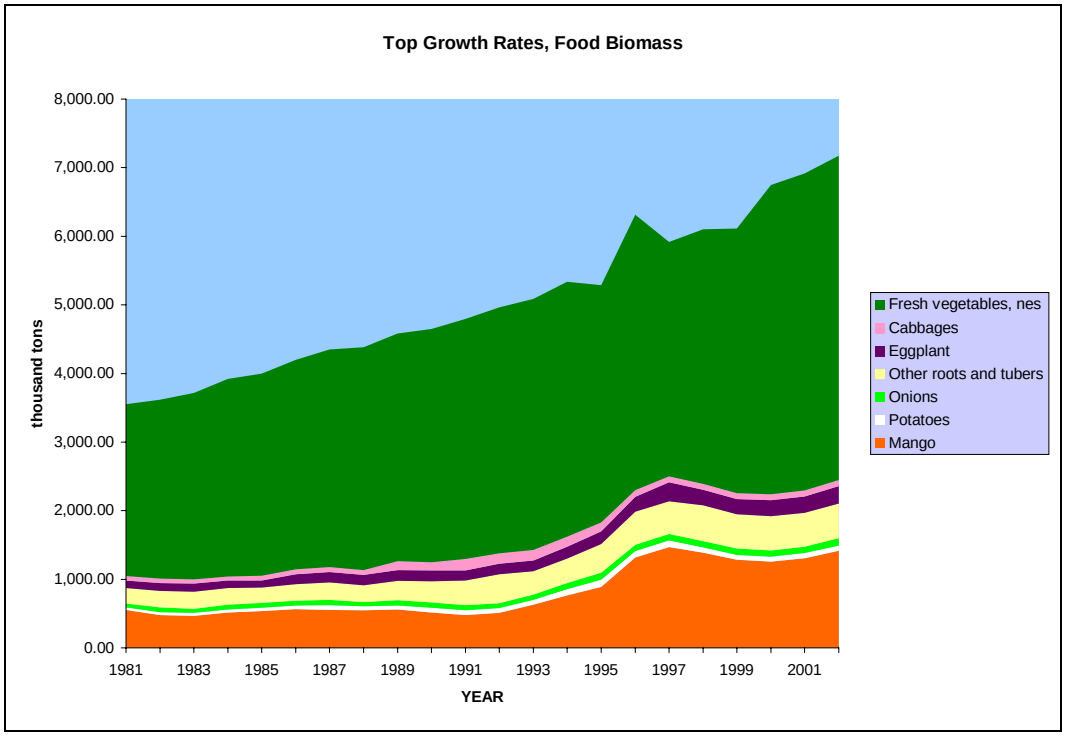


Table 8. Top domestic food biomass volumes and their corresponding growth rates, 1981-2002

Food Crops	Total Volume 1981 to 2002 (000 tons)	Cumulative Percentage (%)	Average Growth Rates (%)				
			Annual	1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Sugarcane	695,924.66	36.08	0.39	-5.71	6.59	-1.34	1.33
Coconut	326,304.64	53.00	0.10	0.58	-3.67	0.70	4.24
Palay	228,568.22	64.85	3.11	3.63	0.59	-1.05	12.48
Other fruits	124,087.96	71.28	2.32	5.59	2.72	-1.28	3.01
Banana	108,074.81	76.89	1.70	-0.69	-3.81	2.80	11.32
Fishery	98,950.35	82.02	1.73	2.60	2.64	-0.50	2.63

Figure 12. Domestic food biomass groups with top production growth rates, 1981 to 2002



Domestic Crude Fossil and Energy Materials

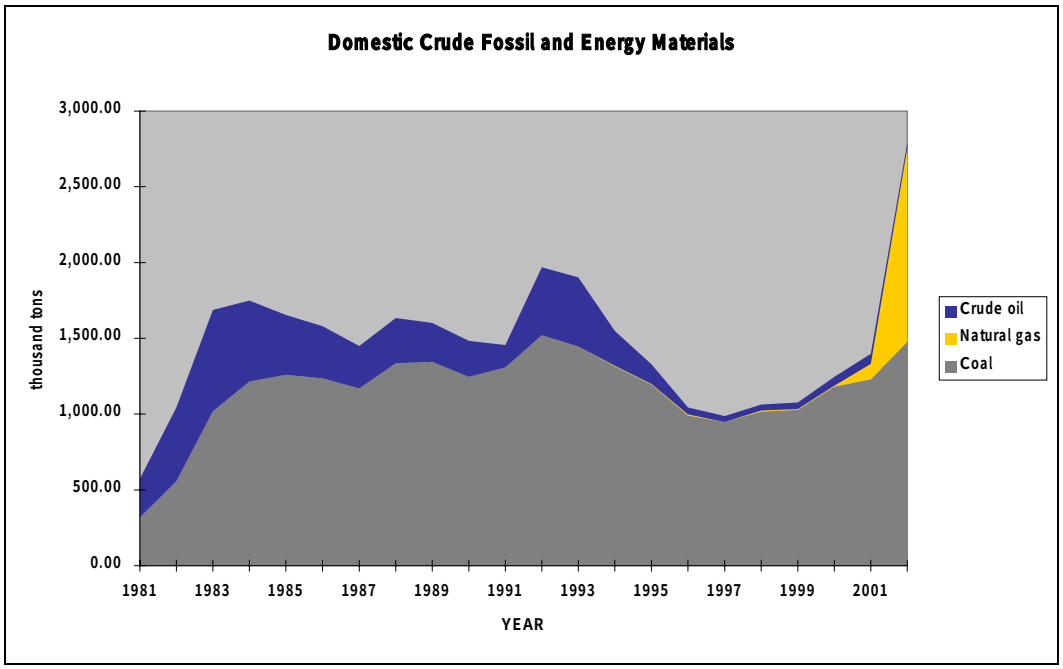
Coal constituted 78 percent of total domestic crude fossil and energy materials for the period. Figure 13 and Table 9 show that the level of coal production was increasing at a very low rate except during 1992 to 1994. Since 1994, it has decreased considerably but by 2000, it has gone back to its pre-1992 levels. Crude oil had its highest levels from 1983 to 1986 and 1992 to 1993. From 1996 to 2002, crude oil production was insignificant.

Table 9. Domestic crude fossil materials and their corresponding growth rates, 1981-2002

Energy Material	Total Volume 1981 to 2002 (000 tons)	Average Annual Growth Rate (%)	Six-year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Coal	25,358.29	9.78	35.81	3.91	-6.22	10.07
Natural gas*	1,415.89					
Crude oil	5,493.79	1.85	13.94	21.42	-28.16	2.41

*Production had been intermittent.

Figure 13. Domestic crude fossil and energy materials, Philippines, 1981 to 2002



2. Imports into the Philippines

Table 10 and Figure 14 show the trends in importation of major commodity groups into the Philippines from 1981 to 2002. The details are in Appendix A.2.

More than half of imports during the period were made up of semi-manufactured or final products. Crude fossil and energy materials made up 32 percent while biomass constituted twelve percent of the total imports. The average annual growth rate in total imports was nine percent.

In terms of average annual growth rates, semi-manufactured and final products also had the highest at 18 percent. Crude minerals and mineral materials had 14 percent and biomass had nearly 10 percent. From the trends shown in Figure 14, with the exception of the final products group, all groups started to post very high growth rates during the period from 1995 to 2001. Semi-manufactured and final products imports showed very marked increases in years 1982, 1989, 1992 and 1997.

Figure 14. Import groups into the Philippines, 1981 to 2002

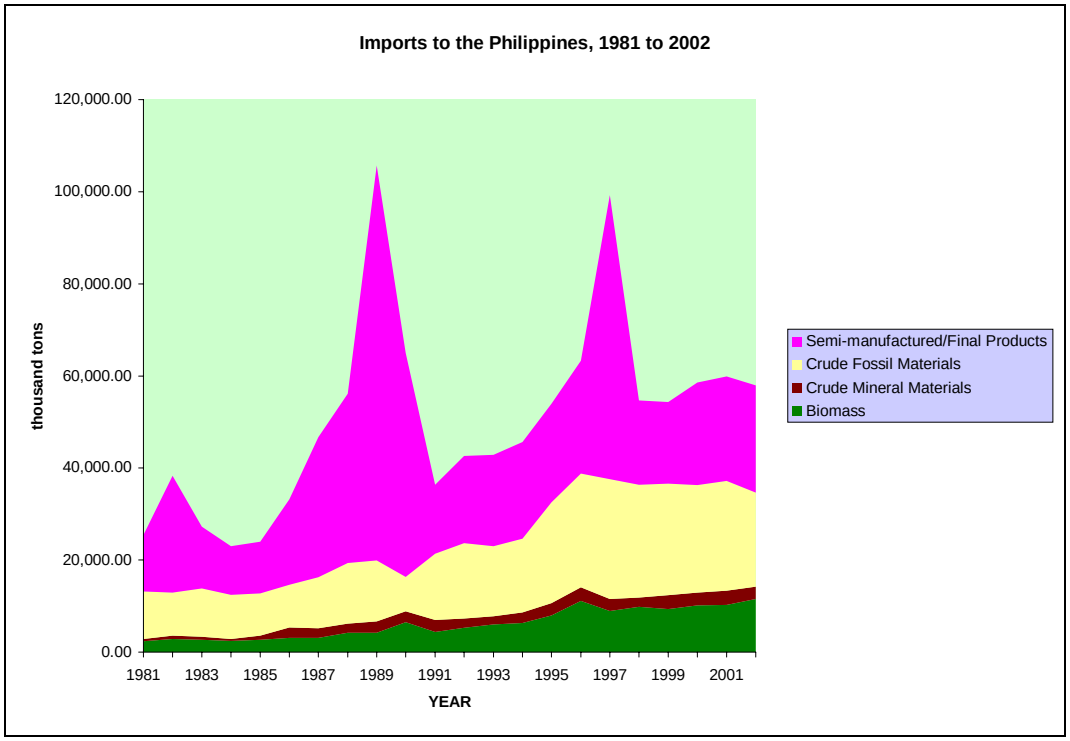


Table 10. Main import groups into the Philippines and their average growth rates, 1981 to 2002

Import Group	Total Volume 1981 to 2002 (000 tons)	Average Annual Growth Rate (%)	Six-year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Crude Mineral Materials	44,798.28	14.43	13.46	19.62	26.86	29.68
Biomass	135,520.23	9.76	51.87	-0.51	1.73	9.08
Crude Fossil Materials	354,118.71	5.81	6.62	13.33	12.45	4.31
Semi-manufactured/Final Products	579,678.68	18.00	-1.81	16.73	7.87	-4.13
Total Imports	1,114,115.89	9.21	22.05	22.08	18.05	6.73

Semi-Manufactured and Final Products

More than half of total imports into the Philippines from 1981 to 2002 were of semi-manufactured or final products. The importation trends of these products show very pronounced peaks in 1989 and 1997 (Figure 14). If these peaks were ignored, imports of final products appear to be rather uniform in volume, that is, the volumes did not have wide fluctuations from year to year, except for the period from 1986 to 1988. This could be due to the fact that import controls were relaxed beginning at that period. After the initial surge in imports in response to this freedom, demand for imported products stabilized at more or less the same levels.

Table 11 lists the top 80 percent of semi-manufactures and final products that were imported during the period of study. Machinery for particular industries, power generating machinery and electrical machinery and electrical parts had the highest average annual growth rates.

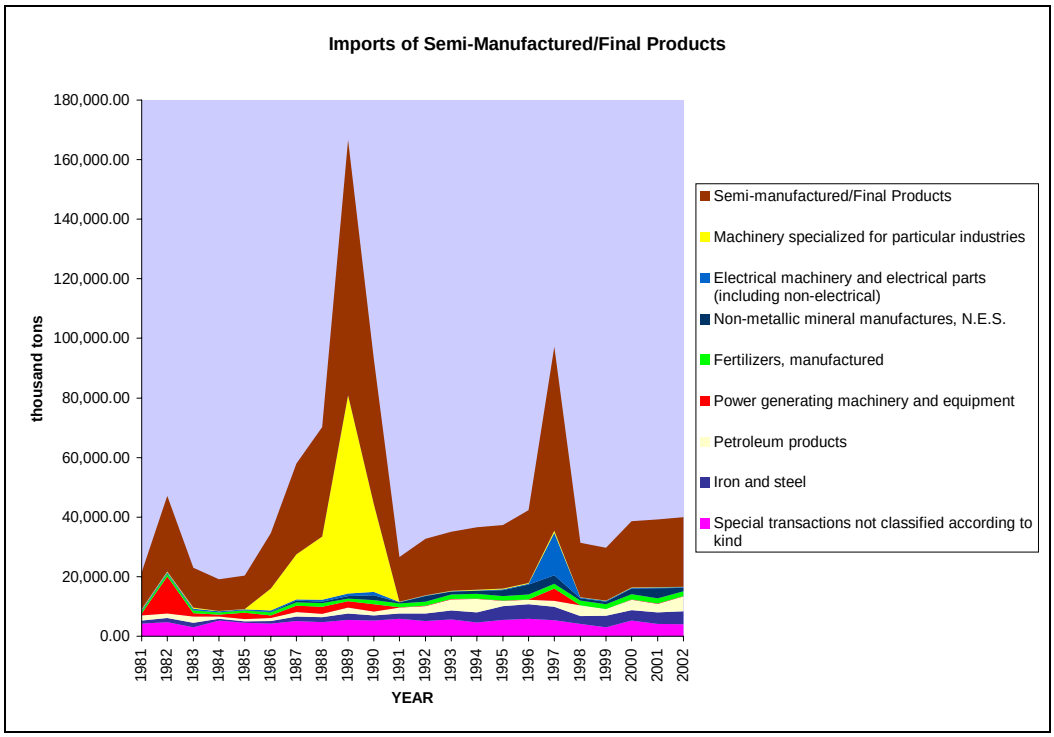
Figure 15 shows that significant peaks occurred in 1982, 1989 and 1997. From 1981 to 2002, the top groups of imported final products were special machinery for particular industries, power generating machinery and electrical machinery and electrical parts, iron and steel, and special transactions. Machinery for specific industries began to increase in 1986 and reached a very high peak in 1989 when it made up 78 percent of all imports of semi-manufactures and final products. It became nil in 1991 and has not recovered significantly since then.

Power generating machinery and equipment showed sharp peaks in 1982 and 1997. Iron and steel had been imported in steadily increasing amounts with the period from 1993 to 1997 showing the highest volumes. The spike in 1997 was mainly due, however, to importation of road vehicles (32 percent) and electrical machinery and electrical parts (23 percent).

Table 11. Top 80 percent of total semi-manufactures and final products imports, 1981 to 2002

Semi-Manufactured/Final Products Group	Total Volume 1981 to 2002 (000 tons)	Average Annual Growth Rate (%)	Six-year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Machinery specialized for particular industries	143,388.32	296.64	1170.43	37.36	23.89	2.42
Special transactions not classified according to kind	105,324.21	2.77	5.52	3.60	-2.20	5.56
Iron and steel	55,158.70	13.10	8.77	24.51	4.53	14.26
Petroleum products	49,130.34	14.85	0.09	21.88	15.89	21.17
Power generating machinery and equipment	32,440.47	223.80	386.36	20.41	442.62	-2.51
Fertilizers, manufactured	28,530.91	4.61	8.04	5.64	4.26	-0.70
Non-metallic mineral manufactures, N.E.S.	24,495.90	47.16	21.07	116.71	5.44	38.00
Electrical machinery and electrical parts (including non-electrical)	21,815.36	252.98	4.78	7.21	870.49	5.60

Figure 15. Top 80 percent of total imports of semi-manufactured and final products, 1981 to 2002



Crude Fossil and Energy Materials

Crude fossil and energy materials constituted almost 32 percent of total imports to the country during the period of study. Figure 16 shows the importation trends of these materials while Table 12 lists their values and corresponding growth rates.

Imports of the three groups of fossil materials had been increasing. Crude petroleum oils and crude oils made up more than 84 percent of these imports. Crude oil imports increased steadily but had a very pronounced dip in 1990. However, starting in 1992, increases in volume had been considerable. In fact, crude fossil imports grew so much relative to the other imports in 1992 and 2001 that their values caused peaks in the total imports graph during these years (Figure 16).

Coal imports were rather low and grew very little until 1995. In 1996, importation started to grow at a high rate and reached a peak in 1998. This level was more or less maintained up to 2002. Coal made up 14 percent of total crude fossils imports.

Natural gas levels were insignificant when compared to either coal or crude oils. However, levels grew steadily through the years until 1998. From 1999 to 2002, there was no import of natural gas.

Figure 16. Imports of crude fossil and energy materials, Philippines, 1981 to 2002

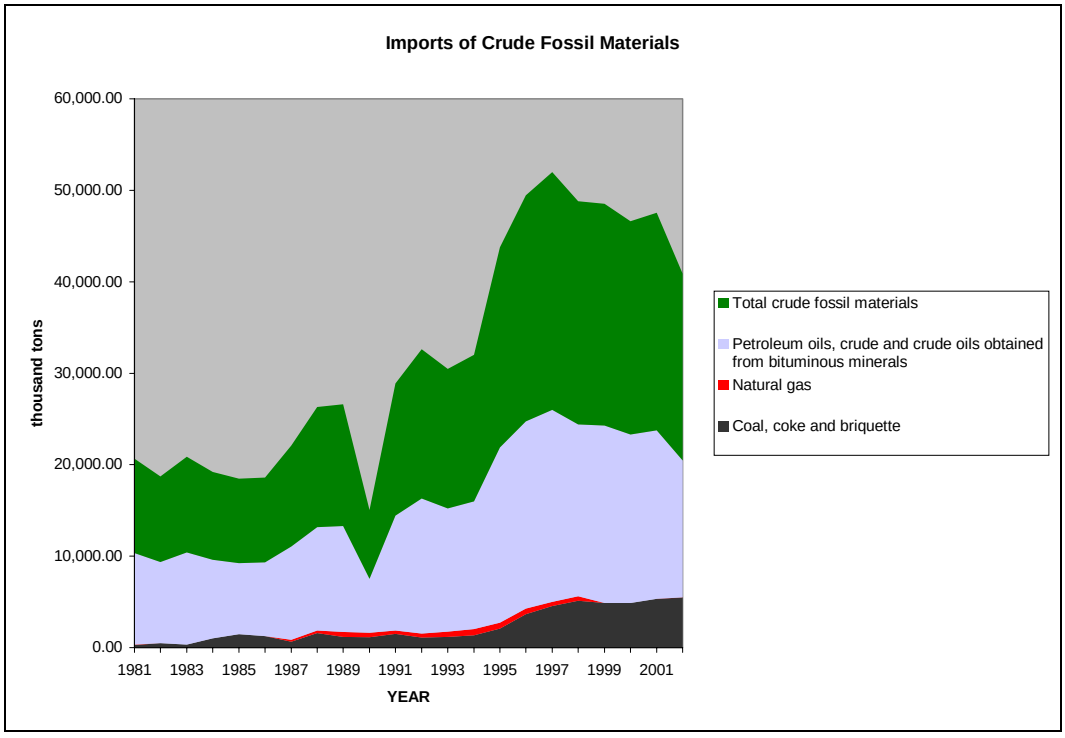


Table 12. Imports of crude fossil materials, 1981 to 2002

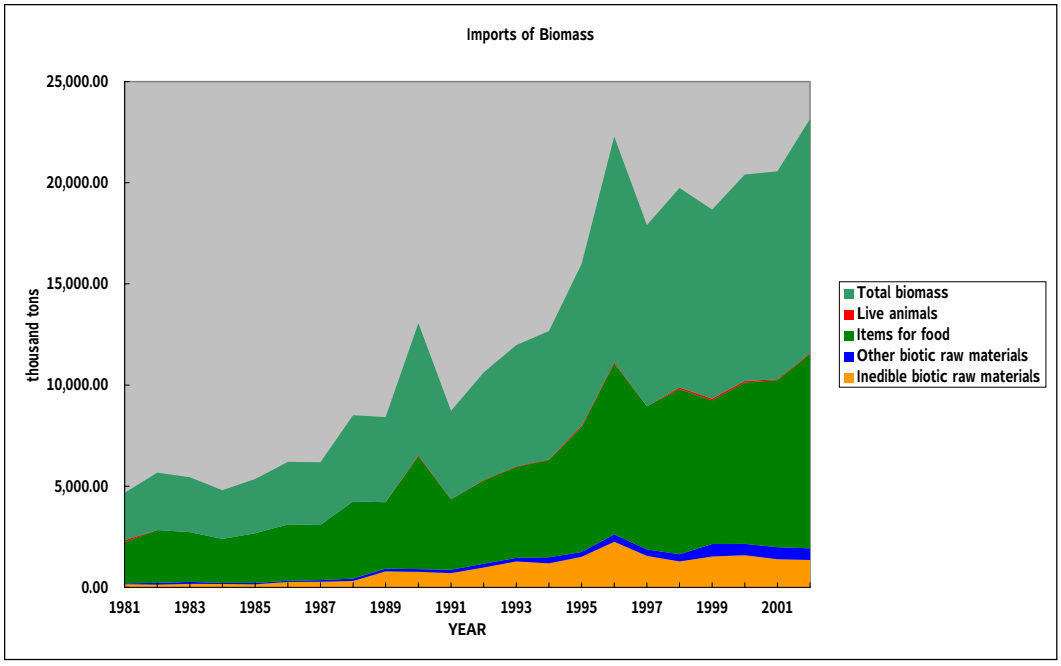
Crude Fossil Materials	Total Volume 1981 to 2002 (000 tons)	Average Annual Growth Rate (%)	Six-year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Natural gas	5,890.04	*	*	*	*	*
Coal, coke and briquette	50,440.66	26.56	58.11	11.37	31.89	1.91
Crude petroleum oils and crude oils obtained from bituminous minerals	297,788.01	5.39	-3.67	20.19	5.17	-5.14
Total crude fossil materials	354,118.71	5.81	-1.81	16.73	7.87	-4.13

*Some years had values of zero, giving misleadingly high rates of growth for the next year.

Biomass

Biomass imports, with an average annual growth rate of almost 10 percent, constituted 12 percent of the total imports into the country from 1981 to 2002. Of this total biomass imports, almost 81 percent was for food for human consumption. Imported food for human consumption was growing at an average annual rate of ten percent (Figure 17).

Figure 17. Biomass imports, Philippines, 1981 to 2002



Biomass imports showed sharp peaks in 1990, 1996 and 1998 but growth rates actually started to increase significantly and continuously starting only from 1992. This could be seen very clearly with food for human consumption and inedible biotic raw materials. Imported volumes of food items especially increased tremendously during the period from 1996 to 2002.

Figure 18 shows the five biomass groups that made up 75 percent of total biomass imports during the period. Cereals other than rice and corn, feeding stuff for animals and rice made up the majority of this set.

Of all imported biomass, the group of cereals other than rice and corn had the highest growth rates during the period (Figure 19). Volumes in this group started to increase significantly starting from 1990 and, except in 1998, have not gone down appreciably since then up to 2002. Other biomass groups like rice, wood in the rough, sugar and sugar preparation, and, vegetables and fruits also showed increasing trends in volumes.

The trend in rice importation is showing sharp peaks. On the other hand, increases in volumes of wood in the rough, sugar and sugar preparation, and vegetables and fruits had been steady.

Figure 18. Biomass groups constituting 75 percent of total biomass imports, 1981 to 2002

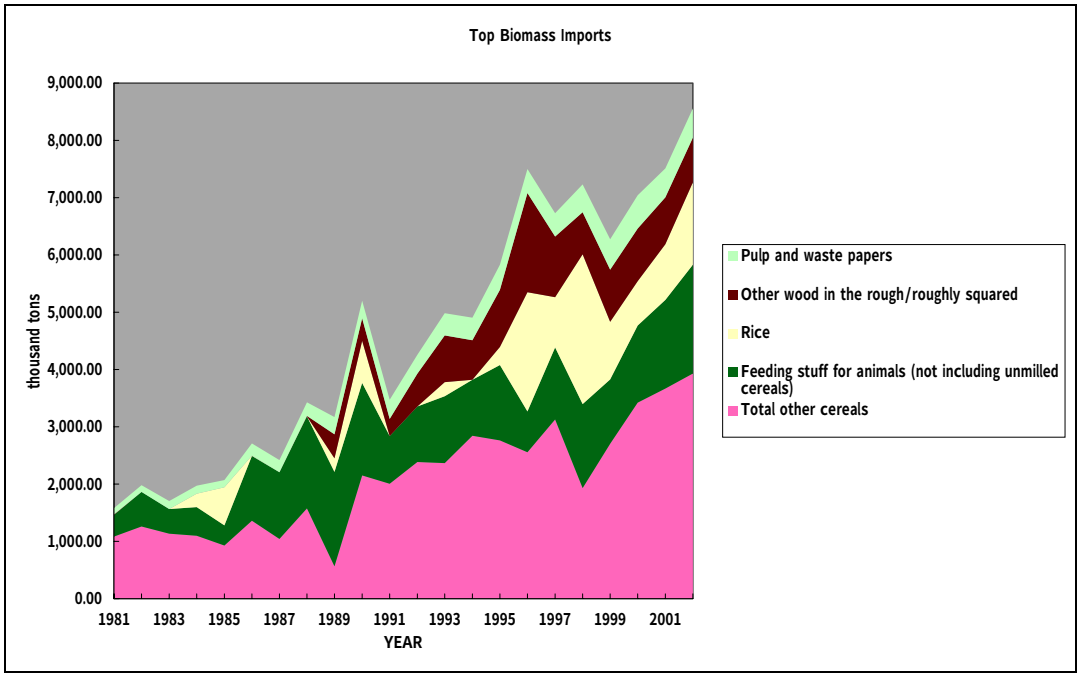
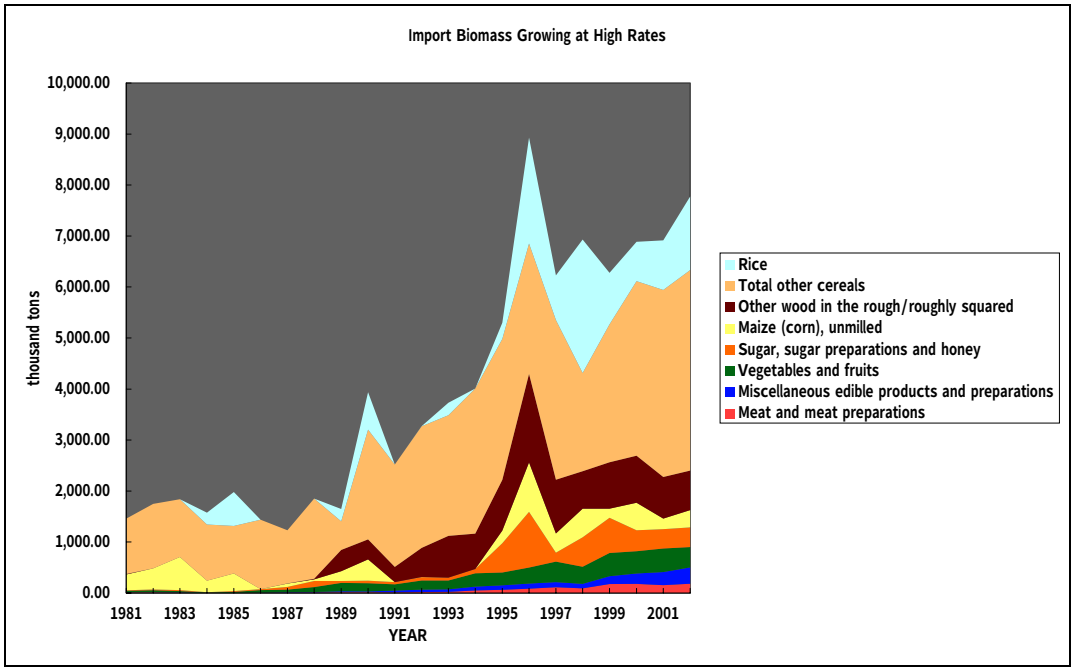


Figure 19. Imported biomass groups with top growth rates, 1981 to 2002

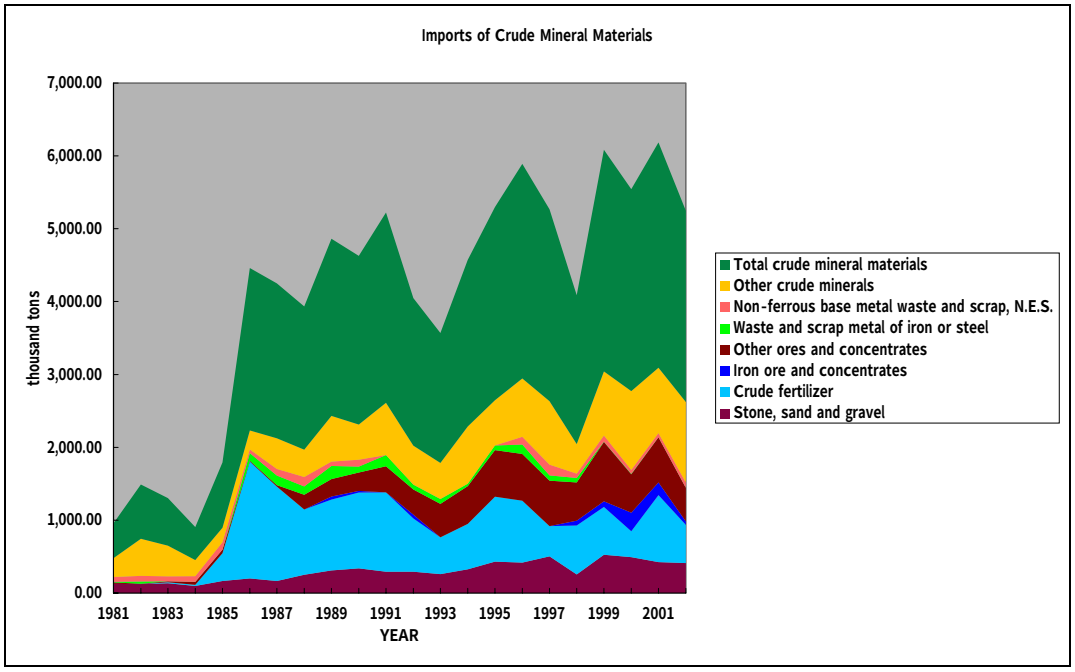


Crude Minerals and Mineral Materials

Crude minerals and mineral materials formed four percent of total imports into the country during the period of study. The top imported crude minerals, volume-wise, were crude fertilizer (32 percent), other crude minerals including abrasives (29 percent), ores and concentrates other than iron ore, (16 percent) and stone, sand and gravel (15 percent).

Figure 20 shows all groups of crude mineral imports and their trends. Other crude minerals including abrasives had the highest growth rate. Ores and concentrates other than iron ore had also been growing consistently just like with stone, sand and gravel. Crude fertilizer, while having the highest total volume, actually was showing a decreasing trend although it had some growth spurts.

Figure 20. Imports of crude minerals and mineral materials, 1981 to 2002



3. Exports from the Philippines

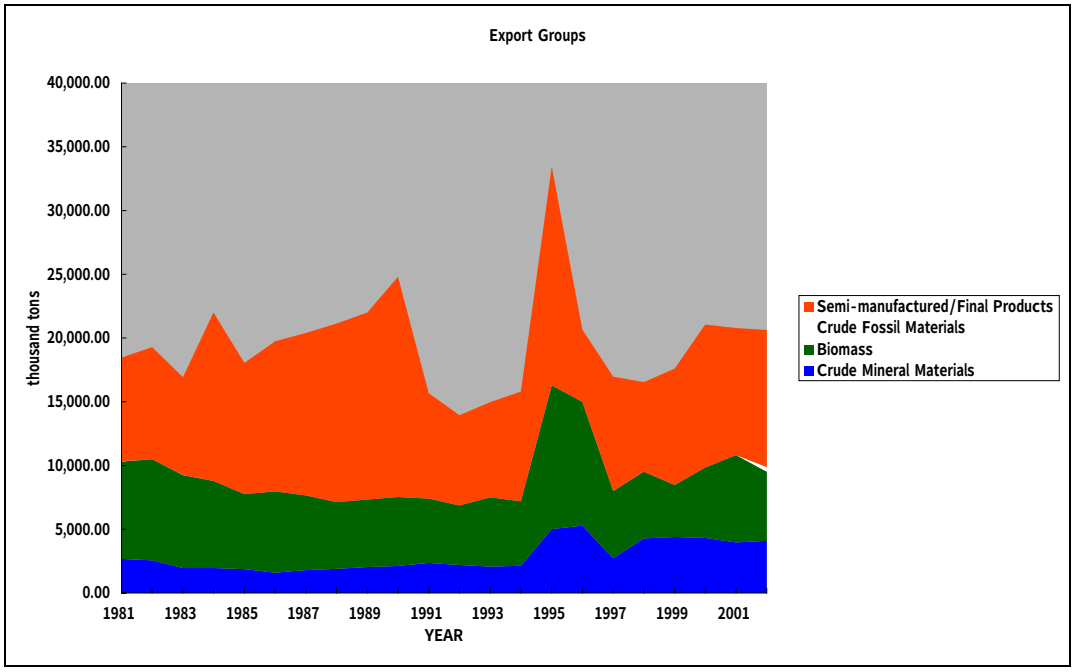
Table 13 and Figure 21 show the trends in exports of the country from 1981 to 2002. Semi-manufactured/final products and biomass were the two groups that significantly determined these trends. Exports of final products constituted 53 percent of total exports

Table 13. Main export groups of the Philippines and their average growth rates, 1981 to 2002

Export Group	Total Volume 1981 to 2002 (000 tons)	Average Annual Growth Rate (%)	Six-year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Crude Fossil Materials	385.93	*	*			
Crude Mineral Materials	63,311.82	6.16	-9.34	5.64	24.37	-1.02
Biomass	137,352.83	2.01	-3.25	-4.92	11.95	4.10
Semi-manufactured/Final Products	229,810.67	8.27	12.00	-4.31	15.02	12.32
Total Exports	430,861.25	3.79	2.73	-4.01	11.00	5.99

*Values had wide swings, hence have artificially high average values.

Figure 21. Main export groups from the Philippines, 1981 to 2002



while 32 percent was contributed by biomass. Crude mineral materials were responsible for 15 percent. Meanwhile, exports of crude fossil materials were nil.

In general, export volumes of final products were decreasing. However, the period from 1987 to 1990 saw high rates of growth. This was followed by decreases in volume until 1995 and 2000 when the volumes showed spikes.

After exhibiting a decreasing trend from 1981 to 1994, biomass exports showed significantly elevated levels in 1995 and 1996. They dipped considerably in 1997 but have since started to rise slowly up to 2002.

Semi-manufactured and Final Products

Six groups of products comprised around 81 percent of the total volume of exports of semi-manufactured/final products (Table 13 and Figure 22). Fifty percent came from special transactions of unspecified types. Electrical machinery and parts contributed 14 percent while cork and wood manufactures not including furniture took care of five percent. Manufactured fertilizers provided five percent also and non-metallic mineral manufactures contributed four percent. Petroleum products had three percent.

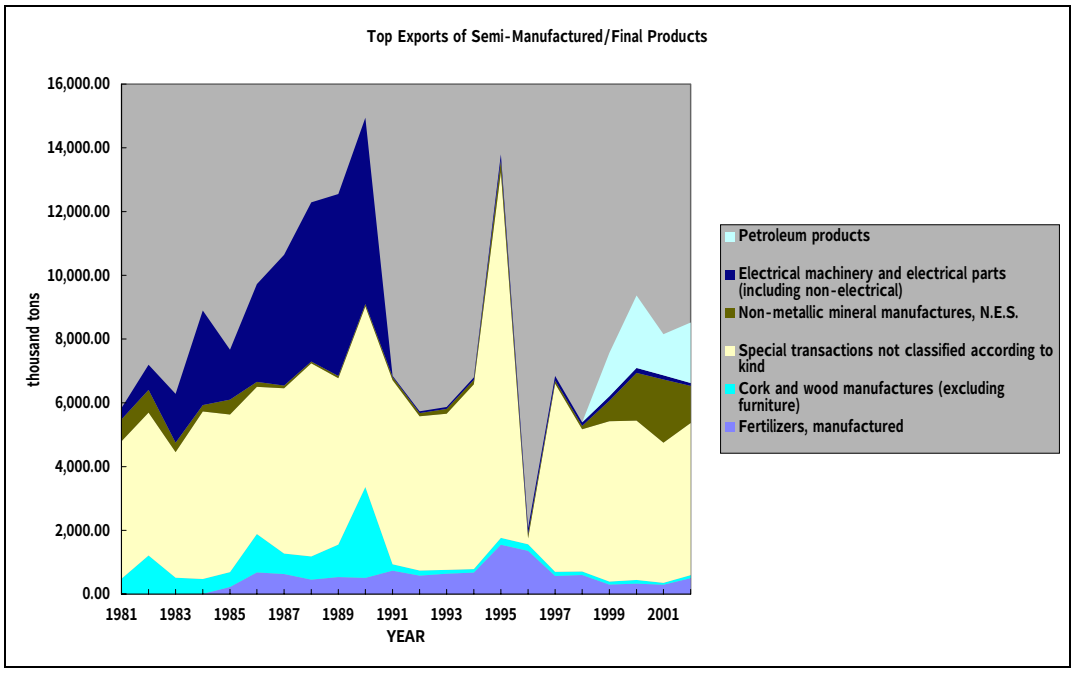
Of these six groups, only manufactured fertilizers showed a more or less uniform output from year to year. Further, only nonmetallic minerals and petroleum products were increasing

Table 14. Products constituting the top 81% of exports of semi-manufactured/ final products, 1981 to 2002

Final Product Group	Total Volume 1981 to 2002 (000 tons)	Average Annual Growth Rate (%)	Six-year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Fertilizers, manufactured	11,131.32	491.01	2,042.27	0.13	13.48	4.55
Cork and wood manufactures (excluding furniture)	11,209.57	16.15	48.56	11.95	1.02	4.65
Special transactions not classified according to kind	112,219.77	151.05	2.53	1.59	523.54	2.17
Non-metallic mineral manufactures, N.E.S.	9,282.31	35.21	-4.84	-1.82	20.08	163.50
Electrical machinery and electrical parts (including non-electrical)	32,302.36	22.98	71.58	0.79	21.67	-2.51
Petroleum products	6,822.39	*	*	*	*	*

*Values had wide swings, thus giving artificially high average values.

Figure 22. Products constituting 81 percent of semi-manufactures and final products exports, 1981 to 2002



in trend. Special transactions started out more or less uniformly but increased very sharply in 1995 and dipped equally sharply in 1996. It then got back to levels that are about the same as those before 1995.

Cork and wood manufactures and electrical machinery and parts show initially increasing trends up to 1990. From 1991 to 2002, the two groups decreased in volume very sharply.

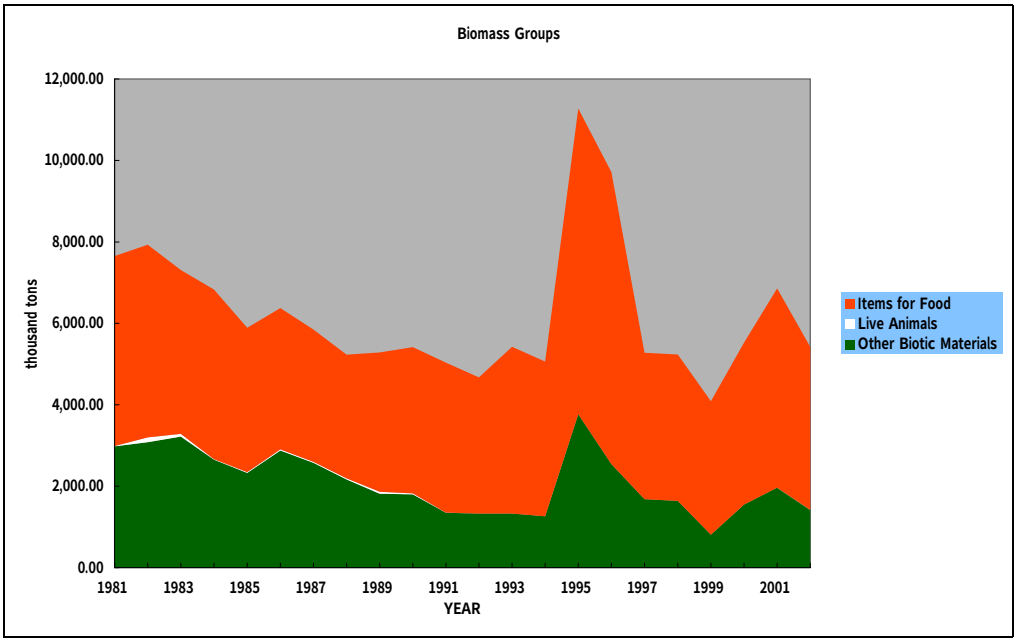
Biomass

Biomass exports were grouped into three broad categories, namely, items for food, other biotic materials and live animals. Food items contributed 66 percent while other biotic materials had 34 percent of total biomass exports (Figure 23). Food items were actually decreasing from 1981 to 1988 and from 1996 to 1999. They only increased from 1989 to 1995 and 2000 to 2001.

Table 15 lists the groups composing the top 93 percent of biomass exports for the period of study. Figure 24 shows that, of these top exports, only fixed vegetable oils and fats and vegetables and fruits had significantly increasing trends. Other food items and feeding stuff for animals were increasing very slightly but sugar and sugar preparations, other wood in the rough, and fish and fish preparations have actually decreasing trends.

Outside of these groups that constituted the main bulk of biomass exports, there were

Figure 23. Broad composition of biomass exports, 1981 to 2002

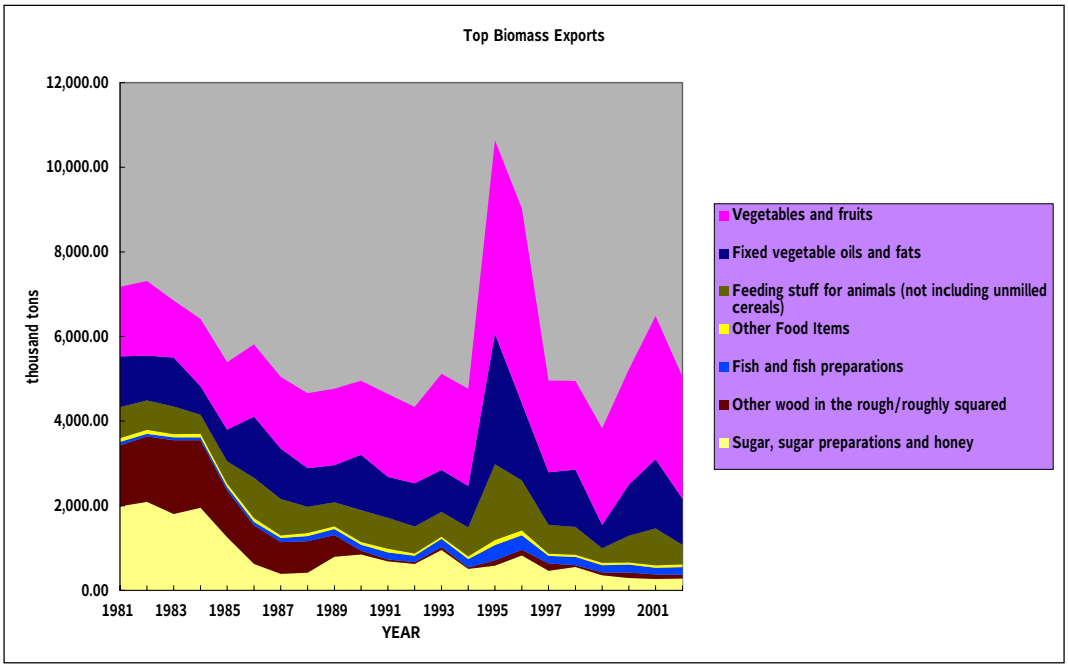


three groups of products that showed very significant increasing trends. These were processed animal and vegetable oils and waxes, pulp and waste papers, and dairy products and birds' eggs.

Table 15. Top 93 percent of biomass exports, 1981 to 2002

Biomass Groups	Total Volume 1981 to 2002 (000 tons)	Average Annual Growth Rate (%)	Six-year Average Growth Rates (%)			
			1981 to 1986	1986 to 1992	1992 to 1998	1998 to 2002
Other food items	1,585.26	2.79	1.90	-3.96	6.21	8.88
Fish and fish preparations	3,435.90	6.77	1.30	11.38	11.59	-0.54
Other wood in the rough/ roughly squared	11,496.76	8.78	-7.36	-31.16	48.79	28.86
Feeding stuff for animals (without unmilled cereals)	16,080.41	6.84	11.09	-4.77	14.96	6.78
Sugar, sugar preparations and honey	18,558.10	-3.22	-17.24	6.26	6.46	-14.42
Fixed vegetable oils, fats	26,521.98	12.05	12.04	-2.80	24.70	15.38
Vegetables and fruits	49,745.15	5.88	1.74	1.13	11.70	9.47

Figure 24. Top 93 percent of biomass exports, 1981 to 2002

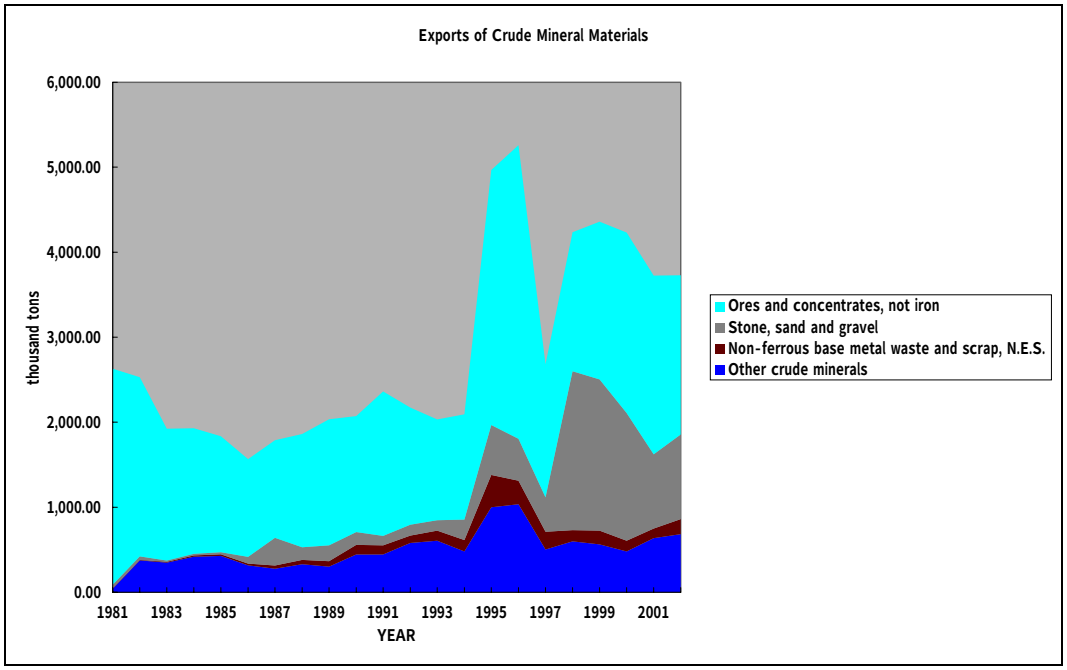


Crude Mineral Materials

The trends in the exportation of crude minerals and mineral materials are depicted in Figure 25. Sixty-one percent of crude mineral material exports from 1981 to 2002 were made up of a mixture of ores and concentrates other than iron ores. Other crude mineral materials including abrasives made up 17 percent. Stone, sand and gravel contributed 16 percent.

These groups of exported crude mineral materials exhibited similar patterns. Yearly volumes of exports were more or less constant until 1995 to 1997 when they showed significant increases in volume. Ores other than iron ore showed a slightly increasing trend through time with the sharp increase in 1995 and 1996 as the exception. Stone, sand and gravel drastically increased in 1998 and maintained a high level up to 2000. It has still a high volume in 2002. Other crude minerals were increasing at low rates except in 1995 and 1996.

Figure 25. Crude mineral materials constituting 98 percent of exports of such products, 1981 to 2002



Crude Fossil and Energy Materials

The Philippines does not export crude fossil or energy materials in commercial quantities. From 1981 to 2002, the country exported a total of only 386 thousand tons of these materials. Ninety-nine percent of this volume was made up of petroleum oils and crude oils. Furthermore, only five years saw any export activity involving these materials. The

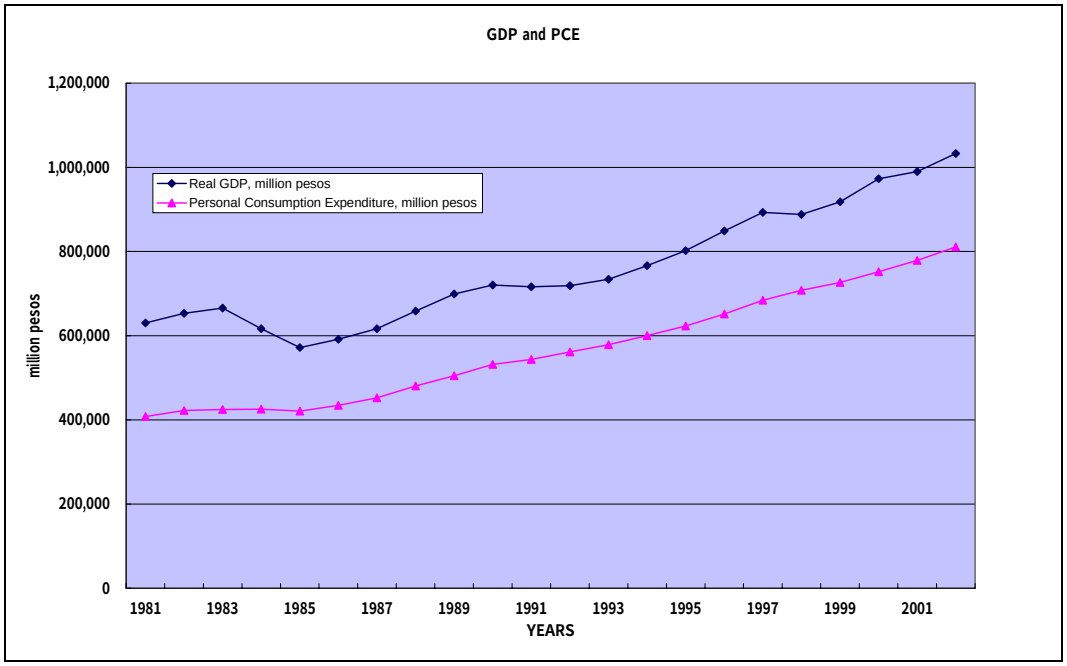
Department of Energy explained that the recorded export volumes were not for trade but for purposes of scientific studies and information exchange.

C. Trends in Macro-Economic Indicators, 1981 to 2002*[1]

The trends in real gross domestic product (real GDP) and personal consumption expenditure (PCE) are shown in Figure 26. Both of them have increasing trends. However, GDP had more pronounced dips and peaks although the two data sets have almost perfect positive correlation (Table 19). Figure 27, on the other hand, shows the comparative trends in gross value added (GVA) of several major economic sectors.

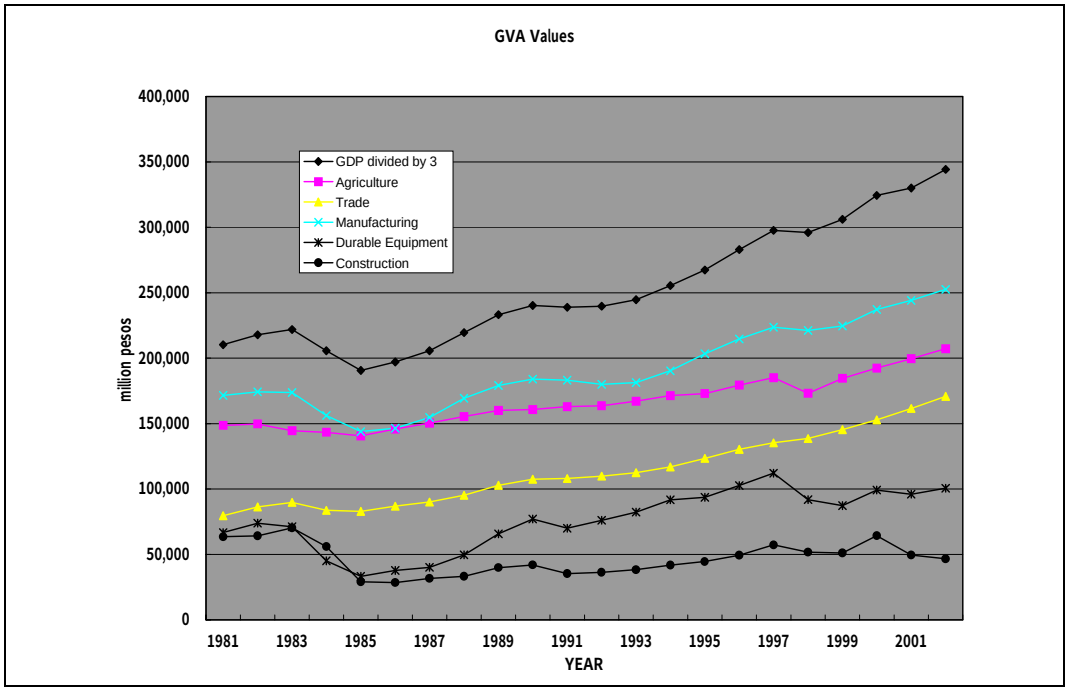
The trends in gross value added (GVA) in the manufacturing, agriculture, trade, durable equipment, and construction sectors are hewing closely to that of real GDP. GVAs of the manufacturing and durable equipment industries have the closest similarities to the shape of

Figure 26. Trends in real gross domestic product and personal consumption expenditure, Philippines, 1981 to 2002



[1] In numerous graphs and figures in this and succeeding sections, values of some data series were scaled upward or downward. This was done in order to show the trends of these series more clearly in comparison with other data in the same figure. A scaled series is marked with an asterisk (*). It is emphasized here, however, that scaling was done purely for illustrative purposes.

Figure 27. Comparative trends in gross value added in various economic sectors, Philippines, 1981 to 2002



the GDP curve. The GVA of agriculture, while generally following GDP's trend, has definite deviations especially from 1982 to 1984, 1989 to 1992, and 1998 to 2000. Trade's GVA is not very reflective of minor changes in GDP's directions. Construction's GVA, on the other hand, had been following GDP's shape until 2001 to 2002 when it went on a decidedly opposite direction to that of GDP's.

In Figure 28, the GVA of ownership in dwellings and real estate had the trend closest to that of GDP. Transportation, communications and storage followed the trend of GDP only up to 1997, after which year, it followed a markedly different path. Electricity, water and gas and mining and quarrying both had GVA trends that are generally different from GDP's.

Figure 29 depicts the comparative trends in sectoral labor productivity from 1981 to 2002. Labor productivity in the agriculture and manufacturing sectors had been increasing although by small degrees. This is the same trend with total labor productivity in the country for the same period. Labor productivity in the construction sector has a decreasing trend. The most irregular trend belongs to the mining and quarrying sector which has sharp peaks and dips while maintaining a generally increasing trend.

Gross capital formation had an increasing trend and its curve follows closely the shape of the GDP curve. However, the increase in gross capital formation is not as much as that of GDP's (Figure 30).

Figure 28. Comparison of trends in gross value added in various economic sectors, Philippines, 1981 to 2002

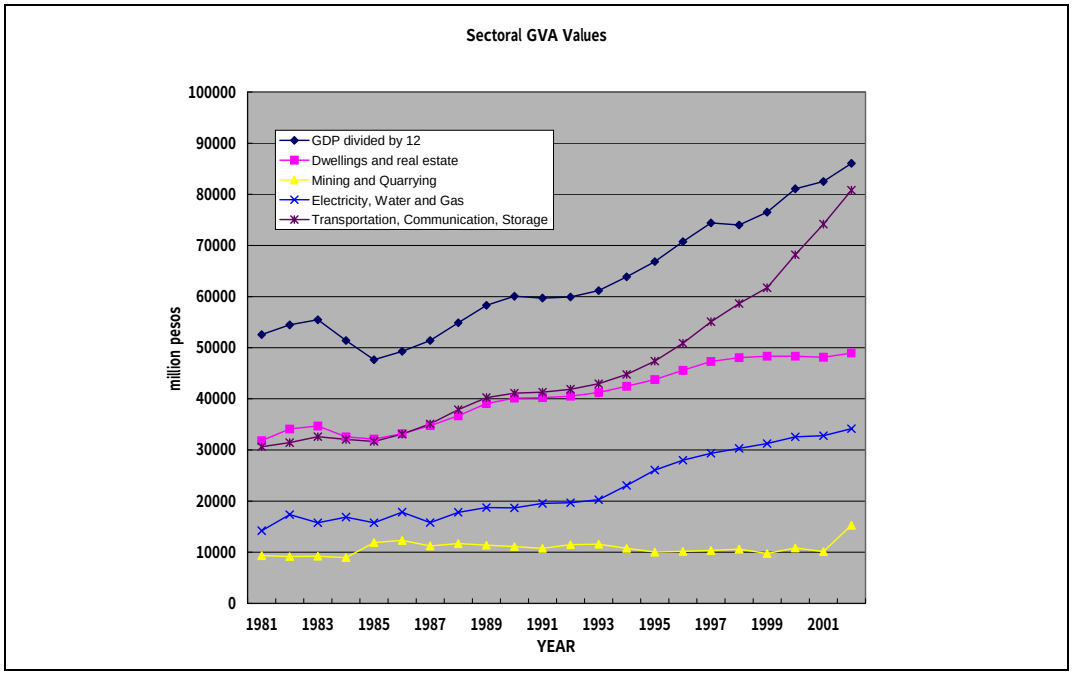


Figure 29. Comparative sectoral labor productivity trends, Philippines, 1981 to 2002

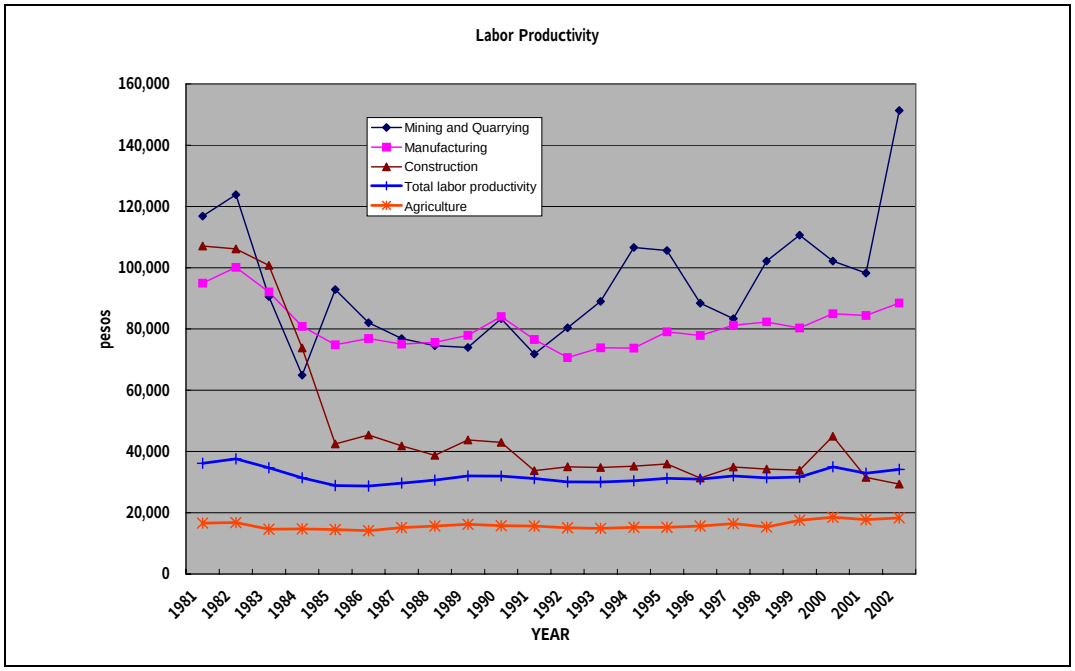


Figure 30. Comparative trends of GDP and gross capital formation, Philippines, 1981 to 2002

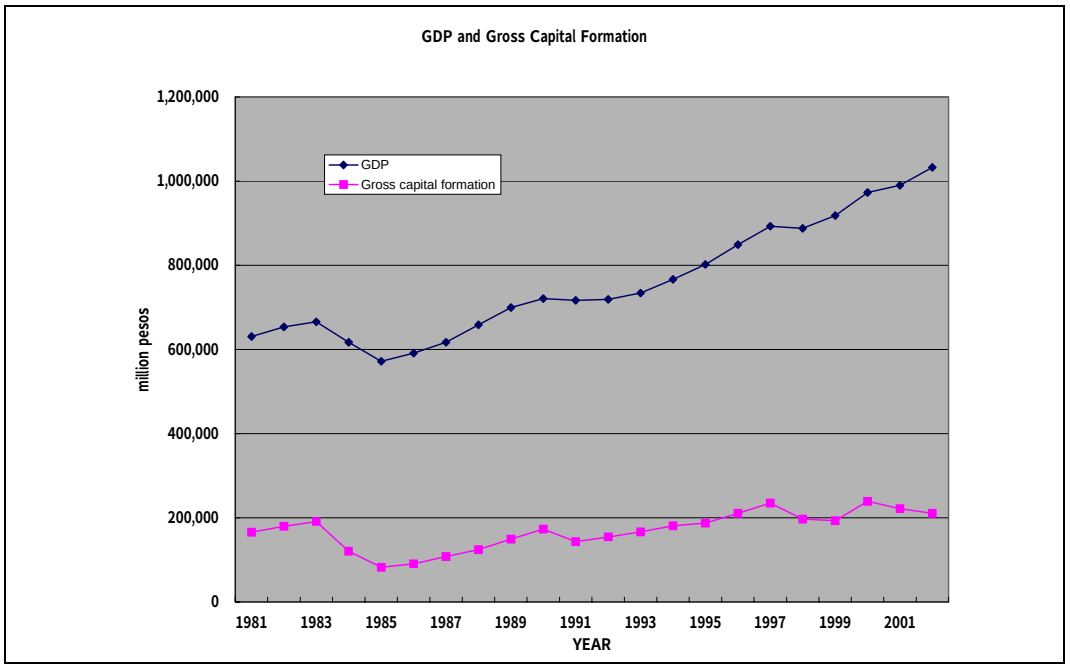
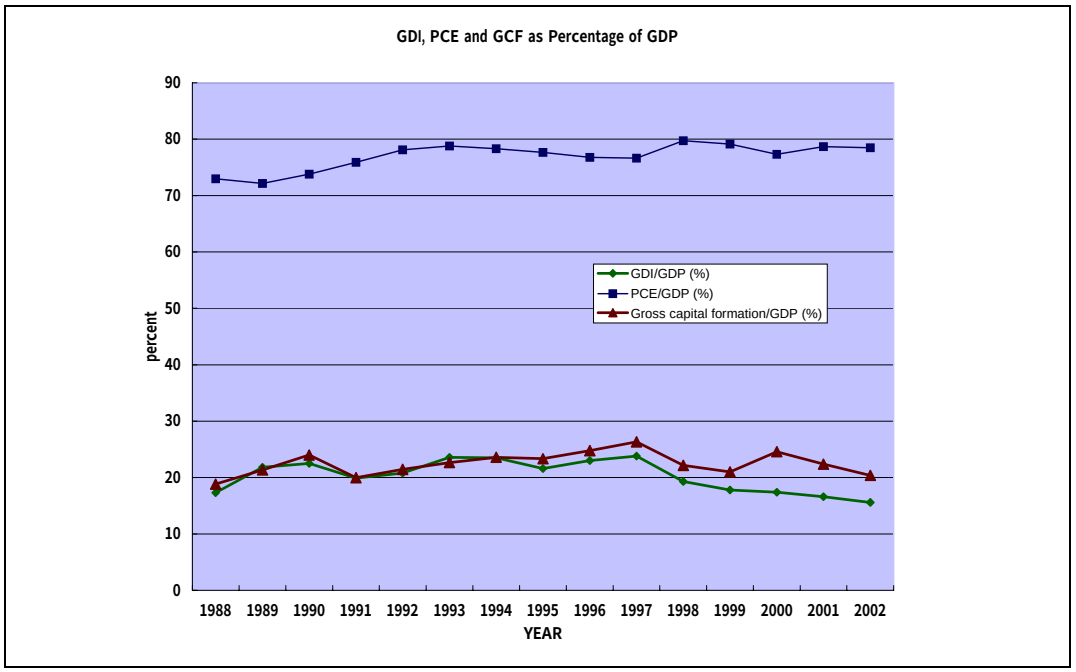


Figure 31. Trends in gross capital formation, personal consumption expenditure and gross domestic investment as percentage of GDP, 1988 to 2002



Personal consumption expenditure (PCE) as a percentage of GDP exhibits an increasing trend but since the last decade has more or less stabilized around 76 to 78 percent of real GDP. Gross domestic investment (GDI) has a decidedly decreasing percentage of the GDP. In fact, the GDI percentage value in 2002 is the lowest since 1988. Gross capital formation as a percentage of real GDP had been fluctuating since 1995 but is showing a decreasing trend since 2000 (Figure 31).

D. The Material Flows-Economic Performance Nexus

Material flow trends may be used as indicators of trends in economic performance if the two data series have close graphical and statistical correlation with each other. This study determined the correlation among trends in the main determinants of material flows and those in selected indicators of economic performance from 1981 to 2002. Table 16 and Table 17 present the main components of material flows and real GDP while Table 18 shows the details of the main material flows.

Table 16. Major components of total material flows, Philippines, 1981 to 2002

Material Flow	Volume (000 tons)	Percentage of Total Flows (%)
Domestic Production	9,111,909	86
Imports	1,114,116	10
Exports	430,861	4
Total Flows	10,656,886	100

Table 17. Main determinants of the sum of real GDP from 1981 to 2002

Sector/Industry	Percentage of Total Real GDP (%)
Manufacturing	25
Agriculture	22
Trade	15
Construction	6
Transportation	6
Ownership in dwellings and real estate	5
Mining and quarrying	1

Table 18. Proportions of major components of domestic material input (DMI), Philippines, 1981 to 2002

Material	Volume (000 tons)	Percentage of							
		DMI (%)	DP (%)	DCM (%)	DB (%)	Imports (%)	IFP (%)	ICF (%)	IB (%)
DMI	10,226,025	100							
Domestic Production	9,111,909	90	100						
Dom. Crude Minerals	6,322,069	62	69	100					
Sand and Gravel	4,220,920	42	46	67					
Gold and Silver Ores	1,702,575	17	19	27					
Domestic Biomass	2,757,572	27	30		100				
Top 10 crops	2,408,251	23	26		87				
Imports	1,114,116	10				100			
Final Products	579,679	5				52	100		
Top 10 products	504,860	5				45	87		
Crude fossils	354,119	3				32		100	
Crude oils	297,788	2				27		84	
Coal	50,441	Nil				4		14	
Imported Biomass	135,520	1				12			100
Food biomass	109,708	1				10			81

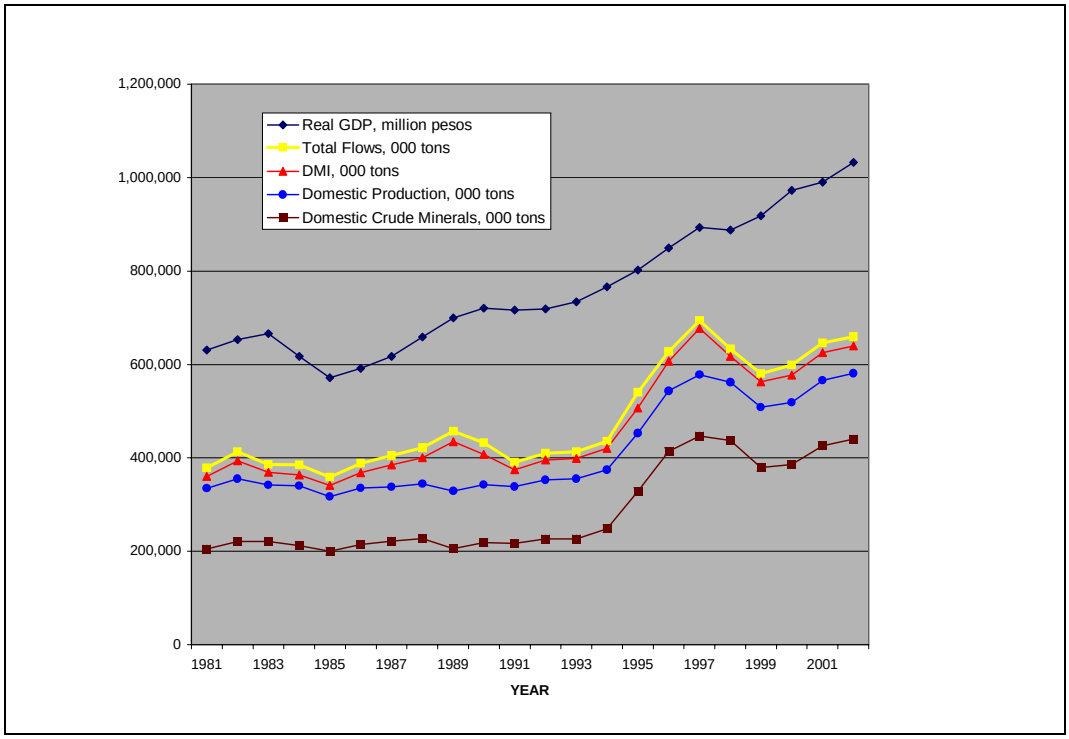
DMI – domestic material input
DP – domestic production
DCM – domestic crude minerals
ICF – imported crude fossil materials
DB – domestic biomass
IFP – imported final products
IB – imported biomass

Of all the major material flows in Figure 32, domestic production had the shape with the least deviation from that of real GDP. This is also borne out by the high correlation coefficient between the two series (Table 20). At the very least, this result implies that, under Philippine conditions, the trend in real GDP will give us a very close idea of the shape of the domestic production curve and vice versa. The trends in total flows and domestic material input (DMI) are also very close approximations of the shape of the real GDP curve. Among the import variables, imported biomass had a high correlation with GDP. Among the import variables, imported biomass had a high correlation with GDP.

Figure 33 contains the two main determinants of domestic production – domestic crude minerals and domestic biomass, and four major economic performance indicators. The graphs show that GDP, PCE, new construction and gross capital formation had trends that are closely similar to those of the material flows. Furthermore, Table 20 shows that these variables are highly and positively correlated with each other.

The trends in real GDP, new construction and gross capital formation also showed very high graphical and statistical correlation with imported biomass and imported fossil materials (Figure 34). These two imports constituted 44% of all imports during the period.

Figure 32. Comparative trends among GDP and the major material flows, 1981 to 2002

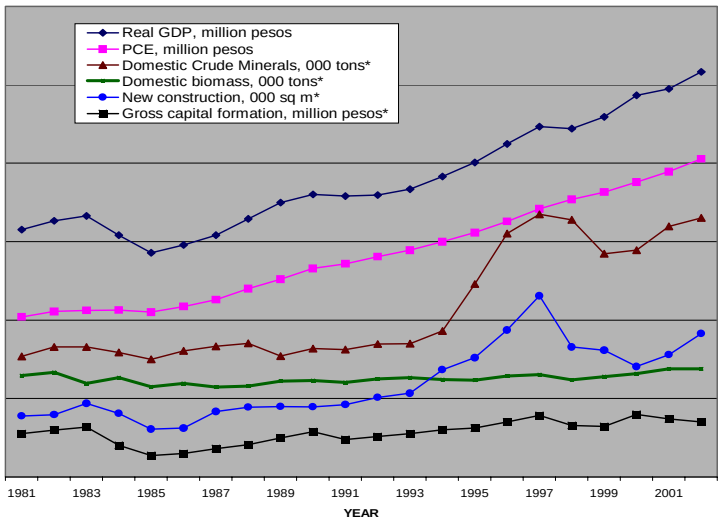


The results above imply that at this stage of the Philippines' development, the trends in its macro-economic indicators of performance may be described by the trends in its major material flows. Table 19 shows that real GDP is almost perfectly correlated with the GVAs of manufacturing, agriculture, and ownership of dwellings and real estate.

Table 19. Correlation coefficients between trends in macro-economic indicators and in real GDP, 1981 to 2002

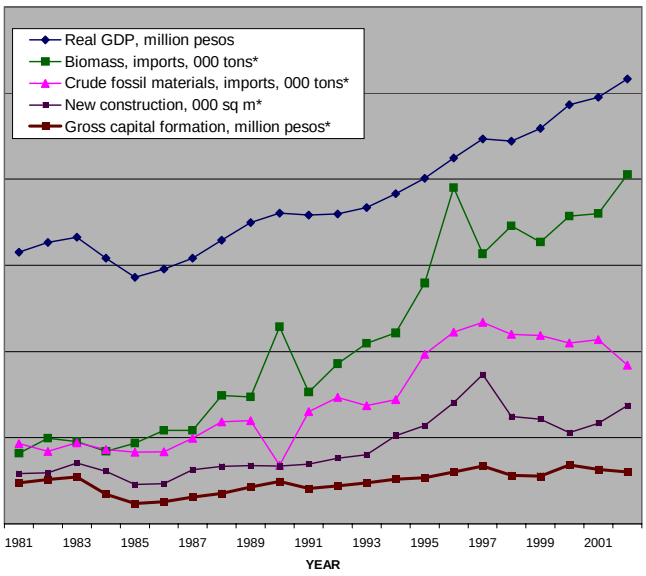
Indicator	Real GDP
GVA, Manufacturing	0.997
GVA, Trade	0.989
GVA, Transportation, Communication, Storage	0.976
GVA, Agriculture	0.972
GVA, Ownership in Dwellings	0.962
GVA, Construction	0.801
GVA, Mining	0.135
Personal Consumption Expenditure	0.991
Total Labor Productivity	0.741
New Building Construction	0.755
Gross Capital Formation	0.879

Figure 33. Trends in major economic indicators and main material flows, 1981 to 2002



*Values had been scaled. Hence, graphs show actual and original trends but not the original values.

Figure 34. Trends in major economic performance indicators and in flows of imported materials



*Values had been scaled. Hence, graphs show actual and original trends but not the original values.

These major contributors to real GDP are also very highly correlated with the main components of total material flows (Table 20).

Table 16 contains the relative proportions of the major material flows to total flows. The relative contributions of each sector or industry to real GDP, on the other hand, are shown in Table 17. Main material flows and the major determinants of real GDP were correlated graphically and statistically (Table 20).

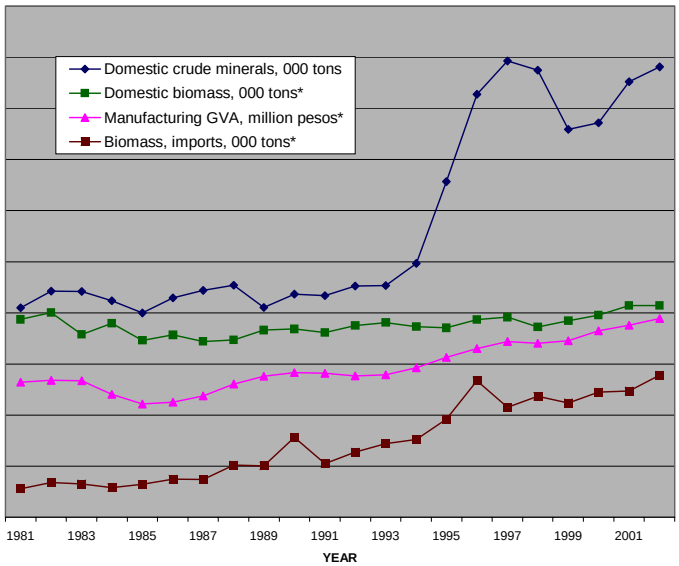
Manufacturing GVA has a very high positive correlation with domestic crude minerals, domestic biomass and imported biomass. All of these flows are main determinants of the total flows in the country from 1981 to 2002 (Table 18). In Figure 35, the shape of the manufacturing GVA curve is especially similar to that of biomass imports and domestic crude minerals.

Table 20. Correlation coefficients among material flows, real GDP, real GVA and labor productivity, 1981 to 2002

	Manufacturing		Agriculture		Construction		Mining		Dwellings	Trade	Transport	Economy
	GVA	Prod*	GVA	Prod*	GVA	Prod*	GVA	Prod*	GVA	GVA	GVA	GDP
DMI	0.91	0.69	0.83	0.60	0.83	-0.38	-0.02	0.54	0.90	0.90	0.88	0.89
Domestic production	0.94	0.67	0.86	0.59	0.81	-0.46	-0.01	0.60	0.94	0.90	0.89	0.92
Domestic crude mineral materials	0.92	0.66	0.84	0.57	0.81	-0.46	-0.03	0.58	0.93	0.90	0.88	0.91
Domestic biomass	0.88	0.62	0.94	0.72	0.62	-0.42-	0.24	0.65	0.81	0.66	0.68	0.89
Imported biomass	0.93	0.70	0.87	0.60	0.93	-0.42	0.04	0.70	0.93	0.96	0.92	0.92
Imported crude fossil materials	0.79	0.36	0.71	0.42	0.79	-0.46	-0.28	0.42	0.86	0.87	0.82	0.78
Imported crude mineral materials	0.67	0.52	0.65	0.66	0.67	-0.22	-0.29	0.29	0.61	0.76	0.70	0.64
Imported final products	-0.24	0.08	-0.26	-0.002	0.24	0.54	0.03	-0.39	-0.31	0.06	0.04	-0.28

*Labor productivity

Figure 35. Comparative trends of manufacturing GVA and of flows of domestic biomass, domestic crude minerals and imported biomass, 1981 to 2002



*Values had been scaled. Hence, graphs show actual and original trends but not the original values.

Labor productivity in manufacturing is moderately correlated with DMI, domestic production, domestic crude minerals, domestic biomass and imported biomass. Its trend, however, is closest to that of imported biomass and DMI (Table20).

In general, labor productivity in agriculture had a very similar trend with DMI, domestic biomass, imported biomass and imported crude mineral materials (Figure 36). Its shape is closest to domestic biomass and imported crude minerals. This might mean that when domestic biomass production and importation of crude minerals increase, labor productivity in agriculture also increases.

The close similarities in the trends of imported crude minerals and labor productivity are probably due to imported crude fertilizers. These results could be interpreted as saying that when labor productivity in agriculture increases, there is a concomitant increase in crude fertilizer importation and domestic biomass production and vice versa.

GVA in agriculture is very highly correlated with DMI, domestic production, domestic mineral materials, domestic biomass, and imported biomass (Table 20). It is also highly correlated with labor productivity in the sector. In Figure 37, aside from the labor productivity

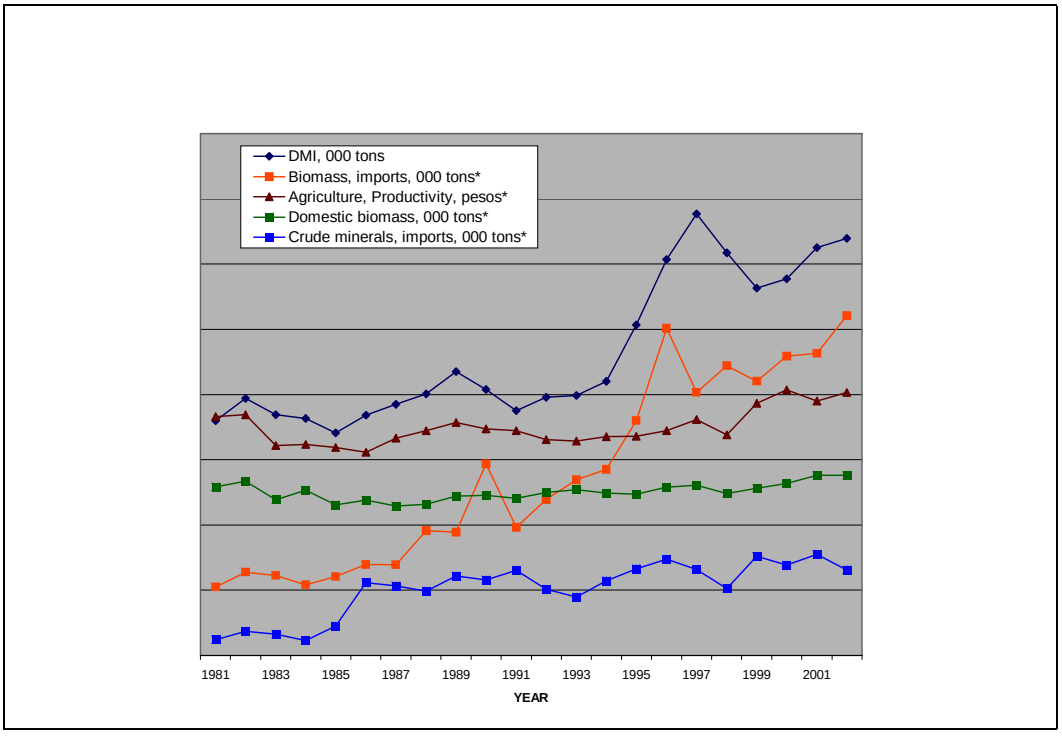
curve, GVA in agriculture's curve is most closely similar to that of domestic biomass. In fact, the correlation coefficient between agriculture GVA and domestic biomass is quite high (0.94). This implies that, given the shape of the domestic biomass, the trend in agriculture GVA may be described with some confidence.

The trend of trade GVA is very similar to those of domestic production, manufacturing GVA, and imported biomass. Both manufacturing and trade GVAs are very highly correlated with imported biomass and domestic production. Imported biomass, however, has the trend that is closest to that of trade (Figure 38).

Construction GVA trends are highly correlated with DMI, domestic crude minerals, imported biomass and imported crude fossil materials (Figure 39). Productivity in the sector, however, is not significantly correlated with material flows (Table 20).

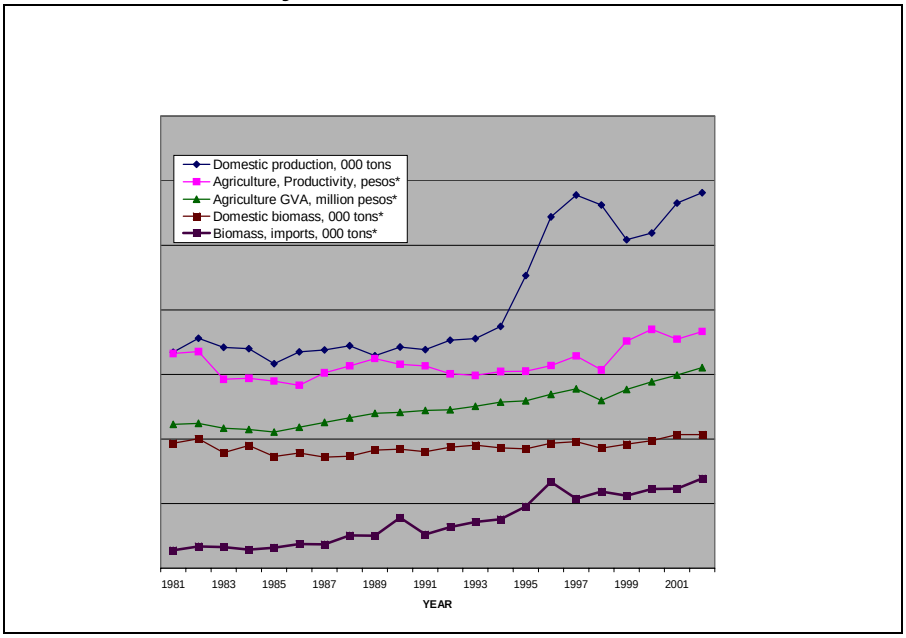
The trend in the GVA of ownership of dwellings and real estate is almost exactly like that of domestic crude mineral production (Figure 40). This is because the main crude mineral product was sand and gravel that are main inputs to construction of dwellings. Dwellings GVA also has a very high positive correlation with domestic production (because crude mineral production is the latter's main component), imported biomass and imported crude

Figure 36. Comparative trends in labor productivity in agriculture and major material flows, 1981 to 2002



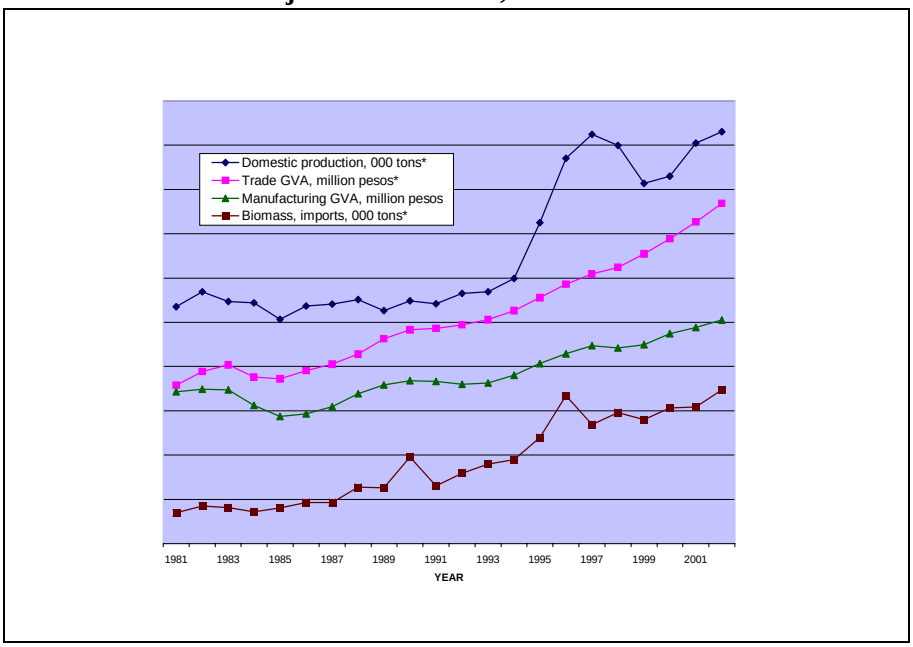
*Values had been scaled. Hence, graphs show actual and original trends but not the original values.

Figure 37. Comparative trends among agriculture labor productivity, GVA and major material flows, 1981 to 2002



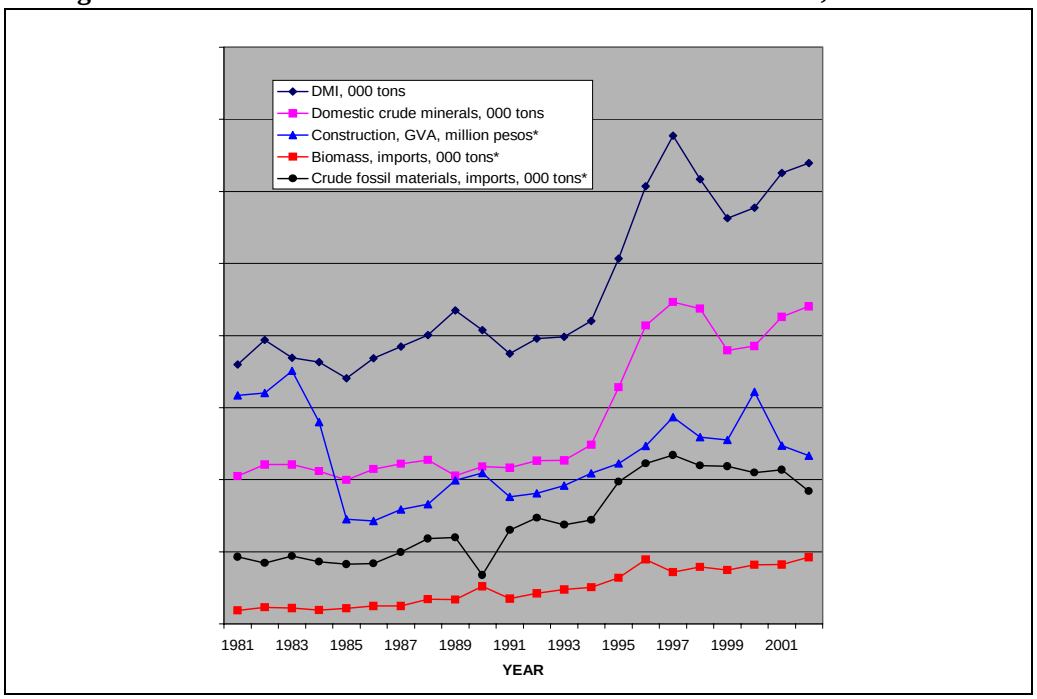
*Values had been scaled. Hence, graphs show actual and original trends but not the original values.

Figure 38. Comparative trends in GVA in trade and manufacturing and major material flows, 1981 to 2002



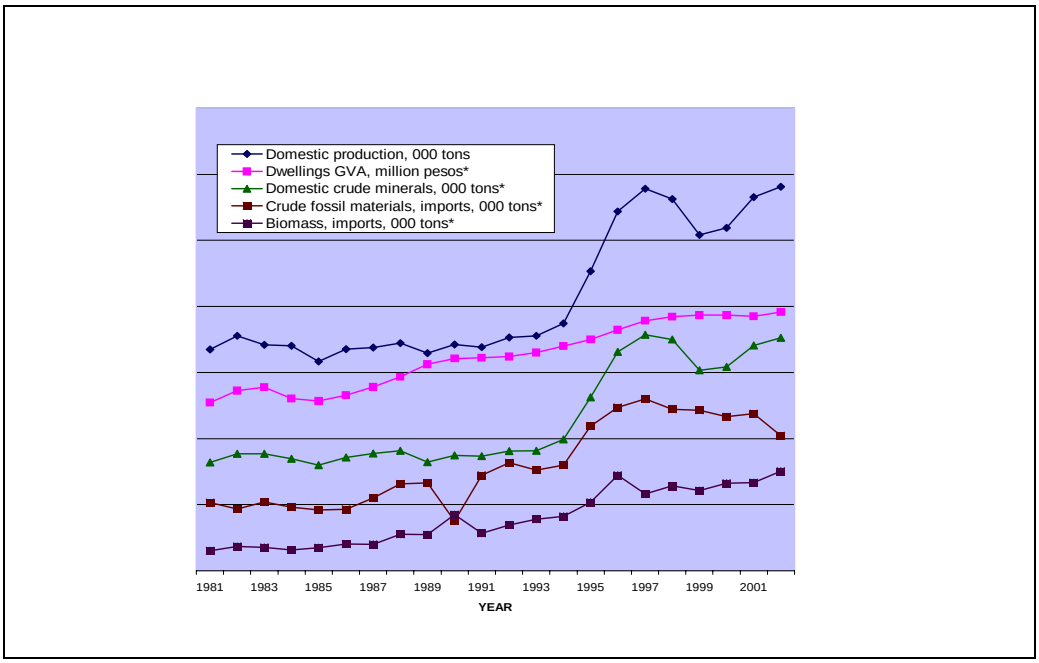
*Values had been scaled. Hence, graphs show actual and original trends but not the original values.

Figure 39. Trends in construction GVA and main material flows, 1981 to 2002



*Values had been scaled. Hence, graphs show actual and original trends but not the original values.

Figure 40. Trends in GVA in ownership of dwellings and in material flows, 1981 to 2002



*Values had been scaled. Hence, graphs show actual and original trends but not the original values.

fossil materials. Because of the very high correspondence between the trends of domestic crude minerals and the GVA in dwellings, it can be said that the trend in domestic crude mineral production is a very good indicator of the trend in ownership of dwellings and real estate.

As shown in Table 20, total labor productivity has low correlation with all material flows. Even among sectoral labor productivity values, correlation with all material flows was rather low.

E. Indicator Values from Material Flows, 1981 to 2002

1. Input Indicators

Table 16 and Table 18 show the relative composition of total material flows in the Philippines during the period of study. Out of the total flows, exports constituted four percent, domestic production, 86 percent, and imports, 10 percent. This means that of the total material volume that went into the economy, only four percent left the Philippines' domestic environment.

Domestic material input (DMI) was 90 percent domestic production and ten percent imports. It was dominated by sand and gravel (46 percent), gold and silver ores (19 percent), and domestic biomass whose top ten crops amounted to 26 percent of domestic production. The foregoing materials made up 91 percent of domestic production during the period of study.

Imports, on the other hand, were dominated by final products whose top 10 imports composed 45 percent of all imports. These products were specialized machinery for specific industries and power generation, manufactured fertilizers, petroleum products, electrical machinery, road vehicles and chemicals.

Crude fossil materials constituted 31 percent of all imports while biomass made up 12 percent. Of these biomass imports, 81 percent is of food biomass, equal to 10 percent of all imports. Thus, 86 percent of imports are composed of machinery and manufacturing-related items (45 percent), crude energy materials (31 percent), and food (10 percent).

In terms of per capita material flows (Figure 41), the per capita DMI and DMC from 1981 to 1995 ranged from just a little below six tons to as much as seven and a half tons per year. Since 1995, however, both curves have risen sharply, reaching the highest point of 9.49 tons per capita DMI and 9.25 tons per capita DMC in 1997. Both curves have since gone down but their year 2002 values (8.1 tons and 7.9 tons, respectively) are higher than corresponding values in 1995 by almost a ton per person.

Figure 42 contains the per capita values of specific domestic material inputs (that is, domestic production and imports combined). Biomass per capita inputs had been generally

Figure 41. Trends in per capita DMI and per capita domestic material consumption, 1981 to 2002

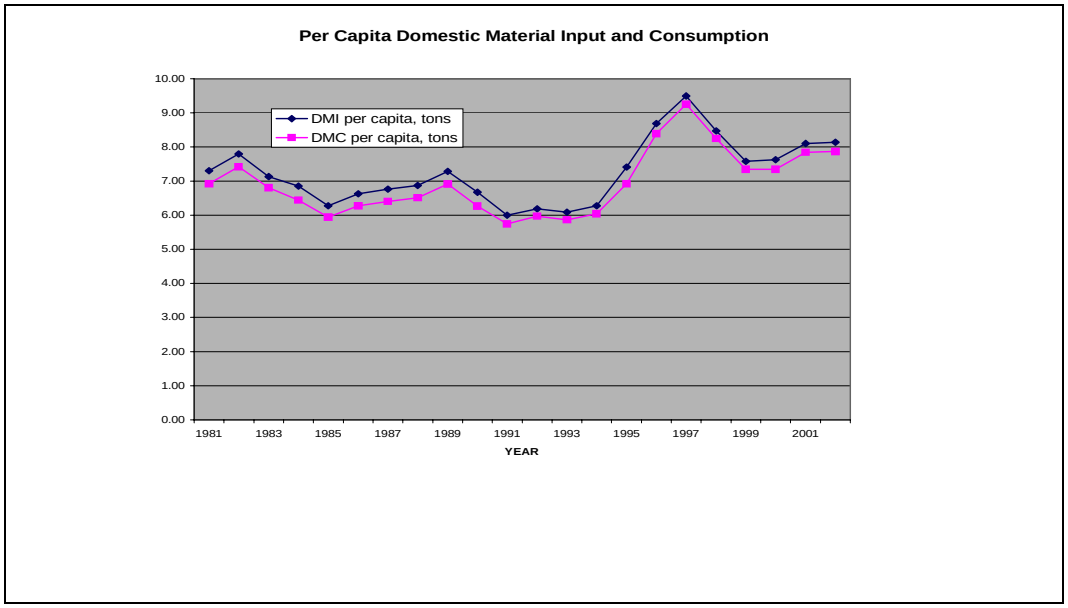


Figure 42. Trends in per capita domestic inputs of major material flows, 1981 to 2002

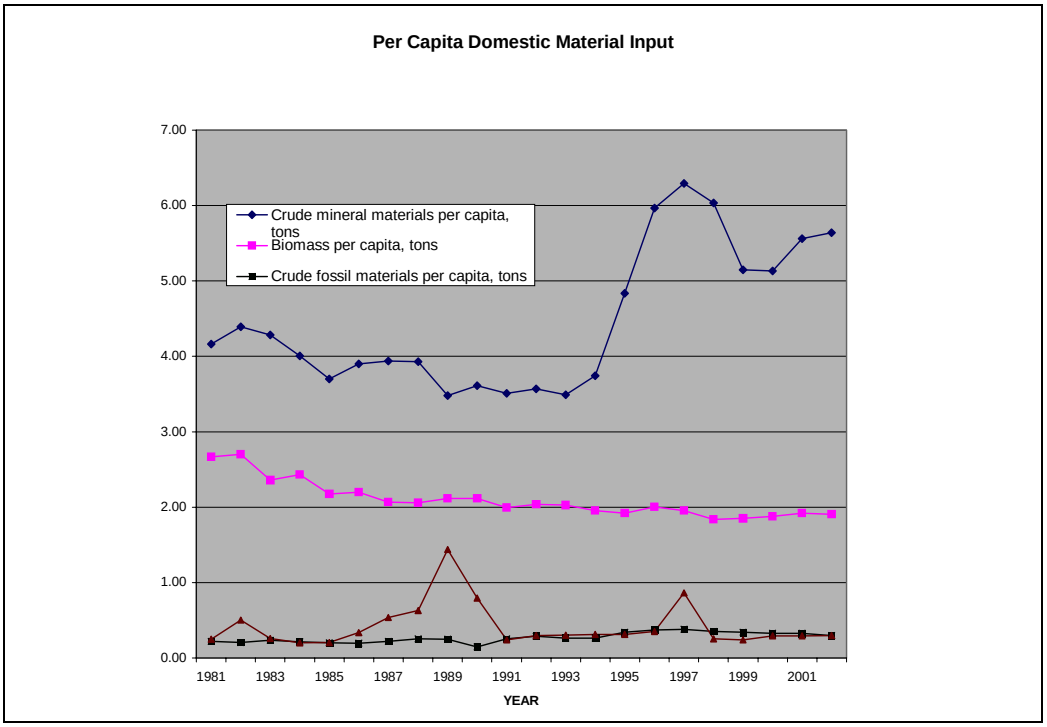
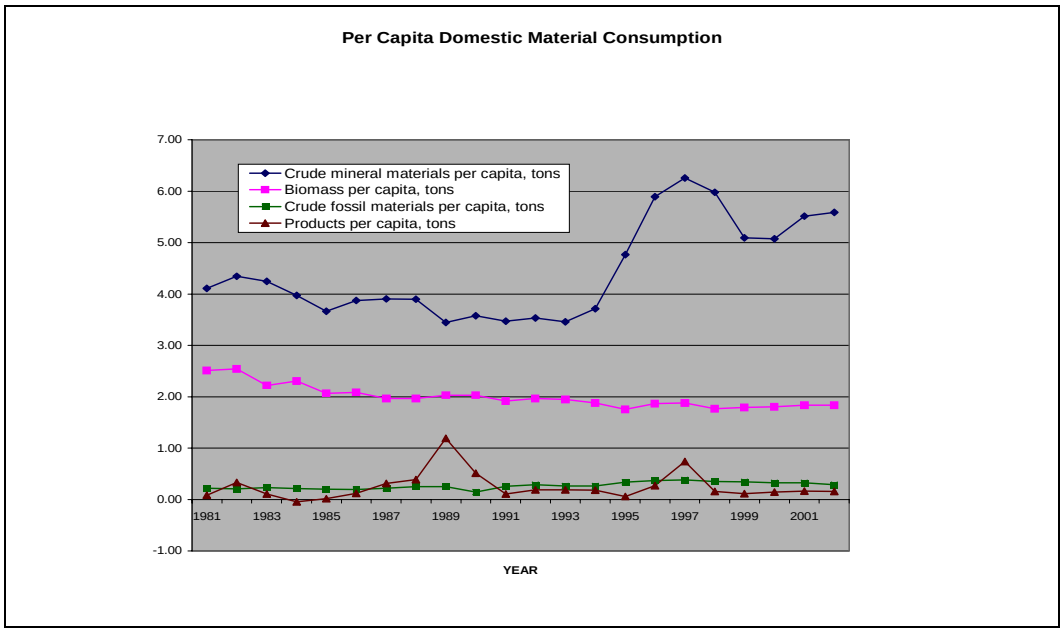


Figure 43. Trends in per capita consumption of major material flows, 1981 to 2002



decreasing with the period from 1998 to 2002 showing an extremely slight increasing trend. Crude minerals, especially sand and gravel and gold and silver ores, had decreasing trends since 1981 until 1995. In 1995, they showed sharp increases per year. Crude minerals are still showing an increasing trend since year 2000.

Final products have maintained a more or less uniform and stable trend except during the years when certain government programs were implemented vigorously. For example, in 1989, the government vigorously promoted industrial growth, thus machinery and similar products had a tremendous upsurge. In 1997, road vehicles were imported in high numbers because of the planned phase out of dilapidated vehicles in line with the government's environmental (clean air) program.

Crude fossil materials, specifically imported crude petroleum oils, had been steadily increasing until 1997 and had been decreasing since then.

As can be seen in Figure 41, the trend in DMC per capita follows closely the trend of DMI per capita. This is also true with the per capita DMC of specific material flows (Figure 43).

Figure 44 compares the trends of biomass imports and exports. Imports had been continuously increasing with two very pronounced peaks (1990 and 1996). Exports on the other hand had been decreasing with one extreme spike in 1995.

On the other hand, both imports and exports of crude mineral materials have increasing trends throughout the period of study (Figure 45). Exports have risen sharply in 1995 and

Figure 44. Trends in imports and exports of biomass, 1981 to 2002

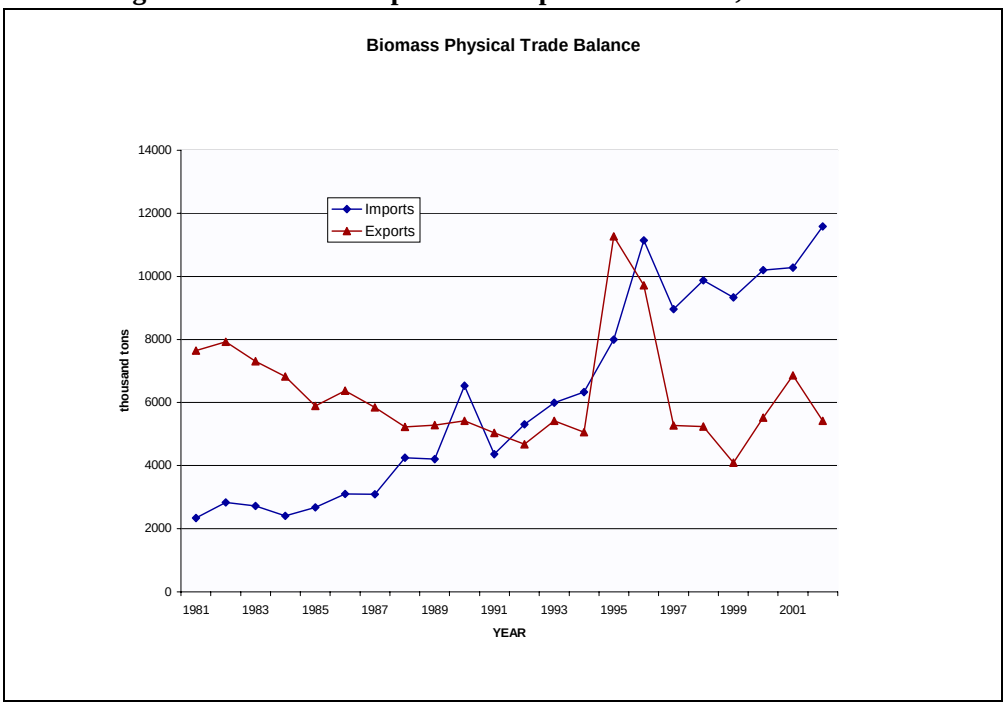


Figure 45. Trends in imports and exports of crude mineral materials, 1981 to 2002

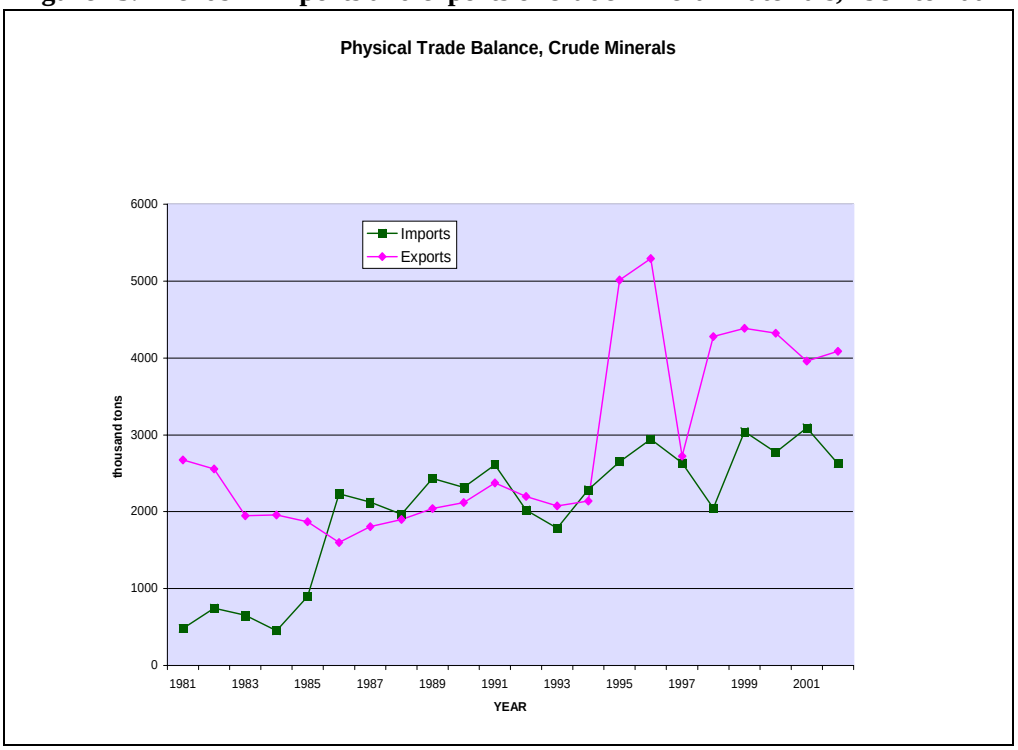
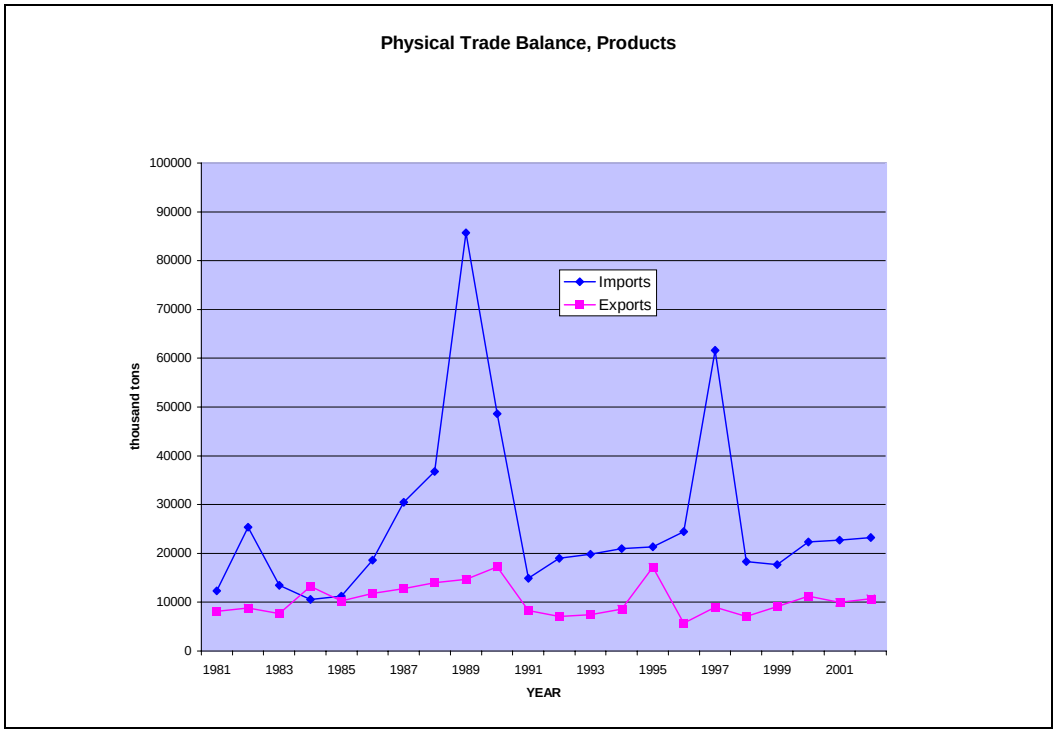


Figure 46. Trends in imports and exports of products, 1981 to 2002



1998 and have not gone down since. Imports, meanwhile, rose and fell almost every year.

Not counting the years when extreme import activities (1989 and 1997) or export activities (1990 and 1995) occurred, both imports and exports of products have generally stable trends. In almost all years, import volumes were higher than export levels.

2. Efficiency Indicators

The direct material intensity index (DMII) for the economy is the ratio of DMI to GDP. It indicates the amount of materials used per unit GDP. In this report, the efficiency indicators were computed using a three-year moving average in order to smoothen out extreme points and at the same time, hopefully adjust for business cycles.

Except for the period 1995 to 1998, overall DMII had been moving around the general area of 610 tons of material per million pesos in GDP. The highest DMII was 723 tons per million pesos. In 2002, it had gone down to 614 tons but it is again showing a slight increasing trend (Figure 47).

In each sector, DMII is the ratio of DMI to sectoral GVA. The sectors of ownership in dwellings and construction had been using the most material mass per one million pesos of

their GVA. Both sector DMIIs were also showing definite increasing trends in the last two years. Trade, agriculture and manufacturing had decreasing DMII from 1998 to 2001. All sectors had increasing trends in direct material intensity indices such that these values were higher in 2002 than they were in 1981.

Similar calculations and graphs had been constructed for domestic production intensity indices or DPII (Figure 48). Results from DPII analysis are essentially the same as those from DMII.

The ability of the economy to convert direct material flows to GDP is measured by the direct resource productivity index (DiRPI). These measures are shown in Figures 49 and 50. DiRPI is the ratio of GDP (or GVA) to DMI. Figure 49 shows that the overall economy DiRPI had a generally decreasing trend despite the fact that there was a cyclical increasing trend followed by a decreasing trend every four or five years. The resource productivity index seemed to stabilize around 1.62 million pesos of GDP per one thousand tons of direct material input.

The resource productivity indices for manufacturing and agriculture are showing definitely decreasing trends despite the rather cyclical dips and peaks every four or five years (Figure 50). In both sectors, the indices in 2002 had much lower values than those in 1983 or

Figure 47. Trends in 3-year moving average direct material intensity indices for major sectors of the economy, 1983 to 2002

Figure 48. Trends in 3-year moving average domestic production intensity indices of major sectors of the economy, 1983 to 2002

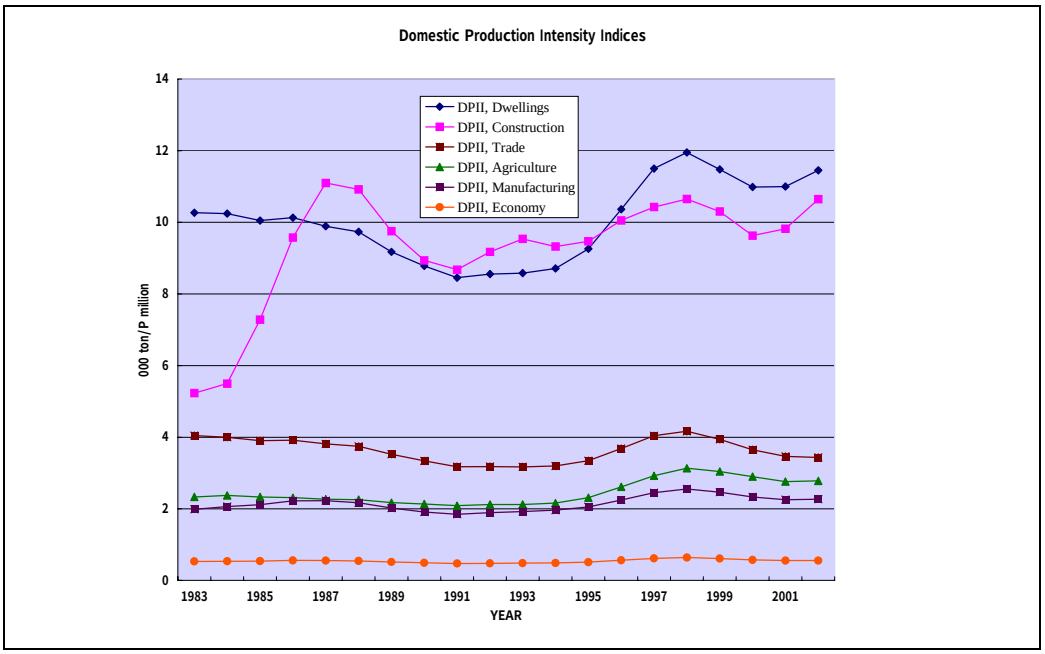


Figure 49. Trend in 3-year moving average direct resource productivity index of the economy, 1983 to 2002

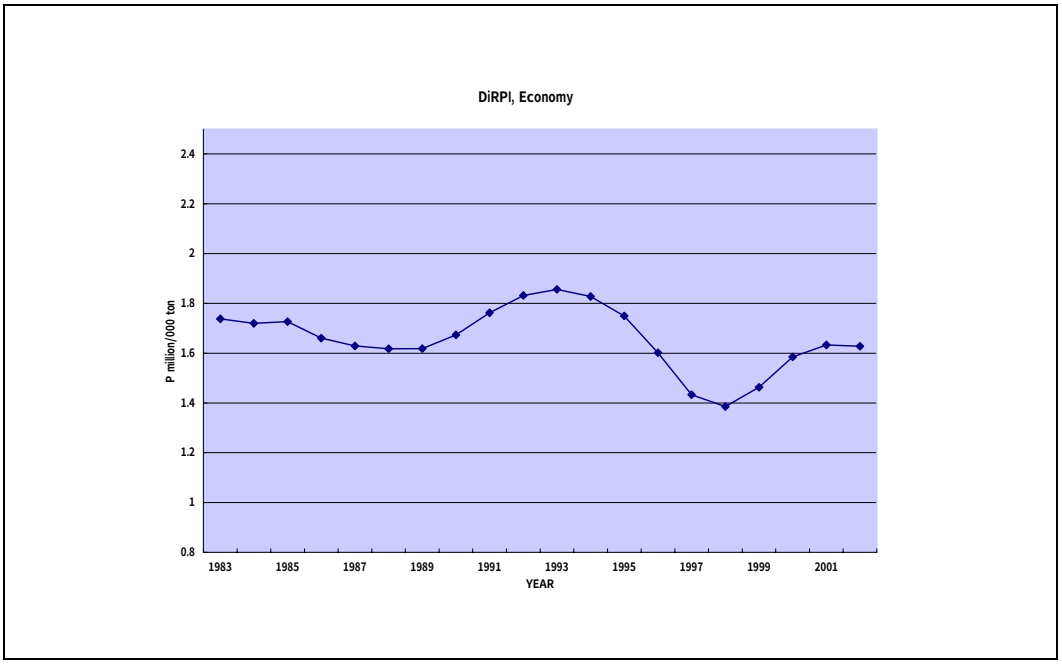


Figure 50. Trends in 3-year moving average direct resource productivity indices, 1983 to 2002

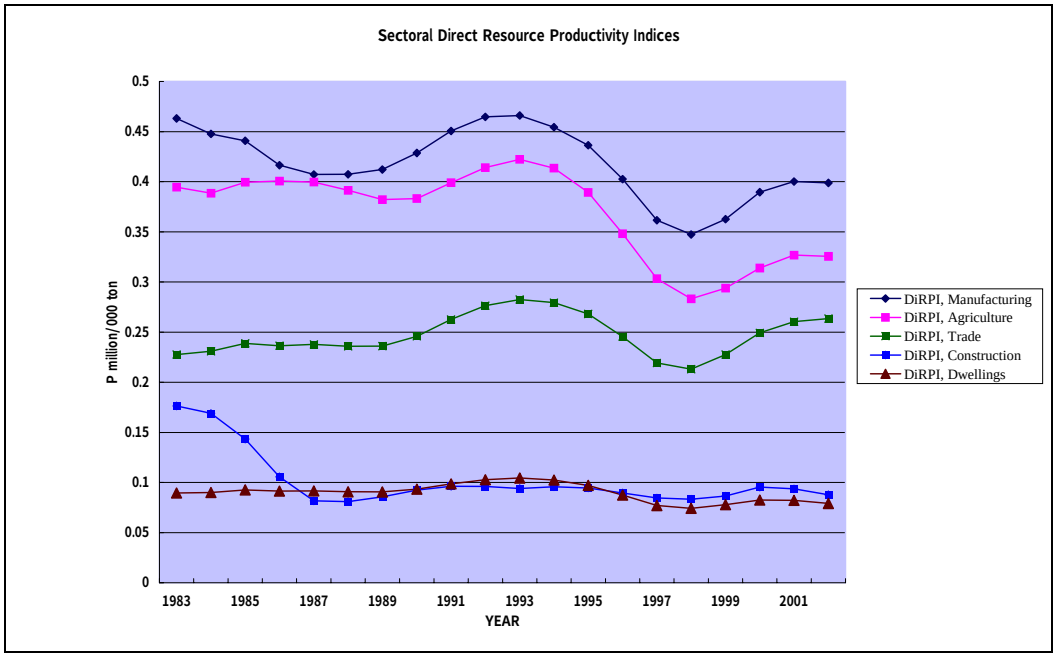
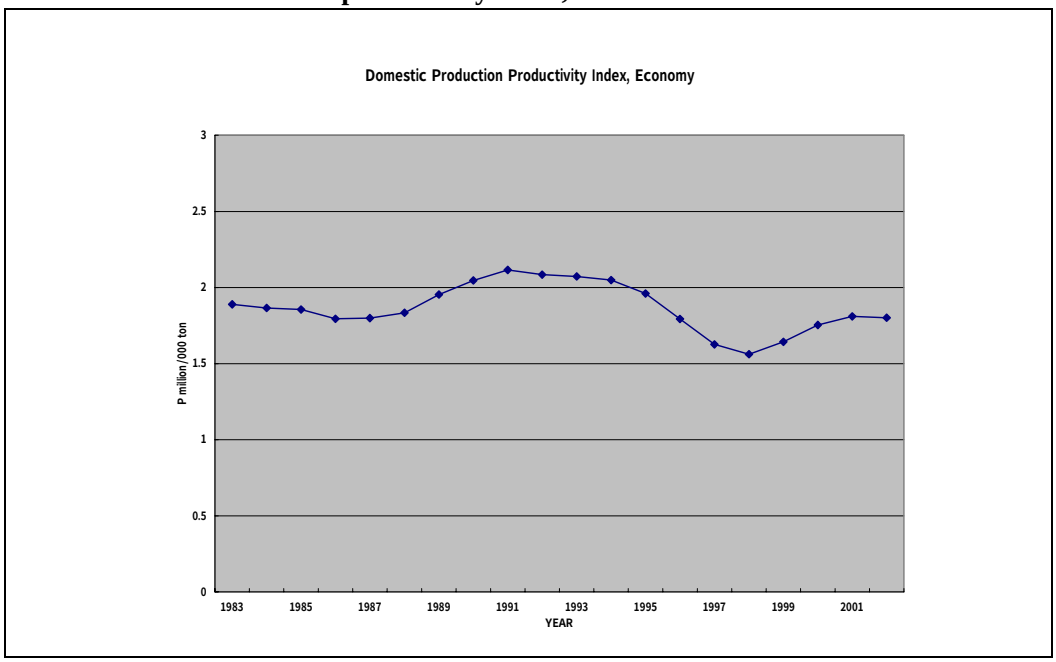


Figure 51. Trend in the economy's 3-year moving average domestic production productivity index, 1983 to 2002



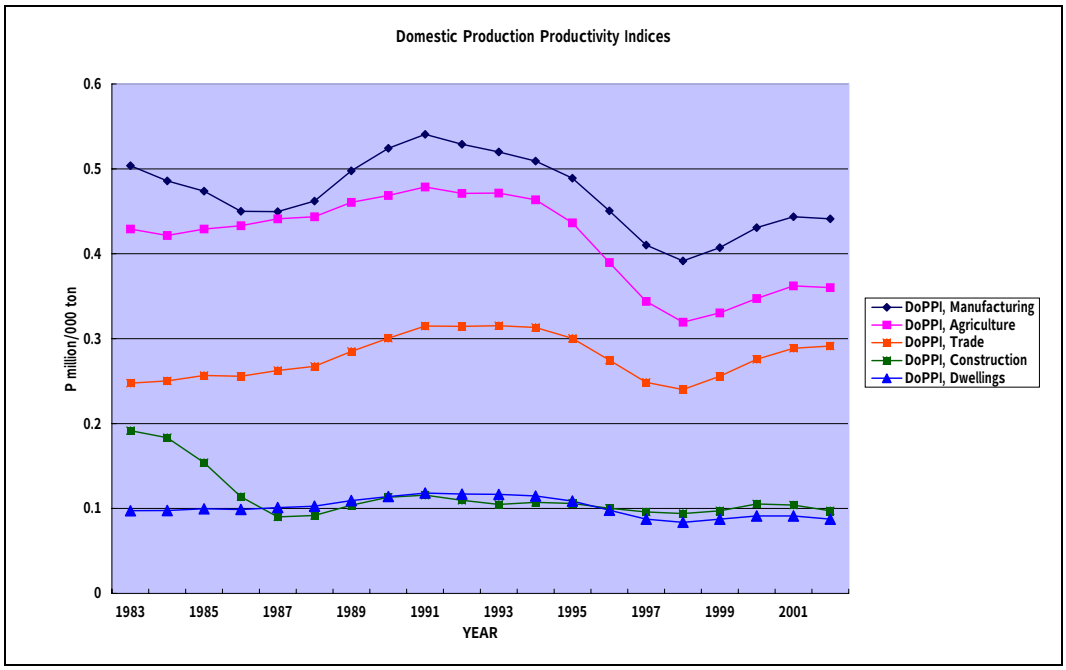
as recently as in 1993. While increasing since 1998, the trends of these two curves had again started to show a decline since 2001.

This was also the pattern of construction and dwelling ownership. The trade sector was the only one with a more or less stable trend and one that had been continuously increasing since 1998.

Throughout the period of study, manufacturing had the highest resource productivity index, followed by agriculture. These values were 0.399 million pesos per thousand ton and 0.325 million pesos per thousand ton, respectively, in 2002. The lowest indices were those of construction and ownership in dwellings and real estate.

As with the case of material intensity, the results of computations with domestic production productivity indices (DoPPI in Figure 51 and 52) are essentially the same as those of direct resource productivity indices (DiRPI).

Figure 52. Trends in 3-year moving average domestic production productivity in some sectors of the economy, 1983 to 2002



F. Sustainability Implications

Implicit to the process of material flow accounting is the objective of making society's metabolism or economic development sustainable. Material flow accounting may be used as a

tool in promoting this sustainability. It provides information on what and how much materials are used as inputs and produced as outputs by the society at a given time. It also provides data on the provenances and final destinations of these materials.

From this information, one may determine whether inputs of specific types, qualities and amounts can be supplied in a sustained manner by the society's domestic environment and by sources outside of its borders. It is also possible to determine whether the domestic environment's carrying capacity for outputs from society's metabolism is being sustained or threatened.

A society that extracts and uses resources in ever increasing amounts will output into its domestic environment either additions to society's stocks or pollutants into its air, water and land, also in ever increasing amounts. Clearly, the sustainable path would be one where economic growth (or growth in GDP) proceeds but extraction of virgin inputs is minimized so that potential output to the environment is also minimized. This path implies recycling and high levels of efficiency in production and utilization.

Philippine data showed that 96 percent of all materials used as inputs to society's metabolism from 1981 to 2002 did not leave the domestic environment. They stayed domestically in the form of addition to society's stocks of livestock, infrastructure or other manmade artifacts, dissipative uses (examples are pesticides, fertilizers, seeds), or pollutants to air, water or land. There are no statistics on the total recycled volume of materials in the country. The concept is not new but it was only during the last few years that government actively promoted the practice. This was in support of the Clean Air Act of 1995.

Meanwhile, a full 90 percent of metabolic inputs during the period from 1981 to 2002 came from domestic production whose main components (amounting to 91 percent of domestic production) were sand and gravel (46%), gold and silver ores (19%) and biomass (26%). Extraction and utilization of sand and gravel impose long-term changes that would be impossible to reverse at reasonable costs to the quarry sites as well as the construction sites. Once made part of infrastructure, sand and gravel cannot be recycled profitably.

The gold mining industry in the Philippines has had several environmental incidents. Most of the reported cases involved mine tailings and mercury contamination of rivers. There was even one reported case where rice fields got contaminated with mercury used for gold extraction.

The top ten biomass crops for the period were responsible for 87 percent of all biomass production. Economic production of five of these crops (sugarcane, palay, banana, corn, and fresh vegetables) favors monoculture and the high use of chemical inputs.

The increasing preference for monoculture has implications on biodiversity and sustainability of the gene pool. In addition, there had been sporadic complaints about groundwater and ambient air contamination with pesticides in areas where fresh vegetables are extensively grown. In areas where banana is grown extensively, residents had been reporting a host of skin and respiratory disorders, even sterility among males, allegedly

caused by exposure to the chemical sprays being administered liberally on banana crops by small planes.

A different set of five crops (sugarcane, coconut, grazing, fruits other than specified ones, and banana) needs extensive land requirements on a long term basis. Production levels of many of these crops had been increasing albeit slowly during the last decade. Continued production at increasing levels of these crops would exert greater pressure on the already scarce land resources that could hardly provide for the other needs of a population that has one of the highest growth rates in the region. As reported by Frank Cimatu (2002), the country had the third highest population growth rate at 2.2% among the 20 most populous countries in the world in 2002.

Imports constituted 10 percent of material inputs to the economy. A large part (86%) of these imports was composed of machinery and chemicals for manufacturing and industries (45%), energy materials (31%), and food biomass (10%). The country also exported similar articles but net imports of machinery and energy were substantial. The country had more biomass exports than imports, although this difference was only about 1.82 million tons.

Thus, imports during the period of study seemed to have contributed largely to additions to stocks, dissipative uses and air pollution. In addition, the imported materials did not offer much potential in terms of recycling.

The overall direct material intensity index (DMII) showed a very slight average increase through time while the indices for ownership in dwellings and the construction sectors had been increasing significantly especially during the last decade. Direct resource productivity (DiRPI) had a generally decreasing trend in all sectors, including the overall economy. There were periods when DiRPI increased but these were followed by comparatively more severe decreases such that resource productivity indices of all sectors in 2002 were just more or less equal to their 1981 values. In some sectors, including the overall economy, one thousand tons of input materials in 2002 could produce less GDP than it could in 1981, the improvements in the same resource productivity indices during the intervening years notwithstanding.

This observation may be interpreted in two ways. First, that the economy has not developed efficiency in its use of materials in achieving economic gains. Second, that the resource materials themselves have become less productive. Either way, the results spell serious implications on sustainability of society's metabolism and development.

G. Country Comparisons

Comparative per capita values for specific domestic material inputs (DMI) and domestic material consumptions (DMC) of highly industrialized countries and the Philippines are shown in Table 21 and Table 22, respectively.

Table 21. Per capita domestic material inputs of five countries in 1991

(in tons per person)

Material Flow	USA	Japan	Germany	Netherlands	Philippines
Overall DMI	20	17	22	38	6
Biomass	4	2	3	12	2
Fossil fuel	8	3	6	15	0*
Sand, gravel/Construction material	7	9	10	7	2
Semi-manufactures/Products	0	1	2	3	0*

*Zero values mean less than 0.5 ton.

Sources: Data for the Philippines are from the author's calculations. All other data are from Table 1 and Table 2 of Adriaanse et al (1997), pages 23, 24 and 25.

Table 22. Per capita domestic consumption of materials in seven countries, 1991

(in tons per person)

	Austria	Germany	Japan	Nether-lands	USA	UK	Philip-pines
Biomass	4.8	2.6	1.5	4.3	3.0	1.5	1.9
Minerals	10.6	10.7	11.8	5.9	8.0	5.3	3.5
Fossil fuels	3.0	6.2	3.3	6.4	7.7	4.2	0.2
Products	0.1					0.2	0.1
Overall DMC	18.5	19.5	16.6	16.6	18.7	11.1	5.8
Population (millions)	7.8	80.0	124.0	15.0	252.8	57.8	62.5

Source: Philippine data are from the author's own calculations. All others are from Schandl and Schulz (2002) in Ayres and Ayres, 2002 (Table 26.6, page 332)

Overall DMC and DMI figures for the Philippines are very significantly below those of highly industrialized countries. However, the consumption figures for biomass and final products as well as inputs of final products are more or less within the same range. Results from similar studies on other developing countries are needed in order to make definite conclusions about these observations. Off hand, one may conclude that these figures might be reflecting what Schandl and Schulz (2002) called characteristic profiles of societies' metabolism.

Tables 21 and 22 show that industrialized countries have very high per capita input and consumption of minerals and energy. Industrialized economies apparently do not outgrow the need for construction materials. Just like a developing country, the highest per capita consumption of industrialized countries was of construction materials. They differed in that

industrialized countries consumed so much more of this material than did their developing counterpart. In addition, it is notable that the per capita consumption of fossil fuels by the Philippines is just a drop in the barrels that industrialized countries consume.

Industrialized countries' per capita consumption of fossil fuels is much higher than their consumption of biomass, Austria being the exception. The Philippines on the other hand had a much greater per capita consumption of biomass (mainly food biomass) than of fossil fuel.

However, it is interesting to note that per capita consumption and input of biomass and of final products in developing countries are somewhat close to those in industrialized countries. One is tempted to conclude that this is probably due to the universal phenomenon of limited stomach capacities and storage spaces. In other words, there are physical constraints to further increases in per capita consumption of food and personal belongings. These physical constraints seem to be absent in the consumption of energy and mineral materials.

CONCLUSIONS

The major domestically produced material flows in the Philippines from 1981 to 2002 were sand and gravel, gold and silver ores, and biomass that was mainly for food. Main imports into the country at that period were machinery and chemicals for manufacturing and for specialized industries, crude fossil materials and other energy carriers, and food biomass. Majority of exports were composed of electronics and electrical machinery and parts, vegetables and fruits, fixed vegetable oils and fats (mainly coconut-based), sugar and sugar preparations, ores and concentrates other than iron ore, and other crude minerals.

The sum of domestic production and imports, called DMI or domestic material input, constituted 96% of total flows. Graphical and statistical correlation analyses showed that the trends in DMI were very closely similar to the trends in real gross domestic product (real GDP) during the same period. Analyses also showed that trends in domestic production were closer to the trends in economic indicators than those of DMI.

All the major material flows had trends that were highly and positively correlated, statistically and graphically, with the trends in GVA of major sectors (manufacturing, agriculture and trade) of the economy. Thus, it may be concluded that trends in material flows in the Philippines during the period of study may be used to describe the trends in major macro-economic indicators.

Because of unavailability of data on hidden flows associated with DMI, sustainability indicators similar to the ones suggested by Adriaanse et al. (1997) and Matthews et al (2000) could not be estimated. This study was able to calculate sustainability indicator values that were based on DMI only. Trends in the direct material intensity index (increasing DMII) and the direct resource productivity index (decreasing DiRPI) seem to indicate that either the economy has not developed efficiency in resource utilization or the resources themselves have become less productive.

An analysis of the extractive and use characteristics of the major components of the DMI showed that there was a consistently high throughput with also a consistently low potential for and actual efforts at recycling. The main domestic product (sand and gravel and biomass could hardly be recycled at reasonable cost. The main flows from imports did not offer potentials for recycling either. The rest of the biomass inputs need large tracts of land and/or high chemical inputs for production. Hence, their continued production at increasing levels would compete for the fixed land base and would impose environmental degradation through air, water and land contamination.

The foregoing observations lead to the conclusion that society’s metabolism during the period of study did not indicate a move toward sustainability, especially in view of the fact that hidden flows and the associated environmental impacts of these flows were not factored in the analysis. This conclusion, however, should be viewed in the appropriate context. Per

capita values of DMI and DMC in the Philippines are quite low in comparison to corresponding values from developed and industrialized economies. As recently as 2002, per capita DMI and DMC of the Philippines were 8.14 tons and 7.87 tons, respectively.

The trends in material flows must be because the country is still developing and is actively pursuing industrialization. Because of this, machinery and other resources for industries and manufacturing are required. In order to attract capital, transport, communication and building infrastructure have to be made available. Hence, the high demand for sand and gravel, and incidentally, for limestone. This demand is exacerbated by the particular condition in the country where one out of every ten households has a member who is working overseas (Coronel, 2002). To these families, having a house of their own that shows off their new financial capability is second only to the primordial desire of affording a college education for all their children.

The economy can not choose not to engage in large scale fruit and vegetable-growing. These crops have a large worldwide demand and the country needs the foreign exchange generated by exports of these products.

Based on the foregoing observations, the trends in material flows in the Philippines from 1981 to 2002 suggest that sustainability of metabolism and development cannot come from direct adjustments to the material flows alone. Resource productivity, or its inverse, utilization efficiency, has to increase. Recycling, in terms of volume and types of materials, has to increase significantly. But, alongside all these, demand for everything, including land for housing and infrastructure, has to decrease. This means that the government should more actively study the implications of its population program strategies.

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APPENDICES

APPENDIX A – Material Flow Accounts of the Philippines, 1981 to 2002

Table A.1. Material flow accounts of the Philippines, 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
A. TOTAL DOMESTIC PRODUCTION	334,587.63	355,747.72	341,972.05	340,181.18	316,808.68	335,198.23	337,944.98	344,523.34
BIOMASS, Total	129,114.75	133,513.45	119,306.81	126,585.58	115,280.92	119,080.01	114,549.22	115,733.79
Agricultural Biomass, Total	99,699.71	104,901.32	90,364.91	98,179.77	87,348.42	91,191.54	85,841.53	87,342.47
Cereals	11,775.96	12,253.60	11,179.30	11,832.53	13,364.24	14,004.83	13,459.07	14,069.07
Other major crops	56,358.11	60,397.08	48,063.34	54,856.50	41,317.76	43,018.91	37,762.33	38,762.93
Fruits excluding melons	11,273.00	11,912.97	11,474.79	11,811.57	12,003.60	12,716.39	13,067.61	12,983.10
Oilcrops and nuts	1,344.74	1,269.72	1,169.36	868.24	1,203.89	1,555.51	1,459.25	1,128.18
Rootcrops	3,414.39	3,176.45	2,574.12	2,931.41	3,154.98	3,253.92	3,343.96	3,396.45
Legumes and pulses	147.00	140.26	122.12	117.84	113.67	110.02	108.55	112.16
Spices	126.84	153.23	134.99	140.83	145.47	139.43	133.58	114.01
Fruit vegetables including melons	947.94	1,029.88	817.54	754.94	816.37	976.13	956.60	949.56
Leafy/Stem vegetables	470.70	444.96	382.63	327.58	348.40	232.60	204.04	222.93
Fresh vegetables, nes	2,502.67	2,606.21	2,716.21	2,880.14	2,948.64	3,052.34	3,170.95	3,244.02
Ornamentals	1.72	1.95	2.22	2.54	2.93	3.41	3.99	4.70
Grazing	11,336.66	11,515.04	11,728.29	11,655.65	11,928.47	12,128.05	12,171.60	12,355.37
Forest Biomass, Total	25,759.88	24,775.18	24,695.82	24,319.34	23,961.10	23,761.07	24,494.73	24,131.54
Logs	5,518.57	4,673.57	4,550.36	3,944.26	3,635.02	3,498.59	4,223.22	3,879.41
Fuelwood	16,267.33	16,276.43	16,269.37	16,484.77	16,471.92	16,368.57	16,353.83	16,372.72
Charcoal	2,437.19	2,422.80	2,443.32	2,460.62	2,452.05	2,449.96	2,452.39	2,438.01
Non-timber forest products	1,397.08	1,274.89	1,302.51	1,299.71	1,274.64	1,312.69	1,332.08	1,310.37
Other minor forest products	139.71	127.49	130.25	129.97	127.46	131.27	133.21	131.04
Fishery Biomass, Total	3,655.16	3,836.94	4,246.08	4,086.47	3,971.40	4,127.39	4,212.96	4,259.78
Wild wet fish	2,866.79	3,009.37	3,330.26	3,205.08	3,114.82	3,237.17	3,304.28	3,341.00
Shellfish	788.37	827.58	915.82	881.40	856.58	890.22	908.68	918.78
MINERALS AND MINERAL PRODUCTS, Total	204,899.91	221,188.48	220,978.53	211,846.33	199,873.00	214,537.52	221,947.14	227,155.23
Ores, assorted kinds	82,675.80	85,585.94	82,529.02	77,780.71	95,670.59	98,312.57	93,660.64	89,736.17
Sand and gravel	116,137.61	129,476.46	132,066.03	127,609.39	97,427.93	109,215.31	120,575.00	129,869.86
Other mass minerals	6,086.50	6,126.07	6,383.49	6,456.23	6,774.48	7,009.64	7,711.50	7,549.20
FOSSIL AND ENERGY MATERIALS, Total	572.96	1,045.80	1,686.71	1,749.27	1,654.76	1,580.71	1,448.62	1,634.32
Coal	318.17	556.76	1,019.59	1,216.39	1,258.87	1,235.50	1,169.17	1,335.69
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crude oil	254.79	489.04	667.12	532.88	395.89	345.21	279.45	298.63
B. TOTAL IMPORTS	25,425.36	38,320.84	27,220.61	23,054.40	24,021.89	33,232.80	46,736.25	56,121.27

Table A.1. continuation of 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
BIOMASS, Total	2,333.59	2,834.63	2,724.57	2,401.32	2,677.58	3,102.21	3,092.23	4,253.21
Live animals	93.28	0.59	0.45	0.47	0.45	0.75	2.00	3.32
Items for food	2,045.48	2,611.46	2,453.50	2,176.60	2,463.92	2,773.29	2,738.20	3,810.94
Other biotic raw materials	194.82	222.58	270.62	224.25	213.21	328.17	352.04	438.95
CRUDE MINERAL MATERIALS	479.19	744.88	651.18	452.42	896.55	2,231.06	2,124.92	1,967.37
Crude fertilizer and other crude minerals	259.10	509.50	436.31	238.64	583.39	1,865.50	1,715.61	1,269.17
Stone, sand and gravel	125.18	123.33	134.05	96.50	165.91	199.55	165.03	251.26
Iron and other ores and concentrates	18.86	5.12	14.59	39.48	46.11	11.88	21.49	202.90
Ferrous waste and scrap metal	10.55	30.04	0.17	1.88	0.90	102.29	130.79	112.48
Non-ferrous base metal waste and scrap, N.E.S.	65.51	76.90	66.06	75.91	100.24	51.84	92.00	131.57
CRUDE FOSSIL MATERIALS	10,337.90	9,355.26	10,426.45	9,602.73	9,223.80	9,303.67	11,044.37	13,159.91
Coal, coke and briquette	273.78	469.11	316.41	1,023.30	1,473.78	1,243.02	667.12	1,599.36
Petroleum oils, crude and crude oils obtained from bituminous minerals	10,016.84	8,886.15	10,095.63	8,579.43	7,747.51	8,060.66	10,195.27	11,272.28
Natural gas	47.28	0.00	14.41	0.00	2.51	0.00	181.98	288.27
SEMI-MANUFACTURED/FINAL PRODUCTS	12,274.68	25,386.06	13,418.41	10,597.94	11,223.96	18,595.85	30,474.73	36,740.77
C. TOTAL EXPORTS	18,453.15	19,280.20	16,925.32	21,992.94	18,040.51	19,738.29	20,401.01	21,129.21
BIOMASS, Total	7,650.76	7,927.45	7,307.78	6,829.55	5,894.19	6,375.64	5,847.63	5,230.04
Live animals	7.39	121.29	70.73	13.02	23.97	25.02	26.32	31.08
Items for food	4,666.11	4,726.89	4,019.62	4,165.92	3,546.80	3,473.61	3,249.05	3,036.98
Other biotic raw materials	2,977.26	3,079.26	3,217.42	2,650.60	2,323.42	2,877.01	2,572.26	2,161.99
CRUDE MINERAL MATERIALS	2,676.04	2,555.38	1,947.87	1,956.25	1,867.56	1,600.66	1,807.81	1,897.91
Crude fertilizer and other crude minerals	41.48	376.87	351.41	421.73	428.50	318.31	280.59	351.84
Stone, sand and gravel	43.13	39.72	14.96	18.55	26.62	80.26	326.50	150.03
Iron and other ores and concentrates	2,584.51	2,131.29	1,570.99	1,500.04	1,392.93	1,181.20	1,162.06	1,345.60
Ferrous waste and scrap metal	1.66	1.85	1.19	0.99	1.12	1.00	1.54	2.32
Non-ferrous base metal waste and scrap, N.E.S.	5.27	5.65	9.32	14.95	18.39	19.90	37.11	48.13
CRUDE FOSSIL MATERIALS	3.99	1.40	4.11	0.00	0.00	0.00	1.73	0.00
Coal, coke and briquette	3.99	0.68	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum oils, crude and crude oils obtained from bituminous minerals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural gas	0.00	0.72	4.11	0.00	0.00	0.00	1.73	0.00
SEMI-MANUFACTURED/FINAL PRODUCTS	8,122.36	8,795.97	7,665.56	13,207.14	10,278.77	11,761.98	12,743.84	14,001.25
TOTAL MATERIAL FLOWS	378,466.15	413,348.76	386,117.99	385,228.52	358,871.08	388,169.31	405,082.24	421,773.81

Table A.2. Material flow accounts of the Philippines, 1989 to 1996

(in thousand tons)

MATERIALS	1989	1990	1991	1992	1993	1994	1995	1996
A. TOTAL DOMESTIC PRODUCTION	329,136.23	342,617.18	338,618.09	353,189.69	355,597.16	374,356.02	453,022.23	543,805.09
BIOMASS, Total	122,135.78	122,840.53	120,372.68	125,047.52	126,882.79	124,388.17	123,467.75	128,860.10
Agricultural Biomass, Total	94,223.54	95,350.31	93,147.92	98,320.10	100,828.96	98,419.08	97,664.72	103,214.80
Cereals	14,680.19	15,476.09	15,044.95	14,838.90	14,943.89	15,402.59	15,437.09	16,410.03
Other major crops	45,128.36	45,531.30	43,979.06	48,956.69	49,913.45	46,094.74	44,718.34	46,147.58
Fruits excluding melons	12,586.38	12,421.45	12,249.64	12,334.41	12,760.77	13,240.67	13,151.21	15,277.72
Oilcrops and nuts	1,111.75	1,523.06	1,219.21	1,328.55	1,581.69	1,569.71	1,700.98	1,647.43
Rootcrops	3,365.59	3,428.45	3,429.71	3,482.97	3,482.32	3,599.66	3,636.30	3,673.08
Legumes and pulses	123.03	135.76	134.20	133.51	135.16	136.51	142.63	140.40
Spices	136.85	133.63	124.86	120.12	128.42	148.85	173.20	177.82
Fruit vegetables including melons	984.86	991.44	974.04	975.52	925.48	969.01	955.65	1,025.61
Leafy/Stem vegetables	290.88	274.27	334.86	314.32	328.99	326.88	506.14	452.63
Fresh vegetables, nes	3,315.32	3,403.54	3,495.73	3,587.31	3,661.38	3,714.79	3,463.90	4,012.80
Ornamentals	5.58	6.73	20.83	23.14	16.85	23.00	28.52	35.70
Grazing	12,494.75	12,024.58	12,140.82	12,224.66	12,950.54	13,192.68	13,750.76	14,214.01
Forest Biomass, Total	23,470.91	22,816.33	22,362.93	21,908.94	21,366.05	21,246.77	21,046.55	21,085.00
Logs	3,228.59	2,552.49	1,961.76	1,469.64	1,046.64	980.48	778.10	791.23
Fuelwood	16,367.05	16,396.32	16,477.98	16,500.82	16,465.47	16,485.75	16,502.82	16,472.70
Charcoal	2,439.15	2,457.76	2,476.36	2,537.00	2,468.97	2,452.02	2,456.41	2,455.63
Non-timber forest products	1,305.56	1,281.60	1,315.30	1,274.08	1,259.06	1,207.74	1,190.21	1,241.31
Other minor forest products	130.56	128.16	131.53	127.41	125.91	120.77	119.02	124.13
Fishery Biomass, Total	4,441.34	4,673.90	4,861.83	4,818.48	4,687.78	4,722.32	4,756.48	4,560.29
Wild wet fish	3,483.40	3,665.80	3,813.20	3,779.20	3,676.69	3,703.78	3,730.57	3,576.70
Shellfish	957.94	1,008.10	1,048.63	1,039.28	1,011.09	1,018.54	1,025.91	983.59
MINERALS AND MINERAL PRODUCTS, Total	205,398.24	218,292.87	216,789.06	226,173.85	226,811.75	248,419.54	328,224.57	413,900.85
Ores, assorted kinds	64,575.68	73,012.94	68,957.49	67,047.27	70,538.16	70,540.32	69,398.31	73,431.22
Sand and gravel	132,476.05	137,135.86	137,170.16	138,132.66	146,061.30	144,181.19	246,357.04	327,654.86
Other mass minerals	8,346.51	8,144.07	10,661.41	20,993.91	10,212.29	33,698.04	12,469.22	12,814.77
FOSSIL AND ENERGY MATERIALS, Total	1,602.21	1,483.77	1,456.36	1,968.32	1,902.63	1,548.31	1,329.91	1,044.15
Coal	1,344.68	1,246.78	1,307.04	1,521.23	1,447.65	1,314.84	1,194.87	991.31
Natural gas	0.00	0.00	0.00	0.00	0.00	4.80	4.62	7.82
Crude oil	257.53	236.99	149.32	447.09	454.98	228.67	130.43	45.02
B. TOTAL IMPORTS	105,694.48	65,010.99	36,343.51	42,633.78	42,851.40	45,608.92	53,909.37	63,291.65
BIOMASS, Total	4,205.67	6,529.22	4,361.53	5,312.32	5,989.20	6,335.92	7,992.91	11,141.60
Live animals	1.46	43.86	6.78	17.60	31.89	38.56	65.89	63.76
Items for food	3,273.01	5,582.67	3,483.92	4,123.25	4,500.92	4,809.79	6,182.96	8,465.41
Other biotic raw materials	931.19	902.70	870.83	1,171.47	1,456.39	1,487.56	1,744.06	2,612.43
CRUDE MINERAL MATERIALS	2,431.34	2,313.58	2,610.68	2,023.69	1,785.41	2,286.19	2,648.08	2,945.02

Table A.2. continuation of 1989 to 1996

(in thousand tons)

MATERIALS	1989	1990	1991	1992	1993	1994	1995	1996
Crude fertilizer and other crude minerals	1,602.09	1,525.09	1,808.50	1,269.11	997.45	1,408.94	1,514.26	1,651.12
Stone, sand and gravel	309.74	338.91	290.79	290.59	260.03	325.66	430.33	417.26
Iron and other ores and concentrates	278.45	275.61	356.99	398.22	460.77	516.90	638.95	639.84
Ferrous waste and scrap metal	182.45	77.62	153.55	62.79	64.16	33.51	63.94	131.42
Non-ferrous base metal waste and scrap, N.E.S.	58.61	96.36	0.85	2.99	3.00	1.19	0.60	105.39
CRUDE FOSSIL MATERIALS	13,308.71	7,530.88	14,450.60	16,314.04	15,231.78	16,006.20	21,891.19	24,730.67
Coal, coke and briquette	1,180.44	1,140.53	1,522.60	1,079.22	1,162.32	1,334.55	2,061.69	3,660.68
Petroleum oils, crude and crude oils obtained from bituminous minerals	11,602.15	5,903.45	12,570.85	14,750.02	13,500.63	13,976.81	19,168.72	20,478.49
Natural gas	526.12	486.90	357.15	484.80	568.83	694.84	660.78	591.50
SEMI-MANUFACTURED/FINAL PRODUCTS	85,748.75	48,637.30	14,920.71	18,983.74	19,845.00	20,980.61	21,377.19	24,474.36
C. TOTAL EXPORTS	21,995.93	24,807.87	15,671.45	13,943.82	14,970.06	15,798.01	33,447.55	20,671.84
BIOMASS, Total	5,287.55	5,414.93	5,035.42	4,674.80	5,422.91	5,063.07	11,271.96	9,712.83
Live animals	43.64	24.35	0.10	0.08	0.08	0.09	0.12	0.08
Items for food	3,425.31	3,588.79	3,687.09	3,343.24	4,091.21	3,797.99	7,502.18	7,167.77
Other biotic raw materials	1,818.60	1,801.78	1,348.23	1,331.48	1,331.62	1,264.99	3,769.66	2,544.98
CRUDE MINERAL MATERIALS	2,042.26	2,120.96	2,373.30	2,196.64	2,075.34	2,137.28	5,012.08	5,291.97
Crude fertilizer and other crude minerals	304.78	447.52	446.03	582.32	615.07	482.34	1,012.53	1,050.87
Stone, sand and gravel	184.74	150.89	111.20	128.16	123.56	240.46	588.05	492.07
Iron and other ores and concentrates	1,485.85	1,404.60	1,705.53	1,398.47	1,206.72	1,252.68	2,999.13	3,453.41
Ferrous waste and scrap metal	1.96	2.97	2.01	2.42	13.63	28.73	31.45	19.26
Non-ferrous base metal waste and scrap, N.E.S.	64.93	114.99	108.52	85.27	116.36	133.07	380.92	276.36
CRUDE FOSSIL MATERIALS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coal, coke and briquette	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum oils, crude and crude oils obtained from bituminous minerals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEMI-MANUFACTURED/FINAL PRODUCTS	14,666.12	17,271.98	8,262.73	7,072.38	7,471.81	8,597.66	17,163.51	5,667.03
TOTAL MATERIAL FLOWS	456,826.63	432,436.03	390,633.05	409,767.29	413,418.62	435,762.95	540,379.15	627,768.58

Table A.3. Material accounts of the Philippines, 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
A. TOTAL DOMESTIC PRODUCTION	577,932.79	562,342.69	508,542.21	518,829.32	565,613.76	581,342.53	9,111,908.81
BIOMASS, Total	130,521.51	124,029.02	128,059.26	131,775.84	138,011.11	138,014.93	2,757,571.51
Agricultural Biomass, Total	105,096.92	98,482.45	102,169.23	105,775.51	112,329.05	112,296.90	2,162,189.15
Cereals	16,380.44	12,996.04	17,189.76	17,745.53	18,353.91	18,469.41	325,307.40
Other major crops	48,632.29	46,091.74	43,708.27	45,599.86	50,770.65	49,735.29	1,035,544.58
Fruits excluding melons	14,216.36	13,338.13	14,863.08	15,301.63	16,000.92	16,571.82	291,557.22
Oilcrops and nuts	1,890.88	1,764.72	1,682.52	1,800.46	1,820.11	1,883.44	32,523.37
Rootcrops	3,703.57	3,358.33	3,528.61	3,370.92	3,224.50	3,210.32	73,740.00
Legumes and pulses	128.25	132.17	134.38	128.54	128.40	128.79	2,833.35
Spices	175.97	167.69	159.35	160.62	121.40	136.81	3,153.97
Fruit vegetables including melons	1,108.00	974.97	1,001.29	1,020.01	1,036.00	1,016.61	21,207.46
Leafy/Stem vegetables	473.33	433.36	399.66	383.67	393.84	343.25	7,889.90
Fresh vegetables, nes	3,419.79	3,710.08	3,855.39	4,510.00	4,620.00	4,730.00	76,621.20
Ornamentals	50.69	72.75	107.68	49.91	32.64	33.25	530.72
Grazing	14,917.35	15,442.47	15,539.26	15,704.36	15,826.68	16,037.91	291,279.97
Forest Biomass, Total	20,811.37	20,876.76	21,108.53	21,174.71	20,719.76	20,538.73	496,432.01
Logs	572.58	651.80	749.32	819.77	586.90	416.05	50,528.35
Fuelwood	16,483.98	16,506.27	16,532.45	16,538.60	16,571.29	16,568.42	361,734.86
Charcoal	2,465.84	2,474.77	2,515.38	2,516.55	2,522.24	2,541.52	54,335.92
Non-timber forest products	1,171.79	1,130.84	1,192.17	1,181.63	944.85	920.67	27,120.79
Other minor forest products	117.18	113.08	119.22	118.16	94.48	92.07	2,712.08
Fishery Biomass, Total	4,613.22	4,669.82	4,781.51	4,825.62	4,962.30	5,179.31	98,950.35
Wild wet fish	3,618.21	3,662.60	3,750.20	3,784.80	3,892.00	4,062.20	77,608.12
Shellfish	995.01	1,007.22	1,031.31	1,040.82	1,070.30	1,117.11	21,342.23
MINERALS AND MINERAL PRODUCTS, Total	446,423.71	437,251.35	379,406.35	385,807.74	426,205.21	440,538.13	6,322,069.33
Ores, assorted kinds	77,676.14	79,062.07	72,082.80	85,980.20	83,809.00	77,487.40	1,739,550.45
Sand and gravel	350,263.03	311,734.50	283,677.63	264,670.00	308,506.63	330,521.63	4,220,920.11
Other mass minerals	18,484.54	46,454.78	23,645.92	35,157.54	33,889.58	32,529.10	361,598.76
FOSSIL AND ENERGY MATERIALS, Total	987.56	1,062.33	1,076.60	1,245.74	1,397.44	2,789.47	32,267.97
Coal	946.72	1,016.05	1,028.47	1,180.77	1,230.74	1,477.00	25,358.29
Natural gas	0.00	6.76	5.20	7.72	101.66	1,277.31	1,415.89
Crude oil	40.85	39.52	42.94	57.25	65.04	35.16	5,493.79
B. TOTAL IMPORTS	99,250.84	54,651.95	54,368.56	58,584.86	59,849.67	57,932.50	1,114,115.89
BIOMASS, Total	8,956.99	9,873.08	9,336.80	10,203.15	10,282.87	11,579.64	135,520.23
Live animals	3.30	71.13	88.44	73.85	34.79	42.25	684.86
Items for food	7,078.13	8,171.30	7,108.62	7,977.70	8,264.95	9,612.43	109,708.45
Other biotic raw materials	1,875.55	1,630.65	2,139.74	2,151.61	1,983.13	1,924.96	25,126.92
CRUDE MINERAL MATERIALS	2,633.42	2,044.32	3,041.56	2,771.72	3,092.15	2,623.53	44,798.28

Table A.3. continuation of 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
Crude fertilizer and other crude minerals	1,286.30	1,075.81	1,537.78	1,439.22	1,817.67	1,631.95	27,442.50
Stone, sand and gravel	503.59	256.28	525.88	491.35	424.80	411.51	6,537.52
Iron and other ores and concentrates	623.72	591.68	889.70	783.24	791.36	506.83	8,112.68
Ferrous waste and scrap metal	72.59	62.35	5.57	3.18	2.97	3.36	1,308.54
Non-ferrous base metal waste and scrap, N.E.S.	147.22	58.20	82.63	54.74	55.35	69.89	1,397.05
CRUDE FOSSIL MATERIALS	26,000.37	24,413.06	24,268.85	23,298.68	23,769.91	20,449.68	354,118.71
Coal, coke and briquette	4,536.92	5,120.01	4,879.67	4,879.72	5,320.49	5,495.95	50,440.66
Petroleum oils, crude and crude oils obtained from bituminous minerals	20,990.12	18,781.72	19,389.18	18,418.97	18,449.41	14,953.73	297,788.01
Natural gas	473.34	511.33	0.00		0.00	0.00	5,890.04
SEMI-MANUFACTURED/FINAL PRODUCTS	61,660.07	18,321.49	17,721.35	22,311.30	22,704.75	23,279.65	579,678.68
C. TOTAL EXPORTS	16,977.90	16,548.02	17,595.12	21,059.20	20,786.63	20,627.24	430,861.25
BIOMASS, Total	5,278.48	5,234.66	4,088.19	5,525.78	6,859.50	5,419.72	137,352.83
Live animals	0.04	0.03	0.04	0.05	0.04	0.08	387.64
Items for food	3,595.96	3,595.45	3,279.24	3,976.34	4,895.60	4,000.67	90,831.83
Other biotic raw materials	1,682.48	1,639.18	808.92	1,549.39	1,963.86	1,418.97	46,133.36
CRUDE MINERAL MATERIALS	2,721.13	4,278.89	4,385.67	4,321.40	3,957.60	4,087.83	63,311.82
Crude fertilizer and other crude minerals	504.98	598.99	564.96	481.22	648.96	691.78	11,003.09
Stone, sand and gravel	404.84	1,869.80	1,779.92	1,500.34	873.13	993.49	10,140.42
Iron and other ores and concentrates	1,565.50	1,634.03	1,856.44	2,124.82	2,114.06	1,872.97	38,942.83
Ferrous waste and scrap metal	37.98	44.33	24.88	88.32	208.24	352.07	869.90
Non-ferrous base metal waste and scrap, N.E.S.	207.82	131.75	159.47	126.69	113.21	177.51	2,355.58
CRUDE FOSSIL MATERIALS	0.03	0.06	0.00	0.00	0.00	374.60	385.93
Coal, coke and briquette	0.03	0.06	0.00	0.00	0.00	0.00	4.76
Petroleum oils, crude and crude oils obtained from bituminous minerals	0.00	0.00	0.00	0.00	0.00	374.60	374.60
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	6.57
SEMI-MANUFACTURED/FINAL PRODUCTS	8,978.27	7,034.41	9,121.25	11,212.03	9,969.53	10,745.08	229,810.67
TOTAL MATERIAL FLOWS	694,161.53	633,542.66	580,505.89	598,473.38	646,250.06	659,902.27	10,656,885.95

APPENDIX B – Details of Material Flows

Table B.1.1. Domestic production of materials in the Philippines, 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
DOMESTIC PRODUCTION, Total	334,587.63	355,747.72	341,972.05	340,181.18	316,808.68	335,198.23	337,944.98	344,523.34
BIOMASS, Total	129,114.75	133,513.45	119,306.81	126,585.58	115,280.92	119,080.01	114,549.22	115,733.79
Agricultural Biomass, Total	99,699.71	104,901.32	90,364.91	98,179.77	87,348.42	91,191.54	85,841.53	87,342.47
Palay	8,306.27	8,960.42	7,659.66	8,220.32	9,245.88	9,709.13	8,966.84	9,419.46
Corn	3,454.68	3,282.18	3,513.55	3,610.95	4,118.10	4,295.55	4,492.02	4,649.36
Sorghum	15.00	11.00	6.10	1.26	0.26	0.15	0.20	0.24
Coconut	17,839.64	16,813.59	13,080.35	13,175.11	13,392.28	17,209.34	16,484.04	14,985.59
Sugarcane	37,920.98	42,960.98	34,440.98	41,160.98	27,411.38	25,190.18	20,654.18	23,160.98
Coffee	177.57	207.19	177.81	141.58	163.88	175.80	169.56	171.67
Tobacco	112.04	124.91	125.17	142.18	107.78	107.53	120.03	110.71
Abaca and other fiber crops	187.18	174.89	134.41	131.29	124.96	153.81	148.51	136.67
Rubber	116.29	109.83	98.80	100.20	111.04	175.20	176.64	187.68
Cacao	4.41	5.70	5.83	5.16	6.45	7.06	9.37	9.63
Banana	5,207.81	5,301.25	4,803.97	5,019.06	4,829.46	4,994.36	4,927.36	4,751.95
Pineapple	1,266.99	1,315.47	1,259.81	1,349.03	1,341.71	1,657.90	1,697.19	1,538.30
Mango	552.18	475.34	463.95	514.67	538.05	562.64	555.24	547.72
Citrus	174.78	176.85	175.30	170.47	174.99	186.20	207.69	209.12
Grapes	0.10	0.12	0.24	0.30	0.79	0.84	0.83	1.05
Other fruits	4,071.14	4,643.93	4,771.52	4,758.05	5,118.60	5,314.45	5,679.31	5,934.96
Primary oilcrops	1,334.97	1,259.41	1,161.23	860.22	1,194.88	1,545.38	1,447.44	1,115.09
Treenuts	9.77	10.31	8.13	8.01	9.01	10.13	11.81	13.09
Cassava	2,027.42	1,847.53	1,393.07	1,799.97	2,034.61	2,079.41	2,151.46	2,249.35
Camote	1,120.42	1,046.64	888.37	842.08	852.54	881.83	870.58	844.20
Potatoes	40.84	44.74	44.77	41.69	49.14	55.40	66.81	59.25
Other roots and tubers	225.71	237.52	247.91	247.68	218.70	237.28	255.10	243.65
Legumes and pulses	147.00	140.26	122.12	117.84	113.67	110.02	108.55	112.16
Onions	52.02	73.75	61.05	70.98	71.51	73.03	79.58	61.30
Garlic	15.49	20.82	15.35	13.93	15.70	16.26	16.19	14.85
Other spices	59.33	58.66	58.59	55.92	58.25	50.14	37.80	37.86
Tomato	170.42	173.59	173.32	193.75	195.51	215.37	217.03	218.23
Eggplant	110.01	112.34	119.50	104.09	106.90	146.30	150.78	153.72
Melons and other fruit vegetables	667.50	743.95	524.72	457.10	513.96	614.47	588.79	577.61
Mushrooms	0.00	0.03	0.06	0.09	0.11	0.17	0.22	0.33
Asparagus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cabbages	67.59	66.79	63.04	62.15	66.13	68.99	71.28	70.28

Table B.1.1. continuation of 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
Other leafy/stem vegetables	403.11	378.14	319.53	265.34	282.16	163.44	132.54	152.32
Fresh vegetables, nes	2,502.67	2,606.21	2,716.21	2,880.14	2,948.64	3,052.34	3,170.95	3,244.02
Ornamentals	1.72	1.95	2.22	2.54	2.93	3.41	3.99	4.70
Grazing	11,336.66	11,515.04	11,728.29	11,655.65	11,928.47	12,128.05	12,171.60	12,355.37
Forest Biomass, Total	25,759.88	24,775.18	24,695.82	24,319.34	23,961.10	23,761.07	24,494.73	24,131.54
Logs	5,518.57	4,673.57	4,550.36	3,944.26	3,635.02	3,498.59	4,223.22	3,879.41
Fuelwood	16,267.33	16,276.43	16,269.37	16,484.77	16,471.92	16,368.57	16,353.83	16,372.72
Charcoal	2,437.19	2,422.80	2,443.32	2,460.62	2,452.05	2,449.96	2,452.39	2,438.01
Bamboo	458.19	445.52	432.83	427.56	446.26	434.54	433.23	418.50
Almaciga and elemi resins	0.67	1.98	0.65	0.28	0.53	0.54	0.68	0.98
Cogon grass	410.94	407.99	404.87	401.57	398.11	394.49	390.71	386.79
Anahaw fronds	82.14	81.21	80.30	79.27	78.26	77.20	76.12	75.01
Nipa shingles	247.47	247.52	244.18	240.03	239.42	239.33	236.46	232.46
Palm midribs	0.71	0.22	0.13	0.36	0.11	0.08	0.01	0.09
Hingiw and other vines	0.06	0.04	0.04	0.04	0.09	0.01	0.05	0.03
Salago and tanbarks	2.60	0.58	0.23	0.41	0.17	2.00	0.06	0.01
Split rattan	1.94	0.32	0.12	4.57	0.12	0.41	0.16	0.09
Unsplit rattan	192.35	89.51	139.16	145.62	111.57	164.10	194.60	196.39
Honey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other minor forest products	139.71	127.49	130.25	129.97	127.46	131.27	133.21	131.04
Fishery Biomass, Total	3,655.16	3,836.94	4,246.08	4,086.47	3,971.40	4,127.39	4,212.96	4,259.78
Wild wet fish	2,866.79	3,009.37	3,330.26	3,205.08	3,114.82	3,237.17	3,304.28	3,341.00
Shellfish	788.37	827.58	915.82	881.40	856.58	890.22	908.68	918.78
MINERALS AND MINERAL PRODUCTS, Total	204,899.91	221,188.48	220,978.53	211,846.33	199,873.00	214,537.52	221,947.14	227,155.23
Iron ore	5.75	5.57	2.65	0.00	0.00	14.98	0.00	0.00
Gold ore	47,180.00	51,900.00	52,140.00	51,460.00	66,120.00	70,860.00	65,560.00	60,980.00
Silver ore	31,470.00	30,860.00	28,350.00	24,480.00	26,210.00	25,765.00	26,725.00	27,315.00
Nickel ore	1,432.67	748.00	406.67	235.33	1,132.67	76.67	0.00	0.00
Cobalt ore	666.67	313.33	113.33	40.00	606.67	60.00	0.00	0.00
Other ores	1,920.72	1,759.04	1,516.37	1,565.38	1,601.26	1,535.92	1,375.64	1,441.17
Shale clay	270.00	290.00	310.00	330.00	350.00	371.45	522.57	860.01
Salt	355.29	364.42	381.91	401.01	421.06	442.11	466.43	492.09
Sand and gravel	116,137.61	129,476.46	132,066.03	127,609.39	97,427.93	109,215.31	120,575.00	129,869.86
Silica sand	661.21	671.65	571.58	605.22	483.42	439.29	440.45	436.74
Limestone	4,800.00	4,800.00	5,120.00	5,120.00	5,520.00	5,756.78	6,282.05	5,760.35
FOSSIL AND ENERGY MATERIALS, Total	572.96	1,045.80	1,686.71	1,749.27	1,654.76	1,580.71	1,448.62	1,634.32
Coal	318.17	556.76	1,019.59	1,216.39	1,258.87	1,235.50	1,169.17	1,335.69
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crude oil	254.79	489.04	667.12	532.88	395.89	345.21	279.45	298.63

Table B.1.2. Domestic production of materials in the Philippines, 1989 to 1996

(in thousand tons)

MATERIALS	1989	19990	1991	1992	1993	1994	1995	1996
DOMESTIC PRODUCTION, Total	329,136.23	342,617.18	338,618.09	353,189.69	355,597.16	374,356.02	453,022.23	543,805.09
BIOMASS, Total	122,135.78	122,840.53	120,372.68	125,047.52	126,882.79	124,388.17	123,467.75	128,860.10
Agricultural Biomass, Total	94,223.54	95,350.31	93,147.92	98,320.10	100,828.96	98,419.08	97,664.72	103,214.80
Palay	9,931.71	10,379.25	10,156.93	9,988.65	9,905.92	11,067.63	11,067.67	11,847.75
Corn	4,748.30	5,096.59	4,887.78	4,849.95	5,037.88	4,334.94	4,369.40	4,562.26
Sorghum	0.17	0.25	0.25	0.30	0.10	0.02	0.02	0.02
Coconut	14,179.92	14,335.94	13,556.64	13,693.57	13,601.90	13,456.38	14,627.87	13,650.05
Sugarcane	30,316.58	30,579.39	29,802.99	34,628.19	35,698.58	32,033.78	29,508.98	31,911.38
Coffee	188.46	162.31	161.43	154.59	150.16	196.45	162.16	144.25
Tobacco	115.80	118.50	123.51	166.80	151.94	82.51	92.37	94.05
Abaca and other fiber crops	111.41	102.27	107.07	98.56	93.52	103.00	100.67	108.21
Rubber	206.28	222.48	216.84	207.00	209.16	214.20	217.92	231.24
Cacao	9.92	10.43	10.58	8.00	8.18	8.42	8.38	8.39
Banana	4,160.80	3,801.99	3,851.04	3,922.02	4,005.21	4,284.34	4,565.02	4,321.92
Pineapple	1,535.16	1,505.48	1,455.31	1,478.69	1,676.61	1,738.44	1,878.65	2,007.89
Mango	561.30	517.92	476.92	511.36	628.79	765.30	887.68	1,316.71
Citrus	200.37	201.62	192.45	193.90	193.74	197.58	200.40	192.91
Grapes	0.88	0.75	0.63	0.50	0.43	0.44	0.43	0.43
Other fruits	6,127.87	6,393.68	6,273.31	6,227.95	6,256.00	6,254.57	5,619.04	7,437.87
Primary oilcrops	1,102.02	1,513.46	1,209.20	1,309.11	1,562.81	1,546.91	1,671.96	1,636.21
Treenuts	9.73	9.59	10.01	19.44	18.88	22.80	29.02	11.22
Cassava	2,226.38	2,236.30	2,192.68	2,168.77	2,224.28	2,299.40	2,298.19	2,303.98
Camote	802.48	814.17	806.15	823.29	843.46	849.87	812.65	796.12
Potatoes	55.12	69.79	71.13	71.18	73.16	93.83	105.23	93.44
Other roots and tubers	281.60	308.19	359.75	419.72	341.42	356.56	420.22	479.54
Legumes and pulses	123.03	135.76	134.20	133.51	135.16	136.51	142.63	140.40
Onions	80.44	76.09	74.03	69.77	73.11	84.26	100.54	93.83
Garlic	18.06	18.74	13.03	12.35	12.93	16.49	18.06	19.53
Other spices	38.35	38.80	37.80	37.99	42.38	48.10	54.60	64.46
Tomato	232.25	239.15	230.40	215.05	180.03	198.29	202.57	211.44
Eggplant	156.24	157.78	145.60	154.56	156.38	172.90	182.98	220.64
Melons and other fruit vegetables	596.38	594.51	598.04	605.91	589.07	597.82	570.11	593.54
Mushrooms	0.41	0.42	0.51	0.50	0.55	0.53	0.53	0.81
Asparagus	1.30	1.60	1.40	2.00	5.88	9.82	10.84	11.76
Cabbages	130.80	117.20	170.90	150.80	155.00	151.30	130.00	98.10
Other leafy/stem vegetables	158.37	155.05	162.05	161.01	167.56	165.23	364.77	341.96
Fresh vegetables, nes	3,315.32	3,403.54	3,495.73	3,587.31	3,661.38	3,714.79	3,463.90	4,012.80
Ornamentals	5.58	6.73	20.83	23.14	16.85	23.00	28.52	35.70

Table B.1.2. continuation of 1989 to 1996

(in thousand tons)

MATERIALS	1989	19990	1991	1992	1993	1994	1995	1996
Grazing	12,494.75	12,024.58	12,140.82	12,224.66	12,950.54	13,192.68	13,750.76	14,214.01
Forest Biomass, Total	23,470.91	22,816.33	22,362.93	21,908.94	21,366.05	21,246.77	21,046.55	21,085.00
Logs	3,228.59	2,552.49	1,961.76	1,469.64	1,046.64	980.48	778.10	791.23
Fuelwood	16,367.05	16,396.32	16,477.98	16,500.82	16,465.47	16,485.75	16,502.82	16,472.70
Charcoal	2,439.15	2,457.76	2,476.36	2,537.00	2,468.97	2,452.02	2,456.41	2,455.63
Bamboo	422.46	476.83	468.68	455.35	439.90	430.86	425.37	440.58
Almaciga and elemi resins	0.66	1.32	1.10	0.89	0.81	1.72	1.48	1.27
Cogon grass	382.73	381.37	377.94	374.59	371.33	368.14	365.04	362.02
Anahaw fronds	73.88	73.25	72.42	71.59	70.77	69.95	69.15	68.36
Nipa shingles	234.42	237.87	246.29	241.06	233.49	227.34	228.70	227.07
Palm midribs	0.20	0.13	0.04	0.00	0.00	0.00	0.10	0.03
Hingiw and other vines	0.27	0.16	0.18	0.29	0.15	0.16	0.12	0.67
Salago and tanbarks	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Split rattan	0.05	0.02	0.94	0.05	0.00	0.01	0.04	0.03
Unsplit rattan	190.88	110.59	147.70	130.26	142.61	109.57	100.20	141.28
Honey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other minor forest products	130.56	128.16	131.53	127.41	125.91	120.77	119.02	124.13
Fishery Biomass, Total	4,441.34	4,673.90	4,861.83	4,818.48	4,687.78	4,722.32	4,756.48	4,560.29
Wild wet fish	3,483.40	3,665.80	3,813.20	3,779.20	3,676.69	3,703.78	3,730.57	3,576.70
Shellfish	957.94	1,008.10	1,048.63	1,039.28	1,011.09	1,018.54	1,025.91	983.59
MINERALS AND MINERAL PRODUCTS, Total	205,398.24	218,292.87	216,789.06	226,173.85	226,811.75	248,419.54	328,224.57	413,900.85
Iron ore	6.52	8.16	7.30	7.35	0.00	0.00	0.00	0.00
Gold ore	60,080.00	51,900.00	51,220.00	49,840.00	54,620.00	54,600.00	54,000.00	60,400.00
Silver ore	2,815.00	19,535.00	16,390.00	16,020.00	14,980.00	15,000.00	14,250.00	12,000.00
Nickel ore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cobalt ore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other ores	1,674.16	1,569.78	1,340.19	1,179.92	938.16	940.32	1,148.31	1,031.22
Shale clay	858.69	758.23	808.13	1,496.77	647.46	802.54	823.73	997.83
Salt	488.67	490.41	492.86	495.82	535.48	530.77	612.86	618.48
Sand and gravel	132,476.05	137,135.86	137,170.16	138,132.66	146,061.30	144,181.19	246,357.04	327,654.86
Silica sand	823.91	786.41	745.58	2,641.10	460.19	452.44	343.25	462.83
Limestone	6,175.23	6,109.02	8,614.83	16,360.22	8,569.15	31,912.29	10,689.38	10,735.63
FOSSIL AND ENERGY MATERIALS, Total	1,602.21	1,483.77	1,456.36	1,968.32	1,902.63	1,548.31	1,329.91	1,044.15
Coal	1,344.68	1,246.78	1,307.04	1,521.23	1,447.65	1,314.84	1,194.87	991.31
Natural gas	0.00	0.00	0.00	0.00	0.00	4.80	4.62	7.82
Crude oil	257.53	236.99	149.32	447.09	454.98	228.67	130.43	45.02

Table B.1.3. Domestic production of materials in the Philippines, 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
DOMESTIC PRODUCTION, Total	577,932.79	562,342.69	508,542.21	518,829.32	565,613.76	581,342.53	9,111,908.81
BIOMASS, Total	130,521.51	124,029.02	128,059.26	131,775.84	138,011.11	138,014.93	2,757,571.51
Agricultural Biomass, Total	105,096.92	98,482.45	102,169.23	105,775.51	112,329.05	112,296.90	2,162,189.15
Palay	11,831.40	8,981.70	12,375.93	13,008.87	13,602.65	13,934.19	228,568.22
Corn	4,549.04	4,014.34	4,813.83	4,736.66	4,751.26	4,535.23	96,703.84
Sorghum	0.00	0.00	0.00	0.00	0.00	0.00	35.34
Coconut	15,827.54	13,925.90	14,579.20	15,602.58	15,858.60	16,428.63	326,304.64
Sugarcane	32,176.58	31,545.38	28,537.09	29,390.11	34,250.60	32,644.40	695,924.66
Coffee	157.46	148.11	142.31	153.11	158.42	150.63	3,614.92
Tobacco	94.67	89.83	74.70	71.74	69.89	72.79	2,369.45
Abaca and other fiber crops	102.16	107.29	109.28	115.72	107.72	110.64	2,669.23
Rubber	265.56	267.36	257.52	259.56	316.80	321.24	4,488.84
Cacao	8.31	7.87	8.16	7.03	8.62	6.95	172.85
Banana	4,922.96	4,557.89	5,959.91	6,426.27	6,597.41	6,862.83	108,074.81
Pineapple	2,132.38	1,938.29	1,992.02	2,030.27	2,108.67	2,129.57	37,033.83
Mango	1,470.03	1,390.61	1,284.45	1,257.89	1,309.15	1,418.10	18,005.97
Citrus	197.56	187.21	202.33	225.16	240.02	243.36	4,344.01
Grapes	0.43	0.43	0.29	0.26	0.22	0.25	10.63
Other fruits	5,493.00	5,263.70	5,424.08	5,361.77	5,745.45	5,917.70	124,087.96
Primary oilcrops	1,858.72	1,738.92	1,653.82	1,771.76	1,791.41	1,854.74	32,139.67
Treenuts	32.16	25.80	28.70	28.70	28.70	28.70	383.71
Cassava	2,360.64	2,091.48	2,279.24	2,128.01	1,991.58	1,960.69	46,344.44
Camote	768.69	676.56	679.72	673.96	663.62	668.30	18,025.71
Potatoes	96.02	71.35	69.94	69.88	72.62	74.29	1,489.62
Other roots and tubers	478.22	518.95	499.71	499.07	496.69	507.04	7,880.23
Legumes and pulses	128.25	132.17	134.38	128.54	128.40	128.79	2,833.35
Onions	95.04	95.68	93.45	92.64	90.87	105.82	1,768.79
Garlic	21.21	13.38	9.80	9.80	9.80	9.80	331.59
Other spices	59.72	58.63	56.10	58.18	20.74	21.19	1,053.59
Tomato	216.26	172.88	188.97	192.53	189.84	194.09	4,420.97
Eggplant	273.00	229.32	223.72	232.54	237.73	251.36	3,798.39
Melons and other fruit vegetables	618.74	572.77	588.60	594.93	608.42	571.16	12,988.10
Mushrooms	0.84	0.62	0.62	0.63	0.62	0.62	9.21
Asparagus	10.99	6.25	6.33	6.43	8.58	8.80	91.98
Cabbages	85.80	87.50	87.47	87.58	89.54	91.40	2,169.63
Other leafy/stem vegetables	375.71	338.99	305.24	289.04	295.11	242.43	5,619.09
Fresh vegetables, nes	3,419.79	3,710.08	3,855.39	4,510.00	4,620.00	4,730.00	76,621.20
Ornamentals	50.69	72.75	107.68	49.91	32.64	33.25	530.72

Table B.1.3. continuation of 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
Grazing	14,917.35	15,442.47	15,539.26	15,704.36	15,826.68	16,037.91	291,279.97
Forest Biomass, Total	20,811.37	20,876.76	21,108.53	21,174.71	20,719.76	20,538.73	496,432.01
Logs	572.58	651.80	749.32	819.77	586.90	416.05	50,528.35
Fuelwood	16,483.98	16,506.27	16,532.45	16,538.60	16,571.29	16,568.42	361,734.86
Charcoal	2,465.84	2,474.77	2,515.38	2,516.55	2,522.24	2,541.52	54,335.92
Bamboo	412.73	426.30	453.87	463.02	363.11	355.93	9,531.61
Almaciga and elemi resins	0.43	0.37	0.42	0.73	0.73	0.73	18.97
Cogon grass	359.09	356.25	353.50	290.21	288.52	286.93	8,113.14
Anahaw fronds	67.59	66.81	66.19	53.03	52.48	51.87	1,556.85
Nipa shingles	219.83	221.03	228.77	188.75	189.36	186.86	5,037.73
Palm midribs	0.00	0.00	0.00	0.03	0.18	0.11	2.54
Hingiw and other vines	0.06	0.00	0.08	0.09	0.11	0.12	2.80
Salago and tanbarks	0.00	0.00	0.00	0.00	0.00	0.00	6.13
Split rattan	0.00	0.01	0.08	0.16	0.04	0.00	9.16
Unsplit rattan	112.04	60.06	89.27	185.61	50.32	38.12	2,841.80
Honey	0.00	0.00	0.00	0.00	0.00	0.00	0.07
Other minor forest products	117.18	113.08	119.22	118.16	94.48	92.07	2,712.08
Fishery Biomass, Total	4,613.22	4,669.82	4,781.51	4,825.62	4,962.30	5,179.31	98,950.35
Wild wet fish	3,618.21	3,662.60	3,750.20	3,784.80	3,892.00	4,062.20	77,608.12
Shellfish	995.01	1,007.22	1,031.31	1,040.82	1,070.30	1,117.11	21,342.23
MINERALS AND MINERAL PRODUCTS, Total	446,423.71	437,251.35	379,406.35	385,807.74	426,205.21	440,538.13	6,322,069.33
Iron ore	11.80	0.00	3.20	6.00	4.30	3.00	86.58
Gold ore	65,400.00	68,000.00	62,200.00	73,000.00	67,600.00	71,800.00	1,310,860.00
Silver ore	10,350.00	9,100.00	9,100.00	11,800.00	14,800.00	4,400.00	391,715.00
Nickel ore	814.30	959.90	625.30	1,023.40	1,282.70	1,200.20	9,937.80
Cobalt ore	0.00	0.00	0.00	0.00	0.00	0.00	1,800.00
Other ores	1,100.04	1,002.17	154.30	150.80	122.00	84.20	25,151.07
Shale clay	1,125.97	917.91	1,074.80	1,263.10	1,366.10	1,523.20	17,768.49
Salt	686.51	727.75	704.30	589.50	237.00	461.00	10,995.73
Sand and gravel	350,263.03	311,734.50	283,677.63	264,670.00	308,506.63	330,521.63	4,220,920.11
Silica sand	325.92	467.18	459.62	621.74	563.92	742.98	14,206.64
Limestone	16,346.14	44,341.94	21,407.20	32,683.20	31,722.56	29,801.92	318,627.90
FOSSIL AND ENERGY MATERIALS, Total	987.56	1,062.33	1,076.60	1,245.74	1,397.44	2,789.47	32,267.97
Coal	946.72	1,016.05	1,028.47	1,180.77	1,230.74	1,477.00	25,358.29
Natural gas	0.00	6.76	5.20	7.72	101.66	1,277.31	1,415.89
Crude oil	40.85	39.52	42.94	57.25	65.04	35.16	5,493.79

Table B.2.1. Imports into the Philippines, 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
TOTAL IMPORTS	25,425.36	38,320.84	27,220.61	23,054.40	24,021.89	33,232.80	46,736.25	56,121.27
BIOMASS	2,333.59	2,834.63	2,724.57	2,401.32	2,677.58	3,102.21	3,092.23	4,253.21
Live Animals	93.28	0.59	0.45	0.47	0.45	0.75	2.00	3.32
Live animals, except fish	0.29	0.58	0.45	0.47	0.45	0.67	1.86	3.32
Animals, live, N.E.S. (including zoo animals, dogs, cats, insects, etc.)	93.00	0.01	0.00	0.00	0.00	0.08	0.14	0.00
Items For Food	2,045.48	2,611.46	2,453.50	2,176.60	2,463.92	2,773.29	2,738.20	3,810.94
Meat and meat preparations	9.79	12.49	7.76	1.36	2.96	4.05	7.89	10.71
Dairy products and birds' eggs	117.05	148.97	133.40	83.95	104.97	136.85	223.81	179.90
Fish and fish preparations	37.28	51.97	10.93	1.61	6.51	40.07	81.95	142.51
Cereals and cereal preparation	1,394.58	1,679.28	1,781.05	1,556.53	1,939.59	1,363.43	1,112.73	1,606.68
Vegetables and fruits	30.51	36.12	26.10	10.33	20.63	49.04	47.09	96.81
Sugar, sugar preparations and honey	12.52	14.52	19.29	5.73	13.38	19.42	54.77	117.27
Miscellaneous edible products and preparations	2.90	4.99	4.57	1.07	1.71	3.79	9.24	11.19
Coffee, tea, cocoa, spices and manufactures thereof	40.19	37.76	17.93	3.52	4.16	2.70	3.61	5.86
Beverages	4.47	5.24	6.82	2.13	4.25	3.67	8.31	9.79
Tobacco and tobacco manufactures	19.93	16.75	17.19	10.74	16.12	16.44	24.87	26.80
Feeding stuff for animals (not including unmilled cereals)	376.26	603.37	428.47	499.63	349.63	1,133.83	1,163.94	1,603.44
Inedible Biotic Raw Materials	154.53	140.04	169.37	161.55	150.09	266.32	272.01	321.44
Hides, Skins and Furskins, Raw	0.81	2.23	1.39	0.36	1.05	0.33	0.63	1.59
Natural rubber	1.74	0.90	0.77	0.18	0.03	0.25	0.13	0.55
Cork, natural, raw and waste (including natural cork in blocks/sheets)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00
Fuel wood (excluding wood waste) and wood charcoal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pulpwood (including chips and wood waste)	0.03	0.00	0.10	0.04	0.00	0.07	0.00	0.00
Other wood in the rough/roughly squared	9.47	0.08	0.37	0.06	0.07	0.17	0.50	10.40

Table B.2.1. continuation of 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
Pulp and waste papers	113.63	117.28	139.43	138.73	122.65	211.59	209.53	238.66
Silk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Cotton	24.91	17.42	26.30	19.76	25.66	52.15	61.13	69.59
Jute, vegetable fibers and other textile bast fibers	3.94	2.13	0.98	2.40	0.62	1.72	0.06	0.62
Wool and other animal hair (excluding wool tops)	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.01
Other Biotic Raw Materials	40.29	82.54	101.25	62.70	63.12	61.85	80.03	117.51
Oil Seeds and Oleaginous Fruits	0.33	38.17	37.22	0.22	32.78	18.11	33.79	64.13
Crude animal and vegetable materials, N.E.S.	4.02	4.97	4.62	3.12	3.57	9.85	8.06	11.02
Animal oils and fats	14.03	12.00	11.80	11.83	9.64	10.95	12.81	10.92
Fixed vegetable oils and fats	19.41	25.04	44.27	45.95	13.83	20.76	23.49	29.29
Animal and vegetable oils, fats and waxes, processed	2.50	2.35	3.33	1.58	3.30	2.18	1.88	2.16
CRUDE MINERAL MATERIALS	479.19	744.88	651.18	452.42	896.55	2,231.06	2,124.92	1,967.37
Fertilizer, crude, other than division 56	0.03	0.05	13.21	16.94	382.05	1,605.72	1,294.84	895.03
Stone, sand and gravel	125.18	123.33	134.05	96.50	165.91	199.55	165.03	251.26
Other Crude Minerals (274+277+278)	259.08	509.45	423.10	221.70	201.34	259.78	420.77	374.14
Iron ore and concentrates	0.05	0.06	0.02	0.01	0.00	0.21	0.03	0.06
Other ores and concentrates	18.81	5.06	14.57	39.47	46.11	11.67	21.46	202.84
Waste and scrap metal of iron or steel	10.55	30.04	0.17	1.88	0.90	102.29	130.79	112.48
Non-ferrous base metal waste and scrap, N.E.S.	65.51	76.90	66.06	75.91	100.24	51.84	92.00	131.57
CRUDE FOSSIL MATERIALS	10,337.90	9,355.26	10,426.45	9,602.73	9,223.80	9,303.67	11,044.37	13,159.91
Coal, coke and briquette	273.78	469.11	316.41	1,023.30	1,473.78	1,243.02	667.12	1,599.36
Petroleum oils, crude and crude oils obtained from bituminous minerals	10,016.84	8,886.15	10,095.63	8,579.43	7,747.51	8,060.66	10,195.27	11,272.28
Natural gas	47.28	0.00	14.41	0.00	2.51	0.00	181.98	288.27

Table B.2.1. continuation of 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
SEMI-MANUFACTURED/FINAL PRODUCTS	12,274.68	25,386.06	13,418.41	10,597.94	11,223.96	18,595.85	30,474.73	36,740.77
Synthetic and reclaimed rubber	16.38	16.83	18.69	12.21	6.69	12.88	16.30	17.64
Synthetic fibers and old textile articles and clothing	54.97	57.61	51.31	34.85	45.82	61.59	65.55	60.04
Petroleum products	1,759.19	1,422.51	2,130.40	811.35	778.94	1,057.39	1,495.03	1,147.13
Natural gas products	69.26	195.10	70.05	27.08	59.04	67.84	0.01	0.00
Organic chemicals	285.10	269.27	333.86	252.82	228.84	323.22	360.61	368.74
Inorganic chemicals	539.90	430.89	364.61	413.24	510.81	645.38	722.61	688.03
Dyeing, tanning and coloring materials	25.49	27.55	30.80	24.73	20.50	29.77	39.61	35.55
Medicinal and pharmaceutical products	74.03	65.35	97.74	45.66	38.88	50.50	69.72	86.40
Essential oils and perfume materials, toilet, polishing and cleaning preparations	8.37	9.35	11.45	9.36	8.72	12.10	14.70	21.33
Fertilizers, manufactured	753.84	899.85	852.17	707.44	778.49	1,035.77	1,166.37	1,224.85
Explosives and pyrotechnic products	2.11	1.33	3.66	1.01	0.67	0.54	0.56	0.55
Artificial resins and plastic materials and cellulose esters and ethers	208.16	237.57	282.76	140.91	155.13	251.79	318.81	278.28
Chemical materials and products, N.E.S.	94.94	93.09	118.41	91.98	86.33	104.80	146.14	164.31
Leather, leather manufactures, N.E.S, and dressed furskins	5.49	4.44	3.50	1.90	1.86	1.68	1.68	2.26
Rubber manufactures, N.E.S	38.22	18.79	15.50	7.28	8.49	13.15	20.35	27.03
Cork and wood manufactures (excluding furniture)	2.24	2.63	1.92	0.70	97.67	96.17	4.77	184.91
Paper, paperboard and articles of paper pulp, of paper or of paperboard	144.85	168.42	163.71	184.14	186.46	216.31	252.58	249.48
Textile yarns, fabrics, made up articles	41.59	43.45	55.96	47.41	47.40	84.33	116.13	154.23
Non-metallic mineral manufactures, N.E.S.	123.67	111.23	97.38	53.63	59.37	155.60	531.31	484.11
Iron and steel	910.41	1,362.39	1,416.27	676.27	458.50	801.00	1,385.46	1,597.94
Non-ferrous metals	71.90	87.45	85.81	48.11	38.48	49.96	73.27	80.11
Manufactures of metal, N.E.S	115.38	208.20	196.19	56.86	94.29	135.81	165.38	195.11

Table B.2.1. continuation of 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
Power generating machinery and equipment	631.44	12,496.43	1,200.33	586.66	2,084.90	810.67	2,177.46	2,446.32
Machinery specialized for particular industries	322.24	211.10	409.56	139.35	124.81	7,449.71	15,079.75	21,208.06
Metalworking machinery	582.42	989.45	106.71	27.78	34.16	50.82	69.68	56.40
General industrial machinery and equipment, N.E.S., and machine parts, N.E.S.	138.48	120.86	1,152.93	52.73	66.10	68.94	75.59	94.05
Office machines and automatic data processing equipment	16.11	11.50	5.24	1.12	5.72	5.99	4.81	10.60
Telecommunication and sound recording and reproducing apparatus and equipment	5.83	5.65	7.28	4.35	3.30	4.53	6.77	10.40
Electrical machinery and electrical parts (including non-electrical)	377.37	433.50	445.40	336.63	266.44	403.79	470.51	674.47
Road vehicles (including air-cushion vehicles)	128.00	117.41	265.34	30.25	29.66	37.53	55.62	73.30
Other transport equipment	79.31	119.11	62.55	196.16	98.04	47.89	113.97	91.01
Sanitary, plumbing, heating and lighting fixtures and fittings, N.E.S.	63.12	28.12	3.24	3.28	1.54	1.54	2.20	2.57
Furniture and parts thereof	0.46	0.38	0.29	0.13	0.83	0.70	2.13	2.01
Travel goods, handbags and similar containers	0.07	0.08	0.13	0.06	0.18	0.29	0.14	0.23
Articles of apparel and clothing accessories	58.48	68.01	76.28	140.14	62.90	46.51	101.50	78.59
Footwear	0.20	0.92	1.29	0.03	0.33	0.15	0.58	1.22
Professional, scientific and controlling instruments and apparatus, N.E.S	81.33	69.34	69.62	31.77	40.62	35.30	47.05	59.82
Photographic apparatus, equipment and supplies and optical goods	26.39	26.39	26.39	26.39	26.39	26.39	26.39	26.39
Miscellaneous manufacturing articles, N.E.S	126.07	155.14	123.30	181.17	126.38	87.07	92.03	113.29
Special transactions not classified according to kind	4,289.56	4,797.46	3,058.88	5,186.20	4,534.02	4,308.47	5,181.00	4,723.45
Coin (other than gold coin), not being legal tender	1.39	1.92	1.49	4.79	6.28	2.01	0.63	0.52
Armored fighting vehicles, arms of war and ammunition and parts	0.93	0.01	0.01	0.01	0.00	0.00	0.00	0.03
Gold, non-monetary (excluding gold ores and concentrates)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table B.2.2. Imports into the Philippines, 1989 to 1996

(in thousand tons)

MATERIALS	1989	19990	1991	1992	1993	1994	1995	1996
TOTAL IMPORTS	105,694.48	65,010.99	36,343.51	42,633.78	42,851.40	45,608.92	53,909.37	63,291.65
BIOMASS	17.51	16.50	14.57	20.86	24.49	52.09	62.55	85.74
Live Animals	181.37	209.31	192.55	209.95	205.10	261.62	285.11	262.52
Live animals, except fish	170.98	165.93	184.65	182.08	146.88	154.48	173.63	208.12
Animals, live, N.E.S. (including zoo animals, dogs, cats, insects, etc.)	993.50	3,303.96	2,005.99	2,387.65	2,610.94	2,844.56	3,329.12	5,606.43
Items For Food	166.15	162.01	117.92	179.36	171.60	259.40	251.15	313.22
Meat and meat preparations	37.38	47.28	45.17	65.65	57.57	86.07	573.32	1,090.79
Dairy products and birds' eggs	16.51	15.47	34.82	44.97	47.86	74.33	88.63	99.04
Fish and fish preparations	11.49	19.42	20.42	21.15	26.57	30.00	35.73	36.66
Cereals and cereal preparation	13.66	11.51	10.78	15.18	19.67	22.44	29.16	30.08
Vegetables and fruits	18.49	15.36	25.17	28.74	23.23	46.49	38.00	18.85
Sugar, sugar preparations and honey	1,645.98	1,615.90	831.88	967.65	1,167.01	978.29	1,316.56	713.96
Miscellaneous edible products and preparations	789.46	765.80	704.98	982.14	1,283.38	1,184.16	1,514.74	2,254.19
Coffee, tea, cocoa, spices and manufactures thereof	1.36	2.00	1.29	1.40	1.00	0.95	1.27	2.13
Beverages	0.93	0.19	0.32	0.84	0.90	1.09	0.80	0.74
Tobacco and tobacco manufactures	0.00	0.00	0.00	0.00	0.01	0.00	0.06	0.02
Feeding stuff for animals (not including unmilled cereals)	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.01
Inedible Biotic Raw Materials	0.01	0.01	0.85	0.07	0.08	0.20	0.46	0.58
Hides, Skins and Furskins, Raw	415.92	392.02	299.95	572.45	818.94	691.11	995.22	1,734.05
Natural rubber	304.57	308.94	334.76	332.58	388.14	392.01	437.61	420.54
Cork, natural, raw and waste (including natural cork in blocks/sheets)	0.01	0.01	0.00	0.21	0.01	0.03	0.17	0.04
Fuel wood (excluding wood waste) and wood charcoal	66.41	62.54	67.56	73.45	71.03	95.59	75.17	93.34
Pulpwood (including chips and wood waste)	0.25	0.08	0.06	0.72	2.79	2.32	3.48	2.54
Other wood in the rough/roughly squared	0.01	0.01	0.18	0.39	0.47	0.83	0.51	0.20
Pulp and waste papers	141.73	136.89	165.84	189.34	173.01	303.40	229.32	358.24
Silk	79.48	74.15	110.21	99.53	115.03	215.46	157.04	240.72
Cotton	8.42	11.14	8.81	6.18	7.32	10.30	8.01	8.79
Jute, vegetable fibers and other textile bast fibers	9.48	9.39	8.81	14.67	12.99	13.21	18.39	20.39
Wool and other animal hair (excluding wool tops)	42.04	38.48	34.05	62.39	27.79	47.40	27.54	61.92
Other Biotic Raw Materials	2.31	3.74	3.96	6.56	9.88	17.03	18.35	26.43
Oil Seeds and Oleaginous Fruits	17.51	16.50	14.57	20.86	24.49	52.09	62.55	85.74
Crude animal and vegetable materials, N.E.S.	181.37	209.31	192.55	209.95	205.10	261.62	285.11	262.52

Table B.2.2. continuation of 1989 to 1996

(in thousand tons)

MATERIALS	1989	19990	1991	1992	1993	1994	1995	1996
Animal oils and fats	170.98	165.93	184.65	182.08	146.88	154.48	173.63	208.12
Fixed vegetable oils and fats	993.50	3,303.96	2,005.99	2,387.65	2,610.94	2,844.56	3,329.12	5,606.43
Animal and vegetable oils, fats and waxes, processed	166.15	162.01	117.92	179.36	171.60	259.40	251.15	313.22
CRUDE MINERAL MATERIALS	2,431.34	2,313.58	2,610.68	2,023.69	1,785.41	2,286.19	2,648.08	2,945.02
Fertilizer, crude, other than division 56	974.00	1,041.46	1,092.07	733.59	503.62	624.15	891.64	849.80
Stone, sand and gravel	309.74	338.91	290.79	290.59	260.03	325.66	430.33	417.26
Other Crude Minerals (274+277+278)	628.09	483.63	716.43	535.52	493.83	784.79	622.62	801.32
Iron ore and concentrates	40.45	21.96	0.01	52.09	0.00	0.19	0.01	0.01
Other ores and concentrates	238.00	253.65	356.99	346.12	460.77	516.71	638.94	639.83
Waste and scrap metal of iron or steel	182.45	77.62	153.55	62.79	64.16	33.51	63.94	131.42
Non-ferrous base metal waste and scrap, N.E.S.	58.61	96.36	0.85	2.99	3.00	1.19	0.60	105.39
CRUDE FOSSIL MATERIALS	13,308.71	7,530.88	14,450.60	16,314.04	15,231.78	16,006.20	21,891.19	24,730.67
Coal, coke and briquette	1,180.44	1,140.53	1,522.60	1,079.22	1,162.32	1,334.55	2,061.69	3,660.68
Petroleum oils, crude and crude oils obtained from bituminous minerals	11,602.15	5,903.45	12,570.85	14,750.02	13,500.63	13,976.81	19,168.72	20,478.49
Natural gas	526.12	486.90	357.15	484.80	568.83	694.84	660.78	591.50
SEMI-MANUFACTURED/FINAL PRODUCTS	85,748.75	48,637.30	14,920.71	18,983.74	19,845.00	20,980.61	21,377.19	24,474.36
Synthetic and reclaimed rubber	19.62	21.21	18.94	24.02	24.95	29.40	27.18	26.91
Synthetic fibers and old textile articles and clothing	58.27	46.90	57.28	68.84	56.13	83.28	80.06	92.80
Petroleum products	1,902.58	1,364.30	2,034.83	2,573.61	3,633.90	4,506.70	1,764.88	1,575.13
Natural gas products	0.91	0.00	207.16	287.11	490.71	625.88	621.35	561.38
Organic chemicals	399.30	392.52	332.44	392.05	427.04	444.66	439.57	454.16
Inorganic chemicals	895.33	868.27	1,038.60	2,353.54	868.06	1,041.64	1,004.41	1,084.32
Dyeing, tanning and coloring materials	56.97	54.29	47.29	51.18	59.81	68.48	73.50	72.92
Medicinal and pharmaceutical products	77.69	81.36	13.88	12.31	13.99	15.37	14.57	18.81
Essential oils and perfume materials, toilet, polishing and cleaning preparations	20.76	21.79	24.91	26.05	29.80	38.77	52.69	52.40
Fertilizers, manufactured	955.89	1,391.84	1,287.18	1,288.46	1,455.45	1,665.24	1,523.16	1,520.45
Explosives and pyrotechnic products	0.49	0.62	388.50	483.06	575.55	680.70	575.14	765.60
Artificial resins and plastic materials and cellulose esters and ethers	379.15	422.79	19.09	27.28	37.45	50.37	61.69	81.15
Chemical materials and products, N.E.S.	178.86	218.69	96.04	109.44	233.10	147.03	177.20	253.11
Leather, leather manufactures, N.E.S, and dressed furskins	5.58	8.10	5.03	7.84	20.50	9.45	8.23	7.39
Rubber manufactures, N.E.S	40.38	31.96	20.69	37.41	57.97	59.59	73.44	93.27

Table B.2.2. continuation of 1989 to 1996

(in thousand tons)

MATERIALS	1989	19990	1991	1992	1993	1994	1995	1996
Cork and wood manufactures (excluding furniture)	1,017.94	191.36	10.70	26.37	40.85	79.70	130.11	223.52
Paper, paperboard and articles of paper pulp, of paper or of paperboard	275.96	298.58	241.22	322.99	385.89	511.94	454.01	513.17
Textile yarns, fabrics, made up articles	167.82	202.13	134.44	158.48	190.75	201.96	212.83	562.66
Non-metallic mineral manufactures, N.E.S.	800.10	1,614.26	392.46	1,869.44	1,013.27	988.80	1,976.73	3,414.68
Iron and steel	2,163.90	1,723.66	1,780.17	2,499.63	3,010.34	3,249.89	4,605.17	4,868.81
Non-ferrous metals	105.64	98.12	105.51	141.13	160.16	175.18	194.07	221.94
Manufactures of metal, N.E.S	283.13	289.04	94.01	127.82	223.19	211.01	222.55	250.03
Power generating machinery and equipment	2,119.79	2,463.70	90.16	121.67	159.32	166.46	132.33	144.58
Machinery specialized for particular industries	66,565.96	29,541.35	121.40	148.64	129.03	157.80	213.88	277.71
Metalworking machinery	142.80	165.97	18.95	33.73	28.07	27.07	43.50	50.84
General industrial machinery and equipment, N.E.S., and machine parts, N.E.S.	157.56	206.30	72.38	90.52	112.17	127.78	151.15	208.02
Office machines and automatic data processing equipment	11.46	8.58	7.21	9.95	12.46	16.11	21.52	24.67
Telecommunication and sound recording and reproducing apparatus and equipment	18.48	19.50	20.53	23.90	29.31	43.73	55.54	74.21
Electrical machinery and electrical parts (including non-electrical)	879.33	1,051.46	106.62	131.44	163.73	159.39	216.07	267.12
Road vehicles (including air-cushion vehicles)	162.87	162.71	214.59	288.86	323.99	342.76	445.77	578.66
Other transport equipment	51.73	84.76	8.29	44.50	60.11	200.96	98.76	79.99
Sanitary, plumbing, heating and lighting fixtures and fittings, N.E.S.	4.06	4.71	3.95	6.74	9.75	8.53	10.23	15.98
Furniture and parts thereof	4.31	8.38	4.40	6.80	10.80	16.98	26.40	42.51
Travel goods, handbags and similar containers	0.35	0.31	0.38	0.39	0.78	1.54	1.45	1.98
Articles of apparel and clothing accessories	64.05	73.87	4.23	5.75	7.29	8.43	10.34	10.22
Footwear	1.74	1.84	5.15	5.33	6.96	8.60	9.81	13.86
Professional, scientific and controlling instruments and apparatus, N.E.S	77.30	111.75	5.91	7.90	8.70	10.55	11.18	12.24
Photographic apparatus, equipment and supplies and optical goods	26.39	26.39	26.39	26.39	26.39	26.39	26.39	26.39
Miscellaneous manufacturing articles, N.E.S	144.51	146.51	46.84	62.84	77.69	89.86	107.01	110.14
Special transactions not classified according to kind	5,507.87	5,211.15	5,810.85	5,080.34	5,669.58	4,682.65	5,503.35	5,820.63
Coin (other than gold coin), not being legal tender	0.87	6.25	2.10	0.00	0.00	0.00	0.00	0.00
Armored fighting vehicles, arms of war and ammunition and parts	1.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Gold, non-monetary (excluding gold ores and concentrates)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table B.2.3. Imports into the Philippines, 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
TOTAL IMPORTS	99,250.84	54,651.95	54,368.56	58,584.86	59,849.67	57,932.50	1,114,115.89
BIOMASS	8,956.99	9,873.08	9,336.80	10,203.15	10,282.87	11,579.64	135,520.23
Live Animals	3.30	71.13	88.44	73.85	34.79	42.25	684.86
Live animals, except fish	3.30	71.13	88.44	73.85	34.79	42.25	548.05
Animals, live, N.E.S. (including zoo animals, dogs, cats, insects, etc.)	0.00	0.00					136.80
Items For Food	7,078.13	8,171.30	7,108.62	7,977.70	8,264.95	9,612.43	109,708.45
Meat and meat preparations	113.24	91.94	175.53	179.40	155.77	181.21	1,248.41
Dairy products and birds' eggs	310.98	258.10	286.01	341.14	352.47	370.54	4,855.66
Fish and fish preparations	210.49	149.45	220.65	192.41	108.61	174.77	2,815.96
Cereals and cereal preparation	4,375.43	5,106.40	3,890.47	4,731.53	4,846.85	5,705.66	64,172.34
Vegetables and fruits	404.72	336.98	454.42	438.51	462.57	400.05	4,434.69
Sugar, sugar preparations and honey	175.83	575.25	691.88	413.50	377.19	385.84	4,879.63
Miscellaneous edible products and preparations	99.27	85.53	154.56	201.40	256.78	321.50	1,580.12
Coffee, tea, cocoa, spices and manufactures thereof	49.30	46.27	45.35	59.76	69.65	85.72	673.23
Beverages	49.39	24.96	30.59	33.03	55.29	45.37	435.78
Tobacco and tobacco manufactures	30.19	28.07	37.71	40.52	30.44	45.35	575.45
Feeding stuff for animals (not including unmilled cereals)	1,259.29	1,468.35	1,121.47	1,346.50	1,549.34	1,896.42	24,037.18
Inedible Biotic Raw Materials	1,557.34	1,279.67	1,518.51	1,591.07	1,393.21	1,350.97	19,804.99
Hides, Skins and Furskins, Raw	2.78	2.83	0.71	0.76	0.55	0.14	27.57
Natural rubber	0.95	0.84	0.73	0.79	1.21	0.80	15.69
Cork, natural, raw and waste (including natural cork in blocks/sheets)	0.00	0.01	0.04	0.03	0.02	0.09	0.33
Fuel wood (excluding wood waste) and wood charcoal	0.01	0.01	0.03	0.57	0.07	0.03	0.80
Pulpwood (including chips and wood waste)	0.79	3.78	4.58	18.98	13.30	0.79	44.73
Other wood in the rough/roughly squared	1,058.37	734.18	908.35	921.17	815.76	779.57	11,158.20
Pulp and waste papers	408.91	486.07	534.37	580.51	504.50	510.96	7,235.97
Silk	0.03	0.01	0.01	0.01	0.17	0.08	0.81
Cotton	83.18	50.78	68.45	62.34	56.13	57.54	1,280.44
Jute, vegetable fibers and other textile bast fibers	1.87	0.63	0.75	5.49	1.17	0.50	35.12
Wool and other animal hair (excluding wool tops)	0.45	0.52	0.49	0.43	0.32	0.46	5.34
Other Biotic Raw Materials	318.21	350.98	621.23	560.53	589.92	574.00	5,321.93
Oil Seeds and Oleaginous Fruits	200.05	236.22	375.81	366.52	437.90	410.32	3,343.19
Crude animal and vegetable materials, N.E.S.	11.72	9.75	14.39	15.16	19.14	22.45	210.81
Animal oils and fats	25.57	31.62	44.22	33.69	30.58	29.04	396.03

Table B.2.3. continuation of 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
Fixed vegetable oils and fats	59.75	50.06	157.87	119.09	64.96	71.41	1,086.78
Animal and vegetable oils, fats and waxes, processed	21.11	23.34	28.95	26.07	37.34	40.78	285.12
CRUDE MINERAL MATERIALS	2,633.42	2,044.32	3,041.56	2,771.72	3,092.15	2,623.53	44,798.28
Fertilizer, crude, other than division 56	414.34	669.92	657.86	356.82	919.33	524.62	14,461.10
Stone, sand and gravel	503.59	256.28	525.88	491.35	424.80	411.51	6,537.52
Other Crude Minerals (274+277+278)	871.96	405.89	879.92	1,082.39	898.34	1,107.33	12,981.40
Iron ore and concentrates	0.03	65.11	76.60	253.93	174.34	46.66	731.82
Other ores and concentrates	623.70	526.57	813.10	529.30	617.02	460.17	7,380.86
Waste and scrap metal of iron or steel	72.59	62.35	5.57	3.18	2.97	3.36	1,308.54
Non-ferrous base metal waste and scrap, N.E.S.	147.22	58.20	82.63	54.74	55.35	69.89	1,397.05
CRUDE FOSSIL MATERIALS	26,000.37	24,413.06	24,268.85	23,298.68	23,769.91	20,449.68	354,118.71
Coal, coke and briquette	4,536.92	5,120.01	4,879.67	4,879.72	5,320.49	5,495.95	50,440.66
Petroleum oils, crude and crude oils obtained from bituminous minerals	20,990.12	18,781.72	19,389.18	18,418.97	18,449.41	14,953.73	297,788.01
Natural gas	473.34	511.33	0.00		0.00	0.00	5,890.04
SEMI-MANUFACTURED/FINAL PRODUCTS	61,660.07	18,321.49	17,721.35	22,311.30	22,704.75	23,279.65	579,678.68
Synthetic and reclaimed rubber	26.95	25.79	34.98	33.04	26.35	24.34	481.30
Synthetic fibers and old textile articles and clothing	91.75	101.16	109.63	114.91	117.57	134.24	1,644.56
Petroleum products	2,026.15	3,506.29	2,189.78	3,520.92	2,817.71	5,111.66	49,130.34
Natural gas products	496.50	402.19	0.01	0.00	0.00	0.00	4,181.58
Organic chemicals	467.14	578.81	867.27	840.03	779.00	884.95	10,121.39
Inorganic chemicals	1,170.17	1,050.09	1,019.88	1,034.76	989.85	971.85	19,706.25
Dyeing, tanning and coloring materials	55.71	71.01	88.84	94.69	93.73	99.35	1,221.78
Medicinal and pharmaceutical products	15.64	14.64	18.21	22.81	24.98	26.51	899.05
Essential oils and perfume materials, toilet, polishing and cleaning preparations	76.37	74.05	99.15	142.58	161.92	155.24	1,071.86
Fertilizers, manufactured	1,680.79	1,618.94	1,593.91	1,771.55	1,813.25	1,546.03	28,530.91
Explosives and pyrotechnic products	877.79	604.60	555.46	592.04	571.42	629.83	7,311.26
Artificial resins and plastic materials and cellulose esters and ethers	86.02	73.77	92.20	97.37	96.68	106.63	3,505.06
Chemical materials and products, N.E.S.	280.28	198.67	273.37	324.39	363.71	412.17	4,166.03
Leather, leather manufactures, N.E.S, and dressed furskins	6.78	5.19	4.71	4.11	3.90	3.26	122.88
Rubber manufactures, N.E.S	82.57	50.97	79.07	91.12	109.18	114.85	1,091.28
Cork and wood manufactures (excluding furniture)	222.47	153.91	253.17	219.17	197.11	180.27	3,337.67
Paper, paperboard and articles of paper pulp, of paper or of paperboard	602.59	509.72	649.86	621.88	701.23	742.39	8,397.37

Table B.2.3. continuation of 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
Textile yarns, fabrics, made up articles	254.11	230.26	275.76	265.96	359.62	358.53	4,165.81
Non-metallic mineral manufactures, N.E.S.	2,830.33	716.11	865.77	1,818.55	3,361.46	1,217.66	24,495.90
Iron and steel	4,447.66	2,669.93	3,867.50	3,530.31	3,828.25	4,305.24	55,158.70
Non-ferrous metals	208.43	177.74	268.48	269.74	238.26	263.03	3,162.51
Manufactures of metal, N.E.S	318.08	201.94	195.73	221.70	246.67	233.14	4,285.26
Power generating machinery and equipment	4,090.28	102.86	99.27	124.35	103.55	87.93	32,440.47
Machinery specialized for particular industries	704.74	106.46	109.90	126.41	124.80	115.69	143,388.32
Metalworking machinery	70.29	22.12	23.03	22.98	30.68	18.95	2,616.36
General industrial machinery and equipment, N.E.S., and machine parts, N.E.S.	256.21	155.08	152.46	154.51	135.91	202.87	3,952.59
Office machines and automatic data processing equipment	37.22	30.21	37.15	41.05	49.75	60.99	429.42
Telecommunciation and sound recording and reproducing apparatus and equipment	71.26	56.66	50.64	63.72	62.98	100.64	739.21
Electrical machinery and electrical parts (including non-electrical)	14,265.03	211.13	214.78	224.67	254.92	261.56	21,815.36
Road vehicles (including air-cushion vehicles)	19,826.96	214.26	300.18	371.49	433.02	466.33	24,869.58
Other transport equipment	124.34	24.22	37.99	6.75	15.87	23.51	1,669.81
Sanitary, plumbing, heating and lighting fixtures and fittings, N.E.S.	33.19	14.10	20.57	22.08	19.29	19.65	298.44
Furniture and parts thereof	193.90	31.76	46.18	58.81	59.24	69.67	587.04
Travel goods, handbags and similar containers	16.33	1.98	2.72	4.16	6.50	9.62	49.68
Articles of apparel and clothing accessories	13.77	10.71	10.49	18.60	43.26	21.25	934.65
Footwear	18.98	22.73	31.06	33.80	37.97	42.53	245.08
Professional, scientific and controlling instruments and apparatus, N.E.S	24.92	12.09	11.98	14.91	13.37	11.83	769.48
Photographic apparatus, equipment and supplies and optical goods	26.39	26.39	14.97	16.07	15.68	15.89	537.58
Miscellaneous manufacturing articles, N.E.S	141.76	113.63	147.78	164.25	215.59	219.21	2,792.06
Special transactions not classified according to kind	5,420.21	4,129.32	3,007.45	5,210.97	4,180.52	4,010.30	105,324.21
Coin (other than gold coin), not being legal tender	0.00	0.03	0.02	0.10	0.00	0.07	28.47
Armored fighting vechicles, arms of war and ammunition and parts	0.00	0.00					2.06
Gold, non-monetary (excluding gold ores and concentrates)	0.00	0.00	0.02	0.01	0.01	0.01	0.05

Table B.3.1. Exports of the Philippines, 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
TOTAL EXPORTS	18,453.15	19,280.20	16,925.32	21,992.94	18,040.51	19,738.29	20,401.01	21,129.21
BIOMASS	7,650.76	7,927.45	7,307.78	6,829.55	5,894.19	6,375.64	5,847.63	5,230.04
Live Animals	7.39	121.29	70.73	13.02	23.97	25.02	26.32	31.08
Live animals, except fish	0.00	0.00	0.09	0.06	0.02	0.02	0.02	0.02
Animals, live, N.E.S. (including zoo animals, dogs, cats, insects, etc.)	7.39	121.29	70.64	12.97	23.95	25.00	26.29	31.06
Items For Food	4,666.11	4,726.89	4,019.62	4,165.92	3,546.80	3,473.61	3,249.05	3,036.98
Meat and meat preparations	0.92	0.84	0.40	0.48	0.22	0.37	0.22	0.31
Dairy products and birds' eggs	3.39	3.54	5.23	0.77	0.39	3.07	1.45	0.43
Fish and fish preparations	81.64	61.87	71.49	69.05	79.19	82.28	95.51	122.46
Cereals and cereal preparation	114.15	5.24	52.07	7.63	5.30	5.01	135.48	6.92
Vegetables and fruits	1,650.42	1,764.76	1,345.73	1,594.50	1,596.28	1,706.45	1,692.73	1,776.30
Sugar, sugar preparations and honey	1,987.27	2,091.88	1,804.93	1,953.96	1,254.14	624.52	391.89	419.12
Miscellaneous edible products and preparations	6.11	8.00	9.76	7.92	9.54	10.11	11.14	18.62
Coffee, tea, cocoa, spices and manufactures thereof	86.13	95.05	74.35	82.69	75.96	89.53	58.62	72.27
Beverages	1,593.74	1,748.21	1,992.27	1,901.76	1,489.24	1,201.76	1,157.06	1,084.57
Tobacco and tobacco manufactures	0.04	0.03	0.03	0.16	0.08	0.04	0.07	0.05
Feeding stuff for animals (not including unmilled cereals)	14.73	13.04	8.27	9.09	18.92	19.01	11.86	18.67
Inedible Biotic Raw Materials	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hides, Skins and Furskins, Raw	41.47	32.12	20.65	32.46	52.75	50.59	65.51	51.66
Natural rubber	1.09	64.21	139.64	177.32	230.26	134.37	230.23	182.64
Cork, natural, raw and waste (including natural cork in blocks/sheets)	1,440.21	1,544.64	1,741.31	1,593.74	1,111.62	910.70	749.57	741.24
Fuel wood (excluding wood waste) and wood charcoal	14.18	8.66	6.50	6.92	7.90	15.40	14.97	11.24
Pulpwood (including chips and wood waste)	41.06	43.84	38.79	43.12	34.11	36.15	42.87	41.12
Other wood in the rough/roughly squared	0.29	0.22	0.03	0.01	0.05	0.04	0.01	0.01
Pulp and waste papers	40.67	41.43	37.07	38.95	33.56	35.47	41.96	37.94
Silk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cotton	1,383.52	1,331.06	1,225.15	748.84	834.18	1,675.25	1,415.20	1,077.41
Jute, vegetable fibers and other textile bast fibers	159.88	242.31	40.76	30.22	31.34	165.48	160.35	105.93
Wool and other animal hair (excluding wool tops)	24.75	26.86	25.83	26.43	33.07	40.66	38.50	41.22
Other Biotic Raw Materials	0.63	0.25	0.42	0.42	0.64	0.62	0.22	0.13
Oil Seeds and Oleaginous Fruits	1,196.06	1,059.53	1,155.73	675.84	750.52	1,448.44	1,196.32	911.95
Crude animal and vegetable materials, N.E.S.	2.21	2.11	2.42	15.93	18.60	20.04	19.81	18.18

Table B.3.1. continuation of 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
Animal oils and fats	7,650.76	7,927.45	7,307.78	6,829.55	5,894.19	6,375.64	5,847.63	5,230.04
Fixed vegetable oils and fats	7.39	121.29	70.73	13.02	23.97	25.02	26.32	31.08
Animal and vegetable oils, fats and waxes, processed	0.00	0.00	0.09	0.06	0.02	0.02	0.02	0.02
CRUDE MINERAL MATERIALS	2,676.04	2,555.38	1,947.87	1,956.25	1,867.56	1,600.66	1,807.81	1,897.91
Fertilizer, crude, other than division 56	0.20	1.85	2.80	2.25	1.76	1.96	4.19	20.85
Stone, sand and gravel	43.13	39.72	14.96	18.55	26.62	80.26	326.50	150.03
Other Crude Minerals (274+277+278)	41.28	375.02	348.61	419.47	426.74	316.35	276.40	330.99
Iron ore and concentrates	44.38	23.09	19.31	21.95	29.77	30.67	13.05	12.91
Other ores and concentrates	2,540.13	2,108.20	1,551.68	1,478.09	1,363.16	1,150.53	1,149.01	1,332.69
Waste and scrap metal of iron or steel	1.66	1.85	1.19	0.99	1.12	1.00	1.54	2.32
Non-ferrous base metal waste and scrap, N.E.S.	5.27	5.65	9.32	14.95	18.39	19.90	37.11	48.13
CRUDE FOSSIL MATERIALS	3.99	1.40	4.11	0.00	0.00	0.00	1.73	0.00
Coal, coke and briquette	3.99	0.68	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum oils, crude and crude oils obtained from bituminous minerals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural gas	0.00	0.72	4.11	0.00	0.00	0.00	1.73	0.00
SEMI-MANUFACTURED/FINAL PRODUCTS	8,122.36	8,795.97	7,665.56	13,207.14	10,278.77	11,761.98	12,743.84	14,001.25
Synthetic and reclaimed rubber	0.00	1.38	1.68	1.07	0.66	0.41	0.39	0.00
Synthetic fibers and old textile articles and clothing	0.07	2.16	1.67	4.16	0.49	0.64	0.89	3.17
Petroleum products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural gas products	35.12	3.17	3.93	30.37	65.63	86.96	134.61	155.58
Organic chemicals	68.25	85.52	93.28	72.81	89.16	98.84	104.32	118.80
Inorganic chemicals	14.28	13.52	144.37	179.77	109.22	77.49	172.70	147.24
Dyeing, tanning and coloring materials	0.51	0.50	2.81	0.52	0.18	0.21	0.48	0.92
Medicinal and pharmaceutical products	252.62	250.09	310.23	381.00	457.14	448.25	408.37	359.82
Essential oils and perfume materials, toilet, polishing and cleaning preparations	1.74	1.24	1.86	5.38	7.32	8.34	9.67	10.61
Fertilizers, manufactured	0.12	0.01	0.22	5.60	221.99	679.16	626.46	452.01
Explosives and pyrotechnic products	0.56	0.88	0.70	0.49	0.76	2.36	1.87	3.10
Artificial resins and plastic materials and cellulose esters and ethers	26.94	21.68	15.56	12.00	17.25	19.89	27.07	26.08
Chemical materials and products, N.E.S.	16.49	14.91	14.01	17.50	23.63	25.69	40.03	34.21
Leather, leather manufactures, N.E.S, and dressed furskins	0.11	0.08	0.06	0.17	0.07	0.24	0.32	0.31
Rubber manufactures, N.E.S	0.67	0.73	1.19	0.75	0.85	1.68	2.96	3.28

Table B.3.1. continuation of 1981 to 1988

(in thousand tons)

MATERIALS	1981	1982	1983	1984	1985	1986	1987	1988
Cork and wood manufactures (excluding furniture)	482.61	1,209.31	512.39	466.93	464.75	1,204.52	645.26	724.26
Paper, paperboard and articles of paper pulp, of paper or of paperboard	11.46	10.61	7.72	1.80	1.02	4.18	1.80	3.81
Textile yarns, fabrics, made up articles	39.34	29.32	30.04	26.36	29.31	30.73	40.43	34.96
Non-metallic mineral manufactures, N.E.S.	683.87	713.30	294.33	204.31	466.38	151.66	84.25	56.44
Iron and steel	65.55	40.03	63.41	77.46	88.38	77.24	99.15	117.60
Non-ferrous metals	26.76	16.20	40.64	101.32	173.34	164.97	131.00	152.28
Manufactures of metal, N.E.S	23.43	21.33	16.53	13.66	11.20	13.10	26.13	20.93
Power generating machinery and equipment	14.59	235.88	68.32	16.40	7.78	22.48	23.42	2.82
Machinery specialized for particular industries	66.38	170.17	35.60	2,729.32	1,010.14	397.91	109.14	17.53
Metalworking machinery	0.00	0.02	0.00	0.00	0.09	0.00	0.03	0.00
General industrial machinery and equipment, N.E.S., and machine parts, N.E.S.	0.44	1.00	1.45	1.62	5.99	8.07	13.35	30.23
Office machines and automatic data processing equipment	0.07	0.03	0.02	0.11	0.08	0.06	0.06	0.13
Telecommunication and sound recording and reproducing apparatus and equipment	1.42	1.19	4.92	1.71	8.61	18.88	11.99	10.19
Electrical machinery and electrical parts (including non-electrical)	355.95	790.03	1,532.57	2,967.33	1,567.11	3,064.89	4,103.84	4,991.77
Road vehicles (including air-cushion vehicles)	707.83	392.92	274.63	379.10	247.63	275.27	451.58	128.77
Other transport equipment	2.28	0.79	0.43	0.16	0.59	0.39	0.26	0.09
Sanitary, plumbing, heating and lighting fixtures and fittings, N.E.S.	6.23	2.83	2.81	3.12	2.98	3.41	4.70	5.55
Furniture and parts thereof	53.91	44.86	52.60	55.54	71.43	57.29	79.92	88.75
Travel goods, handbags and similar containers	23.59	16.63	1.78	1.27	2.43	3.80	4.60	5.56
Articles of apparel and clothing accessories	44.77	40.95	44.26	37.56	38.41	43.25	41.87	46.25
Footwear	14.61	14.67	12.67	12.54	10.86	8.07	7.09	10.14
Professional, scientific and controlling instruments and apparatus, N.E.S	41.68	25.03	31.94	31.39	17.11	2.26	13.38	7.22
Photographic apparatus, equipment and supplies and optical goods	4.05	2.91	2.86	0.58	0.63	0.71	0.78	2.33
Miscellaneous manufacturing articles, N.E.S	188.45	136.85	97.75	112.53	97.53	116.00	128.27	154.05
Special transactions not classified according to kind	4,315.05	4,483.23	3,944.33	5,252.60	4,960.59	4,642.67	5,191.35	6,074.48
Coin (other than gold coin), not being legal tender	0.00	0.00	0.00	0.84	0.01	0.00	0.00	0.00
Armored fighting vehicles, arms of war and ammunition and parts	530.57	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Gold, non-monetary (excluding gold ores and concentrates)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table B.3.2. Exports of the Philippines, 1989 to 1996

(in thousand tons)

MATERIALS	1989	19990	1991	1992	1993	1994	1995	1996
TOTAL EXPORTS	21,995.93	24,807.87	15,671.45	13,943.82	14,970.06	15,798.01	33,447.55	20,671.84
BIOMASS	5,287.55	5,414.93	5,035.42	4,674.80	5,422.91	5,063.07	11,271.96	9,712.83
Live Animals	43.64	24.35	0.10	0.08	0.08	0.09	0.12	0.08
Live animals, except fish	0.02	0.01	0.10	0.08	0.08	0.09	0.12	0.08
Animals, live, N.E.S. (including zoo animals, dogs, cats, insects, etc.)	43.62	24.34	0.00	0.00	0.00	0.00	0.00	0.00
Items For Food	3,425.31	3,588.79	3,687.09	3,343.24	4,091.21	3,797.99	7,502.18	7,167.77
Meat and meat preparations	0.22	0.63	0.66	0.06	0.07	0.06	0.39	0.15
Dairy products and birds' eggs	0.28	0.27	0.28	0.32	0.63	0.46	1.40	3.18
Fish and fish preparations	141.12	139.37	166.11	150.88	193.16	202.00	358.89	341.80
Cereals and cereal preparation	26.29	7.47	42.08	47.83	8.60	9.45	18.35	28.51
Vegetables and fruits	1,806.40	1,751.97	1,956.08	1,806.23	2,271.55	2,302.90	4,572.61	4,607.73
Sugar, sugar preparations and honey	795.63	845.17	685.59	621.85	952.91	508.74	581.92	827.37
Miscellaneous edible products and preparations	23.86	27.49	19.46	20.60	26.45	28.40	57.81	61.79
Coffee, tea, cocoa, spices and manufactures thereof	68.33	65.50	86.17	56.47	51.40	58.73	117.00	116.68
Beverages	771.65	302.12	208.59	198.70	235.17	184.46	437.28	552.66
Tobacco and tobacco manufactures	0.01	0.18	0.26	0.01	0.01	0.01	0.02	0.08
Feeding stuff for animals (not including unmilled cereals)	16.78	21.76	28.22	21.73	28.90	25.82	58.27	78.91
Inedible Biotic Raw Materials	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Hides, Skins and Furskins, Raw	49.76	62.47	60.59	58.59	62.97	50.52	88.84	101.81
Natural rubber	120.72	54.49	0.78	1.04	1.20	1.11	2.06	97.37
Cork, natural, raw and waste (including natural cork in blocks/sheets)	511.26	93.55	46.06	43.92	72.09	30.22	130.15	132.15
Fuel wood (excluding wood waste) and wood charcoal	10.15	11.06	17.16	14.47	13.24	14.56	28.46	32.73
Pulpwood (including chips and wood waste)	31.81	29.58	28.66	33.21	35.79	38.11	80.54	65.38
Other wood in the rough/roughly squared	0.01	0.02	0.05	0.00	0.00	0.03	0.22	0.06
Pulp and waste papers	31.16	28.99	26.81	25.74	20.98	24.06	48.70	44.16
Silk	0.00	0.00	0.01	0.00	0.00	0.02	0.02	0.00
Cotton	1,046.94	1,499.66	1,139.64	1,132.78	1,096.44	1,080.53	3,332.38	1,992.32
Jute, vegetable fibers and other textile bast fibers	107.55	122.64	103.27	58.01	45.33	29.95	84.89	9.41
Wool and other animal hair (excluding wool tops)	45.71	52.56	48.23	39.92	42.88	46.64	106.98	102.82
Other Biotic Raw Materials	0.10	0.11	0.23	0.24	0.13	0.06	0.04	0.01
Oil Seeds and Oleaginous Fruits	878.33	1,309.05	968.90	1,017.46	990.03	976.91	3,083.78	1,823.28

Table B.3.2. continuation of 1989 to 1996

(in thousand tons)

MATERIALS	1989	19990	1991	1992	1993	1994	1995	1996
Crude animal and vegetable materials, N.E.S.	15.24	15.29	19.01	17.15	18.07	26.96	56.68	56.81
Animal oils and fats	5,287.55	5,414.93	5,035.42	4,674.80	5,422.91	5,063.07	11,271.96	9,712.83
Fixed vegetable oils and fats	43.64	24.35	0.10	0.08	0.08	0.09	0.12	0.08
Animal and vegetable oils, fats and waxes, processed	0.02	0.01	0.10	0.08	0.08	0.09	0.12	0.08
CRUDE MINERAL MATERIALS	2,042.26	2,120.96	2,373.30	2,196.64	2,075.34	2,137.28	5,012.08	5,291.97
Fertilizer, crude, other than division 56	3.03	3.57	2.30	1.19	7.50	1.47	13.25	14.14
Stone, sand and gravel	184.74	150.89	111.20	128.16	123.56	240.46	588.05	492.07
Other Crude Minerals (274+277+278)	301.75	443.95	443.73	581.14	607.57	480.87	999.28	1,036.73
Iron ore and concentrates	0.14	40.38	6.67	20.51	20.13	13.06	0.00	0.00
Other ores and concentrates	1,485.71	1,364.21	1,698.86	1,377.96	1,186.59	1,239.62	2,999.13	3,453.41
Waste and scrap metal of iron or steel	1.96	2.97	2.01	2.42	13.63	28.73	31.45	19.26
Non-ferrous base metal waste and scrap, N.E.S.	64.93	114.99	108.52	85.27	116.36	133.07	380.92	276.36
CRUDE FOSSIL MATERIALS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coal, coke and briquette	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum oils, crude and crude oils obtained from bituminous minerals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEMI-MANUFACTURED/FINAL PRODUCTS	14,666.12	17,271.98	8,262.73	7,072.38	7,471.81	8,597.66	17,163.51	5,667.03
Synthetic and reclaimed rubber	0.31	0.45	0.34	2.25	0.31	0.07	0.40	0.41
Synthetic fibers and old textile articles and clothing	0.64	0.56	1.79	7.46	14.81	13.99	31.59	21.15
Petroleum products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural gas products	282.30	282.30	328.40	439.73	607.93	636.56	1,138.42	1,094.28
Organic chemicals	114.70	102.68	59.33	49.81	47.33	43.39	83.02	82.20
Inorganic chemicals	268.54	220.56	248.18	97.67	83.29	87.08	35.32	67.14
Dyeing, tanning and coloring materials	1.12	0.53	1.76	4.25	2.73	3.91	8.49	9.26
Medicinal and pharmaceutical products	404.88	563.78	1.83	1.97	2.07	2.60	6.32	9.58
Essential oils and perfume materials, toilet, polishing and cleaning preparations	5.83	8.68	20.58	20.91	18.55	19.17	46.09	44.94
Fertilizers, manufactured	533.85	508.30	733.73	577.56	638.63	672.96	1,547.48	1,354.67
Explosives and pyrotechnic products	6.28	7.17	10.63	10.06	12.75	25.36	51.12	39.97
Artificial resins and plastic materials and cellulose esters and ethers	21.98	26.60	16.29	22.67	24.71	23.97	44.40	45.74
Chemical materials and products, N.E.S.	35.70	35.57	41.67	43.60	38.38	52.12	86.31	94.22

Table B.3.2. continuation of 1989 to 1996

(in thousand tons)

MATERIALS	1989	19990	1991	1992	1993	1994	1995	1996
Leather, leather manufactures, N.E.S, and dressed furskins	0.54	1.32	0.21	0.55	0.16	0.11	0.40	0.38
Rubber manufactures, N.E.S	3.93	5.18	7.34	4.82	5.15	5.67	12.36	13.61
Cork and wood manufactures (excluding furniture)	1,019.30	2,847.54	203.15	159.78	122.60	110.33	215.55	210.01
Paper, paperboard and articles of paper pulp, of paper or of paperboard	5.85	9.34	19.06	12.41	16.29	15.31	63.02	72.26
Textile yarns, fabrics, made up articles	58.59	40.99	31.73	38.16	40.16	57.89	122.62	147.68
Non-metallic mineral manufactures, N.E.S.	68.66	74.56	101.08	101.82	143.70	138.31	374.61	142.50
Iron and steel	113.28	209.48	130.15	59.43	123.12	136.10	224.98	347.72
Non-ferrous metals	138.67	133.75	134.40	139.07	183.13	194.84	395.02	393.09
Manufactures of metal, N.E.S	19.99	28.43	29.13	20.48	26.00	48.22	100.49	123.24
Power generating machinery and equipment	12.69	0.68	0.28	1.42	1.00	1.92	0.96	4.85
Machinery specialized for particular industries	4.59	5.55	5.70	5.94	2.94	4.30	10.83	15.90
Metalworking machinery	0.00	0.00	1.69	0.48	0.77	1.91	4.80	7.07
General industrial machinery and equipment, N.E.S., and machine parts, N.E.S.	27.25	13.40	2.94	3.19	3.92	5.57	13.68	15.74
Office machines and automatic data processing equipment	0.82	0.99	5.64	5.93	5.62	6.68	20.83	34.18
Telecommunication and sound recording and reproducing apparatus and equipment	17.82	21.43	16.04	19.17	22.45	32.91	76.26	95.30
Electrical machinery and electrical parts (including non-electrical)	5,707.47	5,843.09	40.97	53.60	62.37	83.15	187.43	181.02
Road vehicles (including air-cushion vehicles)	179.00	207.66	15.63	10.21	14.28	23.67	70.42	83.74
Other transport equipment	19.19	0.23	0.31	0.04	0.01	1.30	0.48	0.43
Sanitary, plumbing, heating and lighting fixtures and fittings, N.E.S.	6.01	4.83	7.30	6.83	7.75	10.45	33.27	13.36
Furniture and parts thereof	86.95	79.37	68.24	61.01	66.07	79.28	166.90	170.34
Travel goods, handbags and similar containers	17.82	15.55	9.15	10.01	11.17	26.58	46.45	52.03
Articles of apparel and clothing accessories	59.06	69.26	71.44	93.19	79.70	80.59	189.49	206.85
Footwear	10.35	13.95	17.47	15.29	18.41	21.41	35.29	29.80
Professional, scientific and controlling instruments and apparatus, N.E.S	4.74	4.45	0.34	0.65	0.75	0.68	1.58	1.67
Photographic apparatus, equipment and supplies and optical goods	1.59	0.61	0.63	0.60	0.69	0.83	1.70	2.81
Miscellaneous manufacturing articles, N.E.S	176.59	201.03	93.66	107.84	107.45	110.18	227.00	216.93
Special transactions not classified according to kind	5,229.23	5,681.46	5,784.52	4,862.32	4,913.08	5,815.97	11,484.41	220.97
Coin (other than gold coin), not being legal tender	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Armored fighting vehicles, arms of war and ammunition and parts	0.02	0.67	0.00	0.00	0.00	0.00	0.00	0.00
Gold, non-monetary (excluding gold ores and concentrates)	0.00	0.00	0.00	0.17	1.58	2.29	3.71	0.00

Table B.3.3. Exports of the Philippines, 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
TOTAL EXPORTS	16,977.90	16,548.02	17,595.12	21,059.20	20,786.63	20,627.24	430,861.25
BIOMASS	5,278.48	5,234.66	4,088.19	5,525.78	6,859.50	5,419.72	137,352.83
Live Animals	0.04	0.03	0.04	0.05	0.04	0.08	387.64
Live animals, except fish	0.04	0.03	0.04	0.05	0.04	0.08	1.10
Animals, live, N.E.S. (including zoo animals, dogs, cats, insects, etc.)	0.00	0.00	0.00	0.00	0.00	0.00	386.54
Items For Food	3,595.96	3,595.45	3,279.24	3,976.34	4,895.60	4,000.67	90,831.83
Meat and meat preparations	0.14	0.26	0.48	0.90	0.67	0.68	9.15
Dairy products and birds' eggs	0.74	0.72	0.85	9.60	18.60	31.79	87.38
Fish and fish preparations	176.81	198.62	171.68	192.28	155.39	184.30	3,435.90
Cereals and cereal preparation	23.48	16.04	22.90	29.19	77.05	40.22	729.24
Vegetables and fruits	2,167.19	2,095.12	2,284.01	2,721.21	3,386.65	2,888.31	49,745.15
Sugar, sugar preparations and honey	463.01	553.81	355.86	291.61	267.67	279.23	18,558.10
Miscellaneous edible products and preparations	26.48	27.30	43.20	49.34	56.34	51.53	601.25
Coffee, tea, cocoa, spices and manufactures thereof	54.85	47.17	56.09	49.01	59.05	64.22	1,585.26
Beverages	351.46	206.71	186.35	247.14	227.71	217.71	16,496.34
Tobacco and tobacco manufactures	0.01	0.02	0.01	0.04	1.14	0.24	2.53
Feeding stuff for animals (not including unmilled cereals)	37.24	34.59	35.09	35.29	46.68	53.47	636.32
Inedible Biotic Raw Materials	0.00	0.00	0.00	0.01	0.00	0.01	0.03
Hides, Skins and Furskins, Raw	51.06	48.25	36.43	35.47	32.30	34.25	1,120.54
Natural rubber	0.90	0.83	0.89	1.48	1.25	1.74	1,445.63
Cork, natural, raw and waste (including natural cork in blocks/sheets)	172.04	41.81	67.50	127.77	108.68	86.54	11,496.76
Fuel wood (excluding wood waste) and wood charcoal	26.56	20.85	18.26	20.26	19.28	21.46	354.27
Pulpwood (including chips and wood waste)	38.19	33.82	0.00	0.00	0.00	0.00	736.14
Other wood in the rough/roughly squared	0.28	0.02	0.00	0.00	0.08	0.00	1.45
Pulp and waste papers	25.18	26.51	28.18	26.82	18.29	20.00	702.62
Silk	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Cotton	1,331.02	1,432.46	622.56	1,302.25	1,736.16	1,201.25	29,637.02
Jute, vegetable fibers and other textile bast fibers	9.43	5.96	0.99	3.72	18.75	4.04	1,540.24
Wool and other animal hair (excluding wool tops)	57.21	47.20	54.56	72.95	55.62	56.97	1,087.58
Other Biotic Raw Materials	0.00	0.10	0.00	0.01	0.04	0.14	4.56
Oil Seeds and Oleaginous Fruits	1,242.38	1,357.56	551.32	1,207.28	1,632.26	1,089.06	26,521.98
Crude animal and vegetable materials, N.E.S.	21.99	21.64	15.69	18.29	29.48	51.04	482.65
Animal oils and fats	5,278.48	5,234.66	4,088.19	5,525.78	6,859.50	5,419.72	137,352.83
Fixed vegetable oils and fats	0.04	0.03	0.04	0.05	0.04	0.08	387.64

Table B.3.3. continuation of 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
Animal and vegetable oils, fats and waxes, processed	0.04	0.03	0.04	0.05	0.04	0.08	1.10
CRUDE MINERAL MATERIALS	2,721.13	4,278.89	4,385.67	4,321.40	3,957.60	4,087.83	63,311.82
Fertilizer, crude, other than division 56	0.87	0.60	0.65	0.24	12.58	7.30	104.56
Stone, sand and gravel	404.84	1,869.80	1,779.92	1,500.34	873.13	993.49	10,140.42
Other Crude Minerals (274+277+278)	504.11	598.39	564.31	480.98	636.39	684.48	10,898.53
Iron ore and concentrates	0.00	0.00	0.12	0.00	11.06	0.00	307.20
Other ores and concentrates	1,565.50	1,634.03	1,856.32	2,124.82	2,103.00	1,872.97	38,635.63
Waste and scrap metal of iron or steel	37.98	44.33	24.88	88.32	208.24	352.07	869.90
Non-ferrous base metal waste and scrap, N.E.S.	207.82	131.75	159.47	126.69	113.21	177.51	2,355.58
CRUDE FOSSIL MATERIALS	0.03	0.06	0.00	0.00	0.00	374.60	385.93
Coal, coke and briquette	0.03	0.06	0.00	0.00	0.00	0.00	4.76
Petroleum oils, crude and crude oils obtained from bituminous minerals	0.00	0.00	0.00	0.00	0.00	374.60	374.60
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	6.57
SEMI-MANUFACTURED/FINAL PRODUCTS	8,978.27	7,034.41	9,121.25	11,212.03	9,969.53	10,745.08	229,810.67
Synthetic and reclaimed rubber	0.08	0.05	1.43	0.69	0.13	1.52	14.03
Synthetic fibers and old textile articles and clothing	12.91	7.29	5.68	15.55	14.56	18.94	180.18
Petroleum products	0.00	0.00	1,363.36	2,277.57	1,291.12	1,890.34	6,822.40
Natural gas products	425.65	185.91	0.00	0.00	0.00	0.00	5,936.87
Organic chemicals	46.11	49.06	47.12	48.66	44.82	52.79	1,601.99
Inorganic chemicals	123.18	122.76	140.63	278.26	221.42	464.91	3,317.55
Dyeing, tanning and coloring materials	6.18	3.21	3.60	6.21	9.57	16.05	82.99
Medicinal and pharmaceutical products	6.10	10.02	9.50	8.91	10.28	13.94	3,919.30
Essential oils and perfume materials, toilet, polishing and cleaning preparations	20.56	17.48	15.95	16.59	23.14	28.94	353.58
Fertilizers, manufactured	568.78	599.70	297.77	323.22	293.03	496.16	11,131.39
Explosives and pyrotechnic products	35.44	45.51	52.96	63.64	59.23	64.64	495.50
Artificial resins and plastic materials and cellulose esters and ethers	28.84	32.42	30.55	38.77	47.01	54.27	624.68
Chemical materials and products, N.E.S.	55.11	52.15	55.28	50.87	46.46	55.57	929.48
Leather, leather manufactures, N.E.S, and dressed furskins	0.40	0.25	0.21	0.33	0.51	0.50	7.21
Rubber manufactures, N.E.S	9.68	18.21	28.06	29.33	22.30	22.47	200.23
Cork and wood manufactures (excluding furniture)	131.31	110.37	95.18	116.07	61.56	96.88	11,209.64
Paper, paperboard and articles of paper pulp, of paper or of paperboard	63.60	133.10	123.02	155.90	173.48	180.93	1,085.96
Textile yarns, fabrics, made up articles	70.11	71.84	69.03	74.82	81.30	92.79	1,258.20

Table B.3.3. continuation of 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
Non-metallic mineral manufactures, N.E.S.	94.46	102.06	641.67	1,500.99	1,980.98	1,162.61	9,282.55
Iron and steel	136.40	80.24	30.15	37.66	21.17	33.07	2,311.77
Non-ferrous metals	163.34	154.13	218.83	204.91	268.64	226.84	3,755.18
Manufactures of metal, N.E.S	121.77	36.64	44.25	51.21	36.80	43.59	876.54
CRUDE MINERAL MATERIALS	2,721.13	4,278.89	4,385.67	4,321.40	3,957.60	4,087.83	63,311.82
Fertilizer, crude, other than division 56	0.87	0.60	0.65	0.24	12.58	7.30	104.56
Stone, sand and gravel	404.84	1,869.80	1,779.92	1,500.34	873.13	993.49	10,140.42
Other Crude Minerals (274+277+278)	504.11	598.39	564.31	480.98	636.39	684.48	10,898.53
Iron ore and concentrates	0.00	0.00	0.12	0.00	11.06	0.00	307.20
Other ores and concentrates	1,565.50	1,634.03	1,856.32	2,124.82	2,103.00	1,872.97	38,635.63
Waste and scrap metal of iron or steel	37.98	44.33	24.88	88.32	208.24	352.07	869.90
Non-ferrous base metal waste and scrap, N.E.S.	207.82	131.75	159.47	126.69	113.21	177.51	2,355.58
CRUDE FOSSIL MATERIALS	0.03	0.06	0.00	0.00	0.00	374.60	385.93
Coal, coke and briquette	0.03	0.06	0.00	0.00	0.00	0.00	4.76
Petroleum oils, crude and crude oils obtained from bituminous minerals	0.00	0.00	0.00	0.00	0.00	374.60	374.60
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	6.57
SEMI-MANUFACTURED/FINAL PRODUCTS	8,978.27	7,034.41	9,121.25	11,212.03	9,969.53	10,745.08	229,810.67
Synthetic and reclaimed rubber	0.08	0.05	1.43	0.69	0.13	1.52	14.03
Synthetic fibers and old textile articles and clothing	12.91	7.29	5.68	15.55	14.56	18.94	180.18
Petroleum products	0.00	0.00	1,363.36	2,277.57	1,291.12	1,890.34	6,822.40
Natural gas products	425.65	185.91	0.00	0.00	0.00	0.00	5,936.87
Organic chemicals	46.11	49.06	47.12	48.66	44.82	52.79	1,601.99
Inorganic chemicals	123.18	122.76	140.63	278.26	221.42	464.91	3,317.55
Dyeing, tanning and coloring materials	6.18	3.21	3.60	6.21	9.57	16.05	82.99
Medicinal and pharmaceutical products	6.10	10.02	9.50	8.91	10.28	13.94	3,919.30
Essential oils and perfume materials, toilet, polishing and cleaning preparations	20.56	17.48	15.95	16.59	23.14	28.94	353.58
Fertilizers, manufactured	568.78	599.70	297.77	323.22	293.03	496.16	11,131.39
Explosives and pyrotechnic products	35.44	45.51	52.96	63.64	59.23	64.64	495.50
Artificial resins and plastic materials and cellulose esters and ethers	28.84	32.42	30.55	38.77	47.01	54.27	624.68
Chemical materials and products, N.E.S.	55.11	52.15	55.28	50.87	46.46	55.57	929.48
Leather, leather manufactures, N.E.S, and dressed furskins	0.40	0.25	0.21	0.33	0.51	0.50	7.21
Rubber manufactures, N.E.S	9.68	18.21	28.06	29.33	22.30	22.47	200.23

Table B.3.3. continuation of 1997 to 2002

(in thousand tons)

MATERIALS	1997	1998	1999	2000	2001	2002	TOTAL
Cork and wood manufactures (excluding furniture)	131.31	110.37	95.18	116.07	61.56	96.88	11,209.64
Paper, paperboard and articles of paper pulp, of paper or of paperboard	63.60	133.10	123.02	155.90	173.48	180.93	1,085.96
Textile yarns, fabrics, made up articles	70.11	71.84	69.03	74.82	81.30	92.79	1,258.20
Non-metallic mineral manufactures, N.E.S.	94.46	102.06	641.67	1,500.99	1,980.98	1,162.61	9,282.55
Iron and steel	136.40	80.24	30.15	37.66	21.17	33.07	2,311.77
Non-ferrous metals	163.34	154.13	218.83	204.91	268.64	226.84	3,755.18
Manufactures of metal, N.E.S	121.77	36.64	44.25	51.21	36.80	43.59	876.54
Power generating machinery and equipment	0.47	1.75	6.66	3.43	1.31	2.18	431.30
Machinery specialized for particular industries	62.79	10.12	7.22	8.47	13.19	14.17	4,707.90
Metalworking machinery	8.80	3.48	3.45	3.15	3.00	3.53	42.27
General industrial machinery and equipment, N.E.S., and machine parts, N.E.S.	13.61	15.09	19.15	27.35	25.82	32.81	281.66
Office machines and automatic data processing equipment	47.04	41.89	68.46	96.69	87.68	95.53	518.55
Telecommunication and sound recording and reproducing apparatus and equipment	48.22	47.75	32.24	34.82	31.81	40.96	596.10
Electrical machinery and electrical parts (including non-electrical)	152.10	113.14	142.07	152.78	128.77	93.46	32,314.91
Road vehicles (including air-cushion vehicles)	205.39	40.04	55.34	63.86	78.42	113.06	4,018.45
Other transport equipment	0.13	34.15	57.80	31.48	35.17	76.76	262.47
Sanitary, plumbing, heating and lighting fixtures and fittings, N.E.S.	38.20	8.49	17.98	24.44	19.86	26.65	257.05
Furniture and parts thereof	92.41	95.65	110.94	126.74	116.97	117.16	1,942.32
Travel goods, handbags and similar containers	25.94	44.26	38.22	43.07	47.44	19.74	467.08
Articles of apparel and clothing accessories	95.46	100.38	99.00	115.09	115.87	128.51	1,841.23
Footwear	16.11	14.51	10.10	10.11	9.96	6.19	319.60
Professional, scientific and controlling instruments and apparatus, N.E.S	6.30	1.68	1.77	22.25	2.03	2.77	221.69
Photographic apparatus, equipment and supplies and optical goods	1.54	0.91	1.14	1.18	0.87	1.41	31.37
Miscellaneous manufacturing articles, N.E.S	107.03	112.64	118.46	107.02	110.84	130.75	2,958.84
Special transactions not classified according to kind	5,931.38	4,509.76	5,056.94	5,039.87	4,432.86	4,821.64	112,648.70
Coin (other than gold coin), not being legal tender	3.13	4.11	0.03	0.01	0.01	0.01	8.15
Armored fighting vehicles, arms of war and ammunition and parts	0.00	0.00	0.00	0.00	0.00	0.00	531.30
Gold, non-monetary (excluding gold ores and concentrates)	2.21	2.20	0.06	0.06	0.19	0.04	12.52

APPENDIX C – Macro-economic Indicators

Table C.1.1. Values of selected macro-economic indicators, Philippines, 1981 to 1985

MACRO-ECONOMIC INDICATOR	1981	1982	1983	1984	1985
Population, in thousands	49,307	50,523	51,745	52,989	54,266
Gross Domestic Product, million pesos	630,642	653,467	665,717	616,962	571,883
Annual growth rate in GDP, %		3.62	1.87	-7.32	-7.31
GDP per capita, pesos	12,790	12,934	12,865	11,643	10,539
Annual growth in per capita GDP, %		1.13	-0.53	-9.50	-9.49
GVA, Agriculture, million pesos	106,776	108,920	101,202	102,204	104,499
GVA, Forestry, million pesos	16,452	13,734	13,416	11,660	8,997
GVA, Fishery, million pesos	25,251	26,987	29,968	29,383	27,058
GVA, Dwellings and Real Estate, million pesos	31,803	34,093	34,693	32,585	32,132
GVA, Trade, million pesos	79,511	86,338	89,739	83,637	82,835
GVA, Other Services, million pesos	60,905	65,109	70,133	67,285	67,025
GVA, Mining and Quarrying, million pesos	9,350	9,165	9,244	8,959	11,893
GVA, Manufacturing, million pesos	171,569	174,315	173,756	156,195	143,851
GVA, Electricity, Gas, Water, million pesos	14,205	17,367	15,783	16,857	15,767
GVA, Durable Equipment, million pesos	66,704	73,793	71,108	45,043	33,261
GVA, Construction, million pesos	63,421	64,110	70,204	56,027	29,037
GVA, Transportation, Communication and Storage, million pesos	30,629	31,415	32,622	32,060	31,666
Total labor productivity, pesos	36,136	37,618	34,651	31,426	28,882
Agriculture Productivity, pesos	16,631	16,776	14,634	14,707	14,493
Mining and Quarrying Productivity, pesos	116,875	123,851	90,627	64,920	92,914
Manufacturing Productivity, pesos	94,947	100,123	92,081	80,888	74,844
Construction Productivity, pesos	107,130	106,142	100,723	73,817	42,452
Others Productivity, pesos	46,941	51,080	47,258	39,279	35,647

Table C.1.2. Continuation of years 1981 to 1985

MACRO-ECONOMIC INDICATOR	1981	1982	1983	1984	1985
Employment, Agriculture, 000 persons	8,928	8,920	9,880	9,740	9,698
Employment, Mining, 000 persons	80	74	102	138	128
Employment, Manufacturing, 000 persons	1,807	1,741	1,887	1,931	1,922
Employment, Construction, 000 persons	592	604	697	759	684
Employment, Others, 000 persons	6,045	6,032	6,646	7,064	7,369
Personal Consumption Expenditure	407,958	422,067	424,634	425,767	420,832
PCE/GDP, %	64.69	64.59	63.79	69.01	73.59
New construction, number	38,805	39,622	46,927	40,577	30,437
Floor area, New construction, 000 sq m	5,489	5,178	7,233	5,380	4,558
Gross capital formation, million pesos	165,633	179,577	191,070	120,398	82,047
GCF/GDP, %	26.26	27.48	28.70	19.51	14.35
Exports, million pesos	169,411	151,307	156,525	163,638	137,341
Imports, million pesos	178,057	182,414	176,841	145,934	125,205
Exports/GDP, %	26.86	23.15	23.51	26.52	24.02

Table C.2.1. Values of selected macro-economic indicators, Philippines, 1986 to 1990

MACRO-ECONOMIC INDICATOR	1986	1987	1988	1989	1990
Population, in thousands	55,578	56,921	58,293	59,689	61,104
Gross Domestic Product, million pesos	591,423	616,923	658,581	699,448	720,690
Annual growth rate in GDP, %	3.42	4.31	6.75	6.21	3.04
GDP per capita, pesos	10,641	10,838	11,298	11,718	11,794
Annual growth in per capita GDP, %	0.98	1.85	4.24	3.72	0.65
GVA, Agriculture, million pesos	106,240	107,155	115,447	121,066	122,631
GVA, Forestry, million pesos	10,239	12,339	11,264	9,270	7,320
GVA, Fishery, million pesos	29,246	30,920	28,581	29,628	30,783
GVA, Dwellings and Real Estate, million pesos	33,205	34,759	36,691	39,083	40,146
GVA, Trade, million pesos	86,917	90,038	95,180	102,729	107,428
GVA, Other Services, million pesos	68,820	71,772	77,623	80,993	85,758
GVA, Mining and Quarrying, million pesos	12,313	11,232	11,704	11,389	11,091
GVA, Manufacturing, million pesos	146,453	154,604	169,316	179,152	183,925
GVA, Electricity, Gas, Water, million pesos	17,851	15,811	17,797	18,756	18,674
GVA, Durable Equipment, million pesos	37,827	40,124	49,635	65,760	76,976
GVA, Construction, million pesos	28,547	31,742	33,235	39,878	41,858
GVA, Transportation, Communication and Storage, million pesos	33,075	35,086	37,898	40,243	41,108
Total labor productivity, pesos	28,717	29,667	30,636	32,013	31,985
Agriculture Productivity, pesos	14,163	15,132	15,654	16,237	15,781
Mining and Quarrying Productivity, pesos	82,087	76,932	74,548	73,955	83,391
Manufacturing Productivity, pesos	76,878	75,087	75,655	77,960	84,061
Construction Productivity, pesos	45,385	41,821	38,735	43,774	42,975
Others Productivity, pesos	36,433	36,445	37,821	40,255	40,885

Table C.2.2. Continuation for years 1986 to 1990

MACRO-ECONOMIC INDICATOR	1986	1987	1988	1989	1990
Employment, Agriculture, 000 persons	10,289	9,940	9,920	9,852	10,185
Employment, Mining, 000 persons	150	146	157	154	133
Employment, Manufacturing, 000 persons	1,905	2,059	2,238	2,298	2,188
Employment, Construction, 000 persons	629	759	858	911	974
Employment, Others, 000 persons	7,622	7,891	8,324	8,634	9,052
Personal Consumption Expenditure	434,815	452,386	480,562	504,619	531,772
PCE/GDP, %	73.52	73.33	72.97	72.15	73.79
Gross Domestic Investment, million pesos			113,935	152,480	162,155
GDI/GDP, %			17.3	21.8	22.5
New construction, number	31,110	41,712	44,434	44,971	44,770
Floor area, New construction, 000 sq m	4,024	5,950	7,504	9,992	8,128
Gross capital formation, million pesos	90,301	108,085	123,960	149,310	172,951
GCF/GDP, %	15.27	17.52	18.82	21.35	24.00
Exports, million pesos	160,571	171,531	196,458	213,888	217,865
Imports, million pesos	138,021	177,532	212,357	244,590	269,148
Exports/GDP, %	27.15	27.80	29.83	30.58	30.23

Table C.3.1. Values of selected macro-economic indicators, Philippines, 1991 to 1994

MACRO-ECONOMIC INDICATOR	1991	1992	1993	1994
Population, in thousands	62,538	63,989	65,453	66,924
Gross Domestic Product, million pesos	716,522	718,941	734,156	766,368
Annual growth rate in GDP, %	-0.58	0.34	2.12	4.39
GDP per capita, pesos	11,457	11,235	11,217	11,451
Annual growth in per capita GDP, %	-2.86	-1.94	-0.17	2.09
GVA, Agriculture, million pesos	126,204	127,010	130,736	135,224
GVA, Forestry, million pesos	4,732	4,186	3,497	2,971
GVA, Fishery, million pesos	32,001	32,375	32,820	33,195
GVA, Dwellings and Real Estate, million pesos	40,242	40,534	41,269	42,473
GVA, Trade, million pesos	108,002	109,780	112,479	116,923
GVA, Other Services, million pesos	86,218	86,585	89,046	93,300
GVA, Mining and Quarrying, million pesos	10,770	11,495	11,571	10,763
GVA, Manufacturing, million pesos	183,111	179,947	181,289	190,374
GVA, Electricity, Gas, Water, million pesos	19,552	19,681	20,255	23,061
GVA, Durable Equipment, million pesos	69,922	76,094	82,292	91,658
GVA, Construction, million pesos	35,285	36,261	38,344	41,774
GVA, Transportation, Communication and Storage, million pesos	41,291	41,870	42,941	44,764
Total labor productivity, pesos	31,182	30,060	30,035	30,453
Agriculture Productivity, pesos	15,663	15,049	14,923	15,236
Mining and Quarrying Productivity, pesos	71,800	80,385	89,008	106,564
Manufacturing Productivity, pesos	76,583	70,678	73,845	73,731
Construction Productivity, pesos	33,733	35,035	34,795	35,193
Others Productivity, pesos	40,630	40,170	40,607	41,025

Table C.3.2. Continuation of years 1991 to 1994

MACRO-ECONOMIC INDICATOR	1991	1992	1993	1994
Employment, Agriculture, 000 persons	10,403	10,869	11,194	11,249
Employment, Mining, 000 persons	150	143	130	101
Employment, Manufacturing, 000 persons	2,391	2,546	2,455	2,582
Employment, Construction, 000 persons	1,046	1,035	1,102	1,187
Employment, Others, 000 persons	8,989	9,324	9,562	10,047
Personal Consumption Expenditure	543,788	561,509	578,589	600,106
PCE/GDP, %	75.89	78.10	78.81	78.31
Gross Domestic Investment, million pesos	142,588	149,540	173,261	180,096
GDI/GDP, %	19.9	20.8	23.6	23.5
New construction, number	46,136	50,793	53,478	68,278
Floor area, New construction, 000 sq m	6,963	8,150	8,831	10,745
Gross capital formation, million pesos	143,047	154,252	166,397	180,797
GCF/GDP, %	19.96	21.46	22.67	23.59
Exports, million pesos	231,515	241,431	256,451	307,205
Imports, million pesos	266,139	289,273	322,548	369,325
Exports/GDP, %	32.31	33.58	34.93	40.09

Table C.4.1. Values of selected macro-economic indicators, Philippines, 1995 to 1998

MACRO-ECONOMIC INDICATOR	1995	1996	1997	1998
Population, in thousands	68,396	69,867	71,337	72,802
Gross Domestic Product, million pesos	802,224	849,121	893,151	888,000
Annual growth rate in GDP, %	4.68	5.85	5.19	-0.58
GDP per capita, pesos	11,729	12,153	12,520	12,197
Annual growth in per capita GDP, %	2.43	3.62	3.02	-2.58
GVA, Agriculture, million pesos	136,616	143,265	149,429	137,331
GVA, Forestry, million pesos	1,779	1,898	1,328	1,372
GVA, Fishery, million pesos	34,453	34,288	34,247	34,498
GVA, Dwellings and Real Estate, million pesos	43,765	45,576	47,297	48,065
GVA, Trade, million pesos	123,430	130,247	135,326	138,641
GVA, Other Services, million pesos	97,105	102,330	106,259	110,127
GVA, Mining and Quarrying, million pesos	10,035	10,166	10,338	10,624
GVA, Manufacturing, million pesos	203,271	214,613	223,672	221,151
GVA, Electricity, Gas, Water, million pesos	26,060	28,008	29,357	30,315
GVA, Durable Equipment, million pesos	93,701	102,654	112,065	91,837
GVA, Construction, million pesos	44,492	49,339	57,322	51,791
GVA, Transportation, Communication and Storage, million pesos	47,366	50,878	55,067	58,640
Total labor productivity, pesos	31,217	30,942	32,026	31,420
Agriculture Productivity, pesos	15,265	15,671	16,430	15,366
Mining and Quarrying Productivity, pesos	105,632	88,400	83,371	102,154
Manufacturing Productivity, pesos	79,063	77,871	81,188	82,304
Construction Productivity, pesos	35,910	31,366	34,931	34,276
Others Productivity, pesos	41,206	39,811	40,087	37,644

Table C.4.2. Continuation of years 1995 to 1998

MACRO-ECONOMIC INDICATOR	1995	1996	1997	1998
Employment, Agriculture, 000 persons	11,323	11,451	11,260	11,272
Employment, Mining, 000 persons	95	115	124	104
Employment, Manufacturing, 000 persons	2,571	2,756	2,755	2,687
Employment, Construction, 000 persons	1,239	1,573	1,641	1,511
Employment, Others, 000 persons	10,470	11,547	12,108	12,688
Personal Consumption Expenditure	622,985	651,790	684,316	707,904
PCE/GDP, %	77.66	76.76	76.62	79.72
Gross Domestic Investment, million pesos	173,280	195,298	212,570	171,384
GDI/GDP, %	21.6	23	23.8	19.3
New construction, number	76,073	93,631	115,566	82,971
Floor area, New construction, 000 sq m	13,180	16,774	17,665	11,493
Gross capital formation, million pesos	187,131	210,440	235,052	196,794
GCF/GDP, %	23.33	24.78	26.32	22.16
Exports, million pesos	344,181	397,201	465,322	367,447
Imports, million pesos	428,475	500,194	567,672	484,235
Exports/GDP, %	42.90	76.46	84.13	73.27

Table C.5.1. Values of selected macro-economic indicators, Philippines, 1999 to 2002

MACRO-ECONOMIC INDICATOR	1999	2000	2001	2002
Population, in thousands	74,261	75,711	77,151	78,580
Gross Domestic Product, million pesos	918,160	972,960	990,042	1,032,969
Annual growth rate in GDP, %	3.40	5.97	1.76	4.34
GDP per capita, pesos	12,364	12,851	12,833	13,145
Annual growth in per capita GDP, %	1.36	3.94	-0.14	2.44
GVA, Agriculture, million pesos	147,604	153,996	159,381	164,666
GVA, Forestry, million pesos	1,704	1,372	960	697
GVA, Fishery, million pesos	35,156	37,089	39,248	41,791
GVA, Dwellings and Real Estate, million pesos	48,350	48,338	48,119	48,947
GVA, Trade, million pesos	145,406	152,904	161,487	170,789
GVA, Other Services, million pesos	115,253	119,329	122,902	127,676
GVA, Mining and Quarrying, million pesos	9,736	10,833	10,125	15,285
GVA, Manufacturing, million pesos	224,667	237,271	244,082	252,553
GVA, Electricity, Gas, Water, million pesos	31,259	32,560	32,777	34,172
GVA, Durable Equipment, million pesos	87,269	99,119	95,949	100,593
GVA, Construction, million pesos	50,988	64,377	49,487	46,667
GVA, Transportation, Communication and Storage, million pesos	61,726	68,174	74,181	80,805
Total labor productivity, pesos	31,657	35,030	32,908	34,147
Agriculture Productivity, pesos	17,563	18,504	17,737	18,314
Mining and Quarrying Productivity, pesos	110,636	102,198	98,301	151,337
Manufacturing Productivity, pesos	80,353	84,982	84,399	88,460
Construction Productivity, pesos	33,857	44,987	31,500	29,369
Others Productivity, pesos	34,675	39,895	37,531	39,110

Table C.5.2. Continuation of years 1999 to 2002

MACRO-ECONOMIC INDICATOR	1999	2000	2001	2002
Employment, Agriculture, 000 persons	10,503	10,401	11,253	11,311
Employment, Mining, 000 persons	88	106	103	101
Employment, Manufacturing, 000 persons	2,796	2,792	2,892	2,855
Employment, Construction, 000 persons	1,506	1,431	1,571	1,589
Employment, Others, 000 persons	14,110	13,045	14,266	14,395
Personal Consumption Expenditure	726,578	752,066	779,011	810,753
PCE/GDP, %	79.13	77.30	78.68	78.49
Gross Domestic Investment, million pesos	163,432	169,295	164,347	161,143
GDI/GDP, %	17.8	17.4	16.6	15.6
New construction, number	80,884	70,436	77,857	91,471
Floor area, New construction, 000 sq m	11,630	10,624	11,388,459	12,781,457
Gross capital formation, million pesos	192,894	239,054	221,621	210,488
GCF/GDP, %	21.01	24.57	22.39	20.38
Exports, million pesos	380,755	445,673	430,339	445,786
Imports, million pesos	470,673	490,768	508,044	532,049
Exports/GDP, %	74.98	84.23	80.62	80.54

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