GROSS DOMESTIC PRODUCT
EAST TIMOR
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I. INTRODUCTION[1]

This report presents and documents estimates of the Gross Domestic Product (GDP) and some of its major components for East Timor for calendar year 2000. In attempting to build a system of national accounts for an emerging country such as East Timor at this point in time, it is advisable that the system be simple to compile, operate and update. Such a system needs to balance two objectives, accuracy and sustainability. As the first set of accounts for the nation, it was important to produce aggregates with a tolerable level of accuracy, since these will form the basis for policy in the coming years. However, with the limited resources (both human and financial) that the country can realistically devote for regular production of these accounts, undue levels of complexity, which may improve accuracy, may carry costs which outweigh their benefits.

What is produced in this report, in our judgement, provides a reasonable compromise between these two objectives. Thus, the figures presented in this report should be interpreted as "order-of-magnitude" estimates, subject to much greater error than those of more developed countries. As more reliable sources of data are developed and local staff skills are improved, more accuracy will undoubtedly be achieved.

This report is divided into five chapters: the first one following this chapter discusses the main conceptual issues involved in establishing a national accounts framework; the two chapters that follow attempt to measure GDP using the production and the expenditure approaches respectively; the following chapter provides the results of our estimations; and the final chapter discusses what future steps need to be taken.

II. CONCEPTUAL FRAMEWORK

GDP is one element--the best known element--in the national accounts, a vast system for keeping track of a country's production, expenditure, income, wealth, and many other elements in a consistent way. Over the last 50 years, a series of volumes, culminating in the 700-page *System of National Accounts 1993*[2] issued jointly by five international organizations, have explained the full system in detail. In the rest of this chapter, references to this volume will appear as *System*

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[1] Several individuals have contributed to this report, to varying degrees and covering various aspects. They include Prof. John Kuiper, Dr. Yahya Jammal, Dr. Frank de Leeuw, Mr. Kusmadi Saleh, Ms. Wiwiek Arumwaty and Mr. Rifa Rufiadi.

[2] Commission of the European Communities (Eurostat), International Monetary Fund, Organization for Economic Co-operation and Development, United Nations and World Bank, 1993.

followed by chapter and paragraph numbers.

GDP, according to the 1993 volume, represents

> "the final result of the production activity of resident producer units. Basically, GDP is a concept of value added. It is the sum of gross value added of all resident producer units ...." (*System, 2.172-2.173)*

The underlying terms in this definition are *production activity*, *resident, producer units*, and *value added*. The sections below will take up these terms, but not in the order in which they occur in the definition.

A. Value Added

Value added measures the additional value created by a particular process of production. In other words, it is the gross value of the goods or services produced by a "producer unit" *minus* the value of "intermediate" goods and services--that is, those obtained from other producer units--that it uses. Summing the value added of all producer units, classified by economic sector (agriculture, manufacturing, etc.), is the simplest approach to measuring GDP, and the one that is used for East Timor.

There are conceptual difficulties in measuring value added. First of all, there is the problem of exactly which goods and services should be included. Because this so-called "production boundary" problem is important, and in at least one way especially noteworthy for East Timor, it will be discussed separately in the next section. A somewhat lesser difficulty is specifying which goods and services are to be considered intermediate. Raw materials, purchased transportation, fuel, and many other purchased items are clearly intermediate; they represent output of other producer units, and must be subtracted from production to obtain the net contribution of the unit that purchases and uses them. But the purchase of a building or a machine which yields its services over many years is not considered intermediate, nor is the purchase of a computer program which is expected to yield services for more than one year. These purchases are capital investments, and value added does not net out capital investment or its depreciation.

Another set of difficulties in measuring value added arises whenever goods are produced in one period but sold in another period with different prevailing prices, or whenever intermediate goods are purchased in one period but used in another. These are problems of inventory measurement and valuation; final goods produced but not yet sold, and intermediate goods purchased but not yet used, are the inventories of a producing unit. The current production of a unit is equal to its sales plus any additions to (or minus subtractions from) inventories of final products.

The current use of intermediate goods and services of a unit is equal to its purchases minus any additions to (or plus subtractions from) inventories of materials.

Simply obtaining any information on inventories, especially for small producing units, is often difficult. Adding to the difficulty is the fact that such information as is available often refers to values of inventories at the price levels prevailing when they were produced or purchased. National accounts require that additions to (or subtractions from) inventories should be valued at the time of production (in the case of final products) or use (in the case of intermediate products) rather than at the price levels prevailing when they were produced or purchased (*System, 6.57-6.59)*

Still, another complication of using value added to estimate GDP is the treatment of taxes on production that are included in value by purchasers but not by sellers–excise taxes and value added taxes are the leading examples. To arrive at the current market value of GDP, these taxes need to be added to the sum of value added by all producer units.

A final problem is measuring value added for producing units whose activity that do not sell their goods or services but whose activity is nevertheless included in GDP. Public schools, fire departments, and charitable organizations are examples (see the following section on the definition of production). For these units, GDP cannot be measured by the difference between value of output and intermediate products. Instead, the value added of these units is measured noting that on the cost side, value added consists of compensation paid to employees, taxes paid to governments minus subsidies received from governments, allowances for depreciation of capital, and a residual labeled "operating surplus" that covers profits, interest, and other forms of return to capital. Value added is obtained by adding these cost elements (the last one, operating surplus, is usually taken to be zero for government bodies).

There are several conceptual difficulties in measuring value added, which need not be elaborated at this stage. Suffice it to say for now that, except for problems of defining production, to be discussed in the next section, these difficulties are the same in measuring East Timor's GDP as they are in measuring the GDP of most other countries.

B. Production

For the great bulk of goods and services--food sold in markets, shoes, cars, new buildings, bus rides, schooling, medical services, and many others--there is no question that they constitute a part of GDP. Most of the problems in defining production arise when goods or services of value do not pass through a market process (*System, 1.20-1.24).* Examples are food produced by a farm family for its own consumption (included in GDP), child-rearing services performed by family members (not included in GDP), housing services supplied in an owner-occupied house (included

in GDP), transportation services supplied when a car owner drives his car for his own use (not included in GDP), public schooling, police protection, and most of the other services of governments (all included in GDP). On the negative side there are problems of how to treat air pollution due to forest fires or destruction of property during an armed struggle. A problem that is not related to the absence of a market process is the treatment of illegal goods and services.

The *System of National Accounts* follows several principles in dealing with these problems. Three important principles are:

(1) the desire for a truly comprehensive measure of production (although it is recognized that GDP will never be a comprehensive measure of welfare);

(2) the practicality of a GDP concept that is not "swamped by non-monetary values" (*System*, 1.22)--that is, by imputed values for goods that do not pass through a market; and

(3) the usefulness of restricting GDP to processes carried out under the control of some institutional unit.

These principles are not always consistent. Compromises are necessary, and not all users of national accounts agree with the compromises in the current system.

Under the current system, production of agricultural goods for own consumption rather than market sale is included in GDP--an example of the first principle just cited. However, services supplied by household for their own use, such as child care by parents, or cooking and clothes washing by household members, are excluded--an example of the second principle. The services of government and many nonprofit institutions such as churches and charities are included–another example of the first principle.

Compromises among different principles are apparent in many other decisions. Housing services supplied in an owner-occupied house are included in GDP by imputing a value that is intended to represent the rent these services would command if the services were supplied by a landlord. However, transportation services supplied when a car owner drives his car for his own use are excluded from GDP. The cultivation of trees for fruit or timber is included in GDP, but the natural grown of uncultivated forests is not.

Changes in environmental quality are not included in GDP. However, the *System of National Accounts* includes an extensive discussion of how an amended system including natural resource accounting might be constructed (*System, 21.122-21.186).* The construction of such "satellite

accounts" for special purposes is encouraged.

The foregoing problems affect the GDP of East Timor in much the same way as they affect GDP in other countries. An issue of special importance in East Timor is the treatment of destruction of property due to armed conflict. Since construction of a new house or shop adds to GDP, it would be possible to construct a system in which destruction of an existing house or shop reduces GDP. The present system of accounts, however, does not permit "catastrophic losses" to affect GDP directly. Instead, such losses are assigned to a category called "other changes in assets." The category also includes the appearance or disappearance of non-produced physical assets such as mineral deposits, the appearance of non-produced intangible assets such as patents, and the natural growth (or shrinkage) of uncultivated biological resources such as forests or ocean fish stocks (*System*, chapter XII). These changes directly affect wealth but not GDP.

Of course, catastrophic losses do affect GDP indirectly. The destruction of houses reduces the residential services (monetary or imputed) provided by the real estate industry. The destruction of shops or factories reduces nonresidential services of the real estate industry and limits the potential or actual output of the retail and manufacturing industries. These indirect effects can be substantial, even though they do not include the value of the property destroyed.

The final issue in defining production to be considered here is illegal goods and services, such as illegal drugs, smuggling, or prostitution. In theory, the present system includes illegal production in GDP, on the grounds that their consumption and incomes are very likely to appear elsewhere in the system, in estimates of total spending and total income, and that comparisons between countries will be distorted if a good that is illegal in one country but legal in another reduces GDP in the former but not the latter country (System, 6.30-6.36).

In practice, however, few if any countries include estimates of illegal goods and services in GDP. One obvious reason is that it is very difficult to obtain reliable information on value added by illegal transactions. Probably a second reason is that some countries are reluctant to include as a "good" a product that its government officially deems "bad."

C. Residence

Production for a particular country is compiled as the sum of production of its *resident* institutional units. An institutional unit is considered to be *resident* within the "economic territory" of a country if

> "it maintains a center of economic interest in that territory -- that is, when it engages, or intends to engage, in economic activities or transactions on a significant scale

> either indefinitely or over a long period of time".[3]

Two concepts need to be clearly defined in this respect: *economic territory* and *center of economic interest*. The economic territory of a country consists of

> "the geographic territory administered by a government ... [which includes islands,] airspace, territorial waters ... [over which the country] claims to have jurisdiction."[4]

In other words, GDP is basically a geographic concept, covering production that takes place in a particular territory. However, there is an important qualification:

> "The economic territory of a country also includes territorial enclaves in the rest of the world (these are clearly demarcated land areas, such as embassies, consulates, military bases, etc.)"

Thus, the United States embassy in East Timor, for example, would be included in the *economic territory* of the United States although it is geographically located in East Timor.

> An institutional unit has a *center of economic interest* within a particular country

> "when there exists some location - dwelling, place of production, or other premises - within the economic territory of the country on, or from, which the unit engages and intends to continue engaging, either indefinitely or over a finite but long period of time, in economic activities and transactions on a significant scale."[5]

A period of one year is normally used to demarcate a "long" from a "short" period.

The concept of residence, therefore, has nothing to do with nationality or ownership. A country's government at all levels is regarded as a resident of that country, even when it carries out activities abroad (e.g. embassies). An enterprise operating in a particular country is considered as resident of that country even if owned wholly or partly by people or institutions from another nationality. A branch or subsidiary of a foreign enterprise located in a given country is thus regarded as a resident of that country. Conversely, foreign branches and subsidiaries of resident

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[3] *System*, p. 6.

[4] **Balance of Payments Manual**, International Monetary Fund, 1993, p. 20.

[5] **Balance of Payments Manual**, p. 20.

enterprises are considered as "non-resident".

The most critical issue with respect to the present situation in East Timor is how to treat the UNTAET and its affiliated activities: should UNTAET be considered a “resident” of East Timor for the purpose of computing the country’s national accounts and thus include its activities in the country’s production and other accounts, or should it be considered a “non-resident?” The implications are significant: the value of UNTAET’s activities in 2000 accounts for over one-fifth of the country’s quantifiable economic activities according to the SNA.

Arguing against the inclusion of UNTAET is the statement that

> "... the economic territory of a country does not include the territorial enclaves used by foreign governments *or international organizations* which are physically located within the geographical boundaries of that country" (*System*, 14.11, italics added)
> “.... The employees whom a government transfers to work in such enclaves continue to have a center of interest in their home country” (*System*, 14.19)

Arguing in favor of inclusion is the statement that

> [although] “... international organizations ... are not considered residents of any national economy, including that in which they are located or conduct their affairs ... employees of these bodies are, nevertheless, residents of a national economy, specifically of the economy in which they are expected to have their abode for one year or more .... It follows that the wages and salaries paid by the international organizations to their own employees are payments to residents of the economy in which those employees are stationed for one year or more. (*System*, 14.32)

Moreover, technical assistance personnel on long-term assignments are

> “treated as residents of the country in which they work and deemed to be employed by their host government on behalf of the government, or international organization, which is actually financing their work.” (*System*, 14.18)

This report intreprets these statements to mean that UNTAET, in its role as peace keeper, is similar to other diplomatic or military missions, *does not* maintain a center of economic interest in East Timor, and thus is not a “resident” of the country. However, in its status as an organization which is acting on behalf of the East Timorese government, rather than as a usual diplomatic or military mission, it does maintain a center of economic interest in East Timor, and thus is a

"resident" of the country as an institution. So one has to clearly differentiate between the two distinct roles that UNTAET currently plays as an institution. Furthermore, its long-term personnel are also considered "resident" households of East Timor whose activities are part of the country's national accounts. The tables produced in this report list UNTAET's contribution to GDP separately, in order to enable evaluation of the economy with and without UNTAET.

D. Producer Units

The final concept that underlies the definition of GDP is producer units or "institutional units"--the business firms, government bodies, and other forms of organization whose value added is included in GDP (*System,* chapter IV*).* The formal definition of an institutional unit is

> "an economic entity that is capable, in its own right, of owning assets, incurring liabilities and engaging in economic activities and in transactions with other entities" *(System,* 4.2)

Many institutional units are engaged in multiple kinds of activities and/or activities at multiple locations. For statistical purposes, a more fundamental concept than the institutional unit is the "establishment", defined as

> "an enterprise, or part of an enterprise, that is situated in a single location and in which only a single productive activity is carried out or in which the principal productive activity accounts for most of the value added" (*System*, 5.21).

An institutional unit consists of one or more establishments. The production approach to GDP builds up the GDP total from data covering the establishments in each sector of the economy.

The *System of National Accounts* divides producer units into five categories: nonfinancial corporations, financial corporations, government, households and non-profit institutions serving households.

1. nonfinancial corporations: these are legal entities owned by shareholders and engaged in market activities. The inclusion of their output in GDP does not raise any special problems, beyond matters already discussed relating to residence, production boundary, and so forth.

2. financial corporations: like the first category, these are legal entities owned by shareholders and engaged in market activities. Here also, the inclusion of their output in GDP does not raise any special

problems, beyond matters already discussed relating to residence, production boundary, and so forth.

3. government establishments: these include all offices of national and local government, but exclude offices of foreign governments and international bodies. Because their production is predominantly nonmarket services such as police protection and education, their value added is measured as the sum of costs rather than as revenues minus intermediate purchases. A governmental unit that keeps separate financial records and covers a substantial portion of its costs through charging users--an example might be a local bus system--should be reclassified as a part of the non-financial corporate sector.

4. Households: these produce many services that are excluded from GDP, such as child rearing, housecleaning, and food preparation. They are nevertheless a major category of producer unit because (1) some of their production for own use, including farm produce for own consumption and the services of owner-occupied housing, are included in GDP, and (2) unincorporated enterprises are classified in the household sector. These enterprises include all retailing, manufacturing, construction, and other forms of output that are owned and operated by individuals rather than by legal entities.

5. "nonprofit institutions serving households," abbreviated by NPISH These include churches, charities, sports clubs, trade unions, and other private organizations producing goods and services that are not permitted to be a source of income or financial gain. Like governments, their production is primarily nonmarket, and their value added must be estimated as the sum of costs.

E. Sector of Economic Activity

In accordance with international practice, the economic sector of activity of an establishment (according to the International Standard Industrial Classification, ISIC) is determined by the class of ISIC in which the principal activity (or activities) is included.[6] The principal activity is determined by the activity which makes up the largest share of the establishment's output. For example, if an establishment produced the following three products in a given year:

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[6] **International Standard Industrial Classification of All Economic Activities. Third Revision**, UN Statistical Papers Series M No. 4, Rev. 3, 1990, p 27.

Manufactured goods which sold for $60,000;
Resale of traded goods for $15,000 and
Consulting services from which revenues were $25,000

that establishment would be classified in the manufacturing sector, despite having a trading and a services activities. Thus the whole value added of the establishment would be attributed to manufacturing. This is a practical compromise which enables countries to produce comprehensive results in a relatively timely manner.

F. Summary & GDP vs Full SNA

1. Summary

The previous sections have touched on a large number of conceptual matters. It will be helpful to highlight the most important ones by stating, in abbreviated form, what we are measuring when we estimate the GDP of East Timor:

- GDP consists of the value added of establishments, each of which is classified in one economic sector and belongs to one of five kinds of institutional unit.

- GDP is, with a few exceptions, a geographic concept, referring to production by units that reside within a country.

- It includes market production and many, but not all, types of non-market production.

- In the case of market production, it is generally measured by taking the difference between value of final goods and services produced and value of intermediate products used.

- In the case of non-market production, it is generally measured from the cost side, as the sum of employee compensation, indirect taxes, depreciation, and operating surplus.

2. GDP vs the Full SNA

It is far beyond the scope of this exercise to provide a description of the full *System*

of National Accounts. The full system includes 19 accounts for the total economy, a similar number for each type of institution, and additional special tables such as supply and use tables. No country has estimated the full system, and many countries make estimates of only a small subset of accounts. Rather, the modest goal of this section is to indicate the relation of the approach to GDP described in the preceding sections to two other ways of arriving at GDP,

The approach to GDP described in the preceding sections is the *production* approach, because it is the sum of production or value added of all producer units. A second way of arriving at GDP is the *expenditure* approach, in which GDP is the sum of four components: consumption, fixed investment, inventory accumulation, and net exports (defined as exports minus imports). To understand why these two approaches will in principle give the same GDP total, the key relationship is that the gross output (before deducting intermediate products) of each establishment must be used in one or more of five possible ways: intermediate input into another industry, domestic investment, inventory accumulation, export, and consumption. When we sum value added over all industries in the production approach, we have in effect subtracted out the first use, intermediate input. What remains must therefore equal the four components of the expenditure approach.

As always, there are complications. First of all, direct measurement of expenditures will include imported consumption and investment goods as well as domestically produced ones; therefore, imports need to be subtracted from the totals to arrive at GDP. The expenditure approach accordingly includes *net* exports (exports minus imports) rather than gross exports. Secondly, direct measurement of expenditures includes taxes on production, such as excise taxes and value added taxes, while the production approach excludes these taxes. The expenditure concept is generally thought to be more useful, and so taxes on production, as noted earlier, must be added to the production approach to arrive at the market value of GDP.

The expenditure approach is useful for economic analysis, because investment and exports and consumption are key macroeconomic concepts. But in East Timor and many other countries, implementing the expenditure approach statistically is extremely difficult. Direct measures of consumption and inventory accumulation are not available, and measures of fixed investment are likely to suffer from substantial undercoverage. Nevertheless, it will be useful, in future work for East Timor, to try to measure as many components of the expenditure approach as are feasible.

A third way of arriving at GDP is the *income* (or the cost) approach, in which GDP is the sum of employee compensation, depreciation, indirect taxes minus subsidies, and operating surplus. Operating surplus in this approach includes the income after expenses of household enterprises (the *System* term is "mixed income"). The discussion of value added earlier noted that these are the components of value added for an establishment looked at from the cost side. The income approach

to measuring GDP amounts simply to using the sum of all employee compensation, all depreciation, and so forth as the basic building blocks instead of using value added by establishment or industry as in the production approach. It is a useful approach in relating GDP to labor statistics and measures of income distribution.

III. SOURCES & METHODS: PRODUCTION ACCOUNT

Prior to independence, the GDP of East Timor was estimated by the Indonesian Central Statistics Agency (Badan Pusat Statistik, BPS) as part of its annual effort at estimating GDP for various Indonesian provinces. The only account estimated by BPS annually was the production account, produced in both current rupiah and constant 1993 rupiah. Tables 1 and 2 present the 1993-1998 series in current and constant 1993 rupiah respectively. Tables 3 and 4 provide these accounts in US dollars, the first converting current rupiah accounts at the average monetary dollar exchange rate for the relevant year and the second converting constant 1993 rupiah accounts at the average 1993 monetary exchange rate. A word of caution needs to be inserted at this point: interpretation of the dollar figures in Tables 3 and 4 should be done with particular care. Section III.C provides some background on conceptual issues involved in rupiah-dollar conversion methods, their pros and cons and which method to use for answering different questions.

Table 1
GDP by Industrial Origin at Current Market Prices (Rp million)

	1993	1994	1995	1996	1997	1998
1. AGRICULTURE, FORESTRY,FISHERY	153600	174997	208652	261684	335323	523160
a. Farm Food Crops	98171	116221	122750	156082	199127	304689
b. Non-Food Crops	30192	31769	55965	73396	100926	130373
c. Livestock	19791	20299	22024	23852	26179	74105
d. Forestry	2345	3155	3218	3400	3884	3701
e. Fishery	3101	3553	4694	4954	5208	10292
2. MINING & QUARRYING	5114	5927	6939	8183	10303	8135
a. Non-Oil and Gas Mining	0	0	0	0	0	0
b. Quarrying	5114	5927	6939	8183	10303	8135
3. MANUFACTURING INDUSTRY	14719	17979	22468	25777	31188	35029
4. ELECTRICITY & WATER	3243	3535	4398	6364	6991	9901
a. Electricity	2597	2744	3020	3791	4363	6879
b. Water Supply	647	791	1378	2573	2628	3022
5. CONSTRUCTION	108007	125179	146548	171732	180318	134424
6. TRADE, HOTELS & RESTAURANTS	48126	66197	68408	83571	90209	92310
a. Wholesale & Retail Trade	41249	58699	59624	72704	77897	81654
b. Hotels	1570	1475	1725	2264	3109	1362
c. Restaurants	5307	6023	7059	8603	9203	9294
7. TRANSPORT & COMMUNICATION	44112	52150	67122	85259	96961	152924
a. Transport	39168	47151	62051	77105	85721	137348
1) Road Transport	29841	35612	49791	62771	72186	122782
2) Sea Transport	3306	4139	4290	4691	3412	5053
3) Air Transport	5750	7076	7645	9294	9739	8965
4) Services Allied to Transport	271	324	325	350	385	548
b. Communication	4944	4999	5070	8154	11240	15576
8. FINANCIAL, OWNERSHIP & BUSINESS SERVICES	21463	23131	26430	35924	36172	49385
a. Banking	9790	10716	11826	14019	12385	15511
b. Non-Bank Financial Institutions	1780	1928	2586	5622	5790	12618
c. Building Rentals	9274	9831	11320	14925	16153	18814
d. Business Services	619	657	697	1358	1844	2442
9. SERVICES	117040	134439	157462	183244	208629	266544
a. Govemment	111003	127653	149597	174119	198083	255022
b. Private	6037	6786	7865	9125	10546	11522
1) Social & Community Services	1390	1460	1731	2052	2341	3083
2) Amusement & Recreation Services	130	131	160	202	297	313
3) Personal & Household Services	4517	5195	5974	6870	7907	8126
GDP (non-oil)	515425	603536	708427	861738	996096	1271812

Source: Gross Regional Domestic Product of Provinces by Industrial origin, various years, Badan Pusat Statistik.

Table 2
GDP by Industrial Origin at Constant 1993 Market Prices (Rp million)

	1993	1994	1995	1996	1997	1998
1. AGRICULTURE, FORESTRY,FISHERY	153600	155666	148967	166263	178071	178432
a. Farm Food Crops	98171	101626	98905	107211	113946	116257
b. Non-Food Crops	30192	27850	25189	32640	35904	32669
c. Livestock	19791	19827	17078	18444	19692	21721
d. Forestry	2345	3026	3202	3334	3699	2830
e. Fishery	3101	3335	4593	4633	4830	4955
2. MINING & QUARRYING	5114	5342	6132	7000	8551	6960
a. Non-Oil and Gas Mining	0	0	0	0	0	0
b. Quarrying	5114	5342	6132	7000	8551	6960
3. MANUFACTURING INDUSTRY	14719	17070	20731	22368	24993	23953
4. ELECTRICITY & WATER	3243	3439	4060	5485	5747	5986
a. Electricity	2597	2666	2789	3267	3642	3793
b. Water Supply	647	773	1271	2218	2106	2193
5. CONSTRUCTION	108007	123636	143680	151975	155117	109939
6. TRADE, HOTELS & RESTAURANTS	48126	62233	64757	70947	73990	76644
a. Wholesale & Retail Trade	41249	55219	56615	62660	65258	70375
b. Hotels	1570	1451	1623	1851	2362	867
c. Restaurants	5307	5562	6519	6436	6369	5402
7. TRANSPORT & COMMUNICATION	44112	49513	62042	70554	73792	76932
a. Transport	39168	44765	57271	63526	66121	67915
1) Road Transport	29841	33810	45941	51350	55273	59938
2) Sea Transport	3306	3929	3958	3837	2650	3648
3) Air Transport	5750	6718	7054	8010	7890	3949
4) Services Allied to Transport	271	308	318	329	308	380
b. Communication	4944	4748	4771	7028	7671	9017
8. FINANCIAL, OWNERSHIP & BUSINESS SERVICES	21463	21961	24386	30662	28604	36112
a. Banking	9790	10174	10912	11468	9483	10811
b. Non-Bank Financial Institutions	1780	1830	2386	4846	4177	8498
c. Building Rentals	9274	9333	10445	13177	13432	15053
d. Business Services	619	624	644	1171	1512	1750
9. SERVICES	117040	127870	145431	161976	166834	185517
a. Govemment	111003	121194	138031	154087	158355	178161
b. Private	6037	6677	7400	7888	8478	7356
1) Social & Community Services	1390	1436	1628	1769	1876	2108
2) Amusement & Recreation Services	130	129	150	198	271	239
3) Personal & Household Services	4517	5112	5621	5921	6331	5009
GDP (non-oil)	515425	566730	620186	687229	715699	700475

Source: Gross Regional Domestic Product of Provinces by Industrial origin, various years, Badan Pusat Statistik.

Table 3
GDP by Industrial Origin at Current Market Prices
(in million US$, converted at the average monetary exchange rate of the relevant year)

	1993	1994	1995	1996	1997	1998
1. AGRICULTURE, FORESTRY,FISHERY	73.6	81.0	92.8	111.7	115.3	52.2
a. Farm Food Crops	47.0	53.8	54.6	66.6	68.4	30.4
b. Non-Food Crops	14.5	14.7	24.9	31.3	34.7	13.0
c. Livestock	9.5	9.4	9.8	10.2	9.0	7.4
d. Forestry	1.1	1.5	1.4	1.5	1.3	0.4
e. Fishery	1.5	1.6	2.1	2.1	1.8	1.0
2. MINING & QUARRYING	2.5	2.7	3.1	3.5	3.5	0.8
a. Non-Oil and Gas Mining	0.0	0.0	0.0	0.0	0.0	0.0
b. Quarrying	2.5	2.7	3.1	3.5	3.5	0.8
3. MANUFACTURING INDUSTRY	7.1	8.3	10.0	11.0	10.7	3.5
4. ELECTRICITY & WATER	1.6	1.6	2.0	2.7	2.4	1.0
a. Electricity	1.2	1.3	1.3	1.6	1.5	0.7
b. Water Supply	0.3	0.4	0.6	1.1	0.9	0.3
5. CONSTRUCTION	51.7	57.9	65.2	73.3	62.0	13.4
6. TRADE, HOTELS & RESTAURANTS	23.1	30.6	30.4	35.7	31.0	9.2
a. Wholesale & Retail Trade	19.8	27.2	26.5	31.0	26.8	8.2
b. Hotels	0.8	0.7	0.8	1.0	1.1	0.1
c. Restaurants	2.5	2.8	3.1	3.7	3.2	0.9
7. TRANSPORT & COMMUNICATION	21.1	24.1	29.9	36.4	33.3	15.3
a. Transport	18.8	21.8	27.6	32.9	29.5	13.7
1) Road Transport	14.3	16.5	22.1	26.8	24.8	12.3
2) Sea Transport	1.6	1.9	1.9	2.0	1.2	0.5
3) Air Transport	2.8	3.3	3.4	4.0	3.3	0.9
4) Services Allied to Transport	0.1	0.1	0.1	0.1	0.1	0.1
b. Communication	2.4	2.3	2.3	3.5	3.9	1.6
8. FINANCIAL, OWNERSHIP & BUSINESS SERVICES	10.3	10.7	11.8	15.3	12.4	4.9
a. Banking	4.7	5.0	5.3	6.0	4.3	1.5
b. Non-Bank Financial Institutions	0.9	0.9	1.2	2.4	2.0	1.3
c. Building Rentals	4.4	4.5	5.0	6.4	5.6	1.9
d. Business Services	0.3	0.3	0.3	0.6	0.6	0.2
9. SERVICES	56.1	62.2	70.0	78.2	71.7	26.6
a. Govemment	53.2	59.1	66.5	74.3	68.1	25.5
b. Private	2.9	3.1	3.5	3.9	3.6	1.2
1) Social & Community Services	0.7	0.7	0.8	0.9	0.8	0.3
2) Amusement & Recreation Services	0.1	0.1	0.1	0.1	0.1	0.0
3) Personal & Household Services	2.2	2.4	2.7	2.9	2.7	0.8
GDP (non-oil)	247.0	279.3	315.1	367.9	342.4	127.0

Source: Table 1 and International Financial Statistics for the exchange rate).
Note: the table converts current rupiah into US $ at the prevailing monetary exchange rate, not at the purchasing power parity exchange rate, which may be misleading when exchange rates are heavily influenced by factors unrelated to trade (e.g. in 1998). See Section III.C for a discussion of conceptual issues involved.

Table 4
GDP by Industrial Origin at Constant 1993 Market Prices
(in million US$, converted at the average 1993 monetary exchange rate)

	1993	1994	1995	1996	1997	1998
1. AGRICULTURE, FORESTRY,FISHERY	73.6	74.6	71.4	79.7	85.3	85.5
a. Farm Food Crops	47.0	48.7	47.4	51.4	54.6	55.7
b. Non-Food Crops	14.5	13.3	12.1	15.6	17.2	15.7
c. Livestock	9.5	9.5	8.2	8.8	9.4	10.4
d. Forestry	1.1	1.4	1.5	1.6	1.8	1.4
e. Fishery	1.5	1.6	2.2	2.2	2.3	2.4
2. MINING & QUARRYING	2.5	2.6	2.9	3.4	4.1	3.3
a. Non-Oil and Gas Mining	0.0	0.0	0.0	0.0	0.0	0.0
b. Quarrying	2.5	2.6	2.9	3.4	4.1	3.3
3. MANUFACTURING INDUSTRY	7.1	8.2	9.9	10.7	12.0	11.5
4. ELECTRICITY & WATER	1.6	1.6	1.9	2.6	2.8	2.9
a. Electricity	1.2	1.3	1.3	1.6	1.7	1.8
b. Water Supply	0.3	0.4	0.6	1.1	1.0	1.1
5. CONSTRUCTION	51.7	59.2	68.8	72.8	74.3	52.7
6. TRADE, HOTELS & RESTAURANTS	23.1	29.8	31.0	34.0	35.5	36.7
a. Wholesale & Retail Trade	19.8	26.5	27.1	30.0	31.3	33.7
b. Hotels	0.8	0.7	0.8	0.9	1.1	0.4
c. Restaurants	2.5	2.7	3.1	3.1	3.1	2.6
7. TRANSPORT & COMMUNICATION	21.1	23.7	29.7	33.8	35.4	36.9
a. Transport	18.8	21.4	27.4	30.4	31.7	32.5
1) Road Transport	14.3	16.2	22.0	24.6	26.5	28.7
2) Sea Transport	1.6	1.9	1.9	1.8	1.3	1.7
3) Air Transport	2.8	3.2	3.4	3.8	3.8	1.9
4) Services Allied to Transport	0.1	0.1	0.2	0.2	0.1	0.2
b. Communication	2.4	2.3	2.3	3.4	3.7	4.3
8. FINANCIAL, OWNERSHIP & BUSINESS SERVICES	10.3	10.5	11.7	14.7	13.7	17.3
a. Banking	4.7	4.9	5.2	5.5	4.5	5.2
b. Non-Bank Financial Institutions	0.9	0.9	1.1	2.3	2.0	4.1
c. Building Rentals	4.4	4.5	5.0	6.3	6.4	7.2
d. Business Services	0.3	0.3	0.3	0.6	0.7	0.8
9. SERVICES	56.1	61.3	69.7	77.6	79.9	88.9
a. Govemment	53.2	58.1	66.1	73.8	75.9	85.4
b. Private	2.9	3.2	3.5	3.8	4.1	3.5
1) Social & Community Services	0.7	0.7	0.8	0.8	0.9	1.0
2) Amusement & Recreation Services	0.1	0.1	0.1	0.1	0.1	0.1
3) Personal & Household Services	2.2	2.4	2.7	2.8	3.0	2.4
GDP (non-oil)	247.0	271.5	297.2	329.3	342.9	335.6

Source: Table 2 and International Financial Statistics for the exchange rate).
Note: the table converts constant 1993 rupiahs into 1993 US $ at the monetary exchange rate prevailing in 1993, not at the purchasing power parity exchange rate. See Section III.C for a discussion of conceptual issues involved.

A. Pre-1999 Series

No documentation exists on the sources and methods used by BPS to compute East Timor's accounts. What we are providing in what follows is our best guess on this issue based on available documents as well as interviews with people who have had some involvement in these computation in the past.

Basically, BPS estimated the East Timor accounts in more or less the same way as it had computed figures for other Indonesian provincial accounts, namely:

1. Agriculture, Forestry & Fisheries

Farm Food Crops: quantities produced for several commodities (rice, maize, peas, peanuts, soybean, cassava, sweet potatoes, vegetables and fruits) were obtained annually from the statistical office and the Department of Agriculture. Producer price data were obtained from periodic surveys of agricultural products. Price changes measured in the Wholesale Price Index (WPI) were applied to the 1993 levels then multiplied by the quantity to arrive at the current value of output. This was then multiplied by the value-added to output ratio (a nationwide single ratio obtained from the latest Input-Output table) to arrive at the level of value added of surveyed commodities, then marked up to account for other non-surveyed items (also based on the latest Input-Output table).

Non-Food Crops: the same methodology used for farm food crops was applied here as well to the following surveyed crops: coffee, coconuts, hybrid coconuts, arece palm, kapok, candle nuts, cocoa, cloves and vanilla.

Livestock: data on quantities were obtained for eight commodities from the Department of Agriculture: cows, buffalos, goats, pigs, chickens, ducks, eggs and milk. Quantities were estimated as the number of live births (the reproduction rate multiplied by the total population at the end of the previous year) minus the number of animals slaughtered and those exported. The WPI change was applied to the 1993 price. The same methodology converting output to value added and adding a markup was applied here.

Forestry: data on quantities were obtained for eleven types of wood, but primarily sandlewood ("cendana") and candle nuts ("kemiri"), from the Department of Forestry. The WPI change was applied to the 1993 price. The same methodology converting output to value added and adding a markup was applied here.

Fishery: Quantities were obtained from the Department of Agriculture (and marketing organizations) for: salt water fish, fresh water fish, sea shells, pearls, oysters and other shellfish

gathered from the ocean. The WPI change was applied to the 1993 price. The same methodology converting output to value added and adding a markup was applied here.

2. Mining & Quarrying

Only "quarrying" was measured. No data were available on wither quantities or prices. So the value of output was indirectly estimated based on reports from local authorities on taxes and royalties paid on the following commodities: stones (rockstone, coral), sand, clay and marble. The same methodology converting output to value added and adding a markup was applied.

3. Manufacturing

Data on the value of output produced by large and medium manufacturing establishments (those employing 20 or more workers) were obtained from the BPS annual survey. Data on small establishments and household enterprises were obtained from the local office of the Department of Industry and Trade, which kept annual records on the number of establishments, the number of workers, value of output and value of investment per establishment. A value-added to output ratio was then applied, as well as a markup to account for missing establishments.

4. Electricity & Water

Electricity: Data covering quantities (in kwh) and value of electricity sold were obtained from the state electricity company (Perusahaan Listrik Negara, PLN). A value-added to output ratio was then applied, as well as a markup to account for self-generation by households.

Water: Data on quantity and value of water sold to consumers were obtained from the local state enterprise for water supply (PDAM). A value-added to output ratio was then applied, as well as a markup to account for water from other sources.

5. Construction

This covered mainly general and special trade contractors primarily engaged in construction. General contractors undertake complete projects while special trade contractors engaged in only part of a particular project. Output of construction activities included: buildings, infrastructure (roads, terminals etc.), irrigation systems, telecommunications networks, etc.

Data on value of output and intermediate inputs were directly obtained from the general census conducted by BPS every ten years, and from special surveys done periodically. These are supported by data obtained from the Department of Public Works which covers large infrastructure construction. A value added to output ratio is then applied.

6. Trade, Hotels & Restaurants

Trade: with no data source available, annual output for establishments in this sector was measured indirectly. The only reliable measure of output (which is the trade margin) and value added was obtained from the decennial economic census, the latest was conducted in 1996.

Hotels: hotels in Dili were surveyed annually by the BPS local office. The number of occupants was multiplied by detailed room rates. A value-added to output ratio was then applied, as well as a markup to account for undercoverage.

Restaurants: coverage included restaurants, cafes, catering services, warungs and other eating places which sell prepared foods and drinks for consumption on the premises. Changes in quantities use as a proxy changes in the number of employees. Changes in prices rely on relevant components of the Consumer Price Index (CPI). Thus, current value of output uses the 1993 value of output augmented by changes in prices and in the number of employees. A value added to output ratio is then applied.

7. Transport & Communications

Road transport: the number of vehicles by type (passenger cars, buses, trucks, motorcycles) were obtained annually from the local office of the Department of Public Works. A number of passengers per vehicle was assumed, then the transportation component of the Consumer Price Index (CPI) was applied to the 1993 average cost per passenger in 1993. A value-added to output ratio was then applied, as well as a markup to account for other sources.

Ocean transport: the number of passengers and freight shipped were obtained annually from the local office of the state enterprise for ports. The transportation component of the CPI was applied to the 1993 average cost per passenger (and per ton of freight) in 1993. A value-added to output ratio was then applied, as well as a markup to account for undercoverage.

Air transport: the number of passengers and freight shipped by air was obtained annually from the Comoro airport in Dili. The transportation component of the CPI was applied to the 1993 average cost per passenger (and per ton of freight) in 1993. A value-added to output ratio was then applied, as well as a markup to account for undercoverage.

Services Allied to Transport: this included activities operation of: terminals and their facilities, parking lots, airport and seaport and their facilities, loading and unloading, rental of automobiles/cars/trucks (without drivers), freight forwarding, travel agencies, warehouses and storage facilities. Quantity and price data on these items were obtained from administrative records of relevant authorities. A value added to output ratio was then applied.

Communications: output was computed using four commodities (with data obtained from the East Timor Post Office): number of letters, number of packages, money transfers (number of forms filled), checking/savings accounts "cek & giro"(number of transactions). Output for telecommunications was based on data obtained from the local office of the telecommunications company. It included four commodities: domestic telephone calls (meter usage), manual long-distance calls (minutes), telex (meter usage), telegrams (words).

The above figures were then multiplied by an average value per transaction to calculate the value of output. A value-added to output ratio was then applied, as well as a markup to account for undercoverage.

8. Financial & Business Services

Banks: Data were obtained from the local office of Bank Indonesia. Value added was measured using the income approach, including: employee compensation, depreciation, indirect taxes and operating surplus.

Non-bank financial institutions: same as for banks.

Building rentals: data on commercial building rentals relied on surveys of establishments engaged in rentals. Both the value of output and intermediate inputs were computed in that survey. Data from that survey were also used to impute a rental value for owner-occupied dwellings, which was then multiplied by an estimate of the number of such dwellings.

Business services: with no data available for direct measurement of this variable, indirect estimations were made based on indicators of establishment value-added and employment from the 1996 economic census. Growth figures were obtained from a special survey of establishments engaged in such activities.

9. Other Services

Government: value added for this sub-sector was calculated using the income approach (based on actual budget expenditures) as the sum of two components: employee compensation (which includes wages and salaries as well as fringes provided to civil servants) and consumption of fixed capital (which was estimated at 5% that of employee compensation).

Social and community services: this included hospital services and dental and educational services. As in the case of other business services, basic data relied on the 1996 economic census, and growth indicators for subsequent years were obtained from a special survey of institutions engaged in these activities.

Amusement and recreation services: this included recreational and cultural services, such

as movie theaters, museums, zoos, amusement centers, athletic and art centers. As in the previous sub-sector, basic data for this sub-sector relied on the 1996 economic census, and growth indicators for subsequent years were obtained from a special survey of institutions engaged in these activities.

Personal and household services: this included domestic services, repair services (e.g. of motor vehicles, motorcycles, bicycles, household appliances), services of barber shops, beauty shops, laundry centers and the like. As in the previous sub-sector, basic data for this sub-sector relied on the 1996 economic census, and growth indicators for subsequent years were obtained from a special survey of institutions engaged in these activities.

B. 2000 Estimation

In attempting to measure the 2000 accounts, we faced three major constraints:

- First, time was highly constrained for this project. The implication was that we had to use whatever data sources were available, evaluate them and make necessary adjustments. Ideally, we would have liked to have conducted a census of establishments to compute a reliable benchmark set of production accounts, since such a primary source did not exist. But that was not feasible.

- The second constraint was the lack of sufficient skills among the staff left by the former BPS office. It appears that professionals who had participated in the past in compilation of the East Timor GDP, or who had undertaken conceptual training on this subject, are no longer working with the current Census and Statistics Office. The experience of the remaining staff there had been limited to enumeration, with no (or very little) involvement in survey design or back office operations such as editing, programming, estimating etc.

- A further complicating factor was the fact that we were trying to measure a *fluid* economy and one which is by all accounts *in transition*. That is not the ideal way of measuring a benchmark. None of the last three years appears ideal for use as a benchmark, which technically should reflect a stable situation against which one attempts to measure future (or past) trends. The year 1999 was one in which the economy was virtually destroyed. The year 2000 was the first full year after independence, but was one of huge unsustainable flows aiming at what appeared to be building an economy almost from scratch. The year 2001 was a year of tremendous UN sponsored activities, which will be substantially reduced in 2002. At the same time, the country adopted a new currency (the US dollar).

All these factors implied that the most advisable course of action was to do the best that can be done given existing resources and data sources. We attempted to extract the most out of existing data, and planned skill development training for staff at the most rudimentary level possible to ensure that the basic concepts and techniques used in our estimations are fully grasped.

Our attempt at estimating the accounts for the year 2000, therefore, did not follow the elaborate methodologies used by BPS in the past. Rather, we canvassed all existing sources for data that would have a direct or even an indirect bearing on measuring a particular variable and tried to combine data in a way that we felt produced the most plausible picture of the economy in 2000.[7] In what follows, we provide a brief documentation of the methodologies used sector by sector.

1. Agriculture, Forestry & Fisheries

For lack of any other data sources, our figures relied primarily on the assessments made by the ETTA's Department of Agriculture of the level of production in the five main sub-sectors (namely, farm food crops, farm non-food crops, livestock, forestry and fishery) in June 2000, compared with that of 1997.[8] Based on these assessments, the following proportions (relative to the dollar value of production in 1997) were used:

- farm food crops: 70%
- farm non-food crops: 80%
- livestock: 40%
- forestry: 60%
- fishery: 50%

The plausibility of the figures for farm food crops, which are dominated by rice and maize, was checked against results obtained from another independent source.[9]

2. Mining & Quarrying

Oil & Gas: Revenue from the Timor Sea for 2000 was estimated in three steps:

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[7] Appendix B provides a list of documents and data sources reviewed and/or used for these compilations.

[8] 1998 was not used because a drought had affected production in that year.

[9] Chen, Zhijun, *Strategy for Irrigation and Water management in East Timor*, Zhijun Chen, Department of Agriculture, UNTAET, June 8, 2000.

- Monthly production (in barrels) was multiplied by an average world sale price prevailing during that month

- the First Tranche Petroleum (FTP) payment (equal to 5% of gross revenue, i.e. the value of production computed above) was then calculated.

- East Timor's 50% share of the FTP was then calculated with a one-month lag. In October 2000, a payment of East Timor's share of the FTP was received covering the period from October 25, 1999 to September 2000. Another payment was received in September 2001, which we used for the remaining three months of 2000.

To calculate value added, two more steps followed:

- Intermediate inputs were estimated as 35% of the breakeven production value for the oil field.

- Value added was then the difference between the value of output and the value of intermediate inputs used. The implicit value-added to output ratio was consistent with that computed by BPS for this sub-sector.

Quarrying: The value of output of this sub-sector was assumed to be 5% of that of construction. A value-added to output ratio of 60%, consistent with that computed by BPS, was then applied.

3. Manufacturing

The main source of data for this sector was a survey conducted in April/May, 2001 by the Division of Industry, Mineral Resources and Tourism.[10] The survey identified over 15 industries covering over three hundred establishments employing about 2000 workers. When the sample was blown up to cover the estimated population of establishments, the estimate was that 1312 establishments were in operation, total employment was 8,615 and total output was over $15 million. From that information we needed to estimate the value added for 2000. That was done in five steps:

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[10] Queipo, Vincente C., *Survey of Small and Medium Industries in East Timor*, Division of Industry, Mineral Resources & Tourism, Dili, September, 2001.

- An average daily wage of $4.50 was used. Using an estimate of employment of 250 days per year, the average annual wage per employee was $1,125. The wage bill was then calculated as the product of the wage rate and the total number of employees in that sector.

- An operating surplus of 10% of the value of production was assumed.

- A depreciation of 10% of the fixed capital stock was assumed.

- Value added (from the income side) was then the sum of these three flows.[11]

- An adjustment was added assuming that 80% of these establishments were in operation in 2000. The figure provided was in 2001 dollars.

- Finally, that number was deflated by an estimated 3% inflation rate to produce a value added for 2000 in dollars of that year.

4. Electricity & Water

The source for computations for this sector was the government expenditure accounts. Expenditures on wages and salaries to the Power Authority and to the Water and Sanitation Authority during 2000 were combined and added to the cost of fixed capital to measure the value added of this sector from the income side.[12]

5. Construction

Value added for this sector was calculated in four steps:

- First, government expenditure on infrastructure (and other construction) was derived from expenditure accounts of various agencies.

- We assumed that construction activity during 2000 by the private business sector was 25% of that of the government.

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[11] No allowance for taxes was made.

[12] Here also, we assumed that no indirect taxes were paid during 2000.

- An estimate for residential construction was computed as follows:

  a. household spending (derived from in-kind or cash assistance from three sources: NGO's, other sources and own resources) on such activities. This was derived from the 2001 poverty assessment household survey. This component was measured in 2001 dollars.

  b. The above number was compared with the total spending reported by NGO's on the same activity (i.e. shelter assistance) during 2000, obtained from the UNTAET expenditure reports. This component was measured in 2000 dollars.

  c. The ratio of the component in b to that of the first component in a was then calculated as a composite adjustment factor for: under-reporting by households, under-coverage in the survey and implicit inflation related to that activity.

  d. The adjustment factor was then applied to the total reported household spending on this activity (in a) to arrive at an estimate of total household expenditure on residential construction in that year and in 2000 dollars.

- A value added to output ratio of 45% (used in BPS computations for this sector) was then applied to the sum of the estimated construction spending of government, private business and households.

6. Trade, Hotels & Restaurants

Trade: With no independent sources for data on this sub-sector, we assumed that its share in non-oil/non-UNTAET GDP in 2000 was the same as the average share in non-oil GDP that it exhibited in the past (i.e. between 1993 and 1998).

Hotels: Data were available on all hotels in East Timor, their occupancy rate and their revenue by type of accommodation in 2000. A value-added to output ratio (used in BPS computations) was then applied to arrive at the value added for this sub-sector.

Restaurants: Detailed data were available for restaurants in and outside Dili as well as their

wage payments. Value added was computed from the income side by adding the wage bill, an assumed 120% of wage payments inside Dili and 80% outside Dili for operating surplus and an assumed 10% of operating surplus as a proxy for the consumption of fixed capital..

7. Transport & Communications

Road, sea and air transport: The aggregate value for this sub-sector was computed from the UNTAET expenditure reports. As for the distribution of road versus sea versus air, no independent sources existed, so we assumed that their share in non-oil/non-UNTAET GDP in 2000 was slightly smaller than the average shares in non-oil GDP that they exhibited in the past (i.e. between 1993 and 1998).

Services allied to transport: Data from the CFA on tax revenue included taxes collected on "transport rentals". Based on the 10% tax rate on these items, the value of these rentals was then estimated. A value-added to output ratio of 60% was then applied.

Communications: Two main flows were computed:

- Telecommunications: A value of telecommunications services was estimated based on data on "service tax" collected. A value-added to output ratio of 80% was then applied.

- Post office: the source for computations for this sub-sector was the ETTA budget. Expenditures on wages and salaries to the Post Office during 2000 were combined with the cost of fixed capital to measure the value added of this sub-sector from the income side.

8. Financial & Business Services

Banking, non-bank financial activities and business services: With no independent sources for data on these sub-sectors, we assumed that the share in non-oil/non-UNTAET GDP for the first two were slightly smaller than the average shares in non-oil GDP that they exhibited in the past (i.e. between 1993 and 1998), and for the third one that its share was the same as in the past.

Building rentals: value added for this activity was measured as follows:

- First, property rentals were estimated using three components:

  a. East Timorese households: data on this activity were obtained from the 2001 poverty assessment household survey. An adjustment was then added to allow for an

estimated increase in the number of households between 2000 and 2001.

b. Expatriate households: the value of rentals for these households was estimated as follows: an average monthly rent of $400 was multiplied by an average number of monthly rentals (450) then annualized.

c. Businesses: the value of rentals for this category was assumed to be 25% of that of the local households.

- Then imputed rents (for owner-occupied housing) were estimated based on data from the 2001 household survey[13] adjusted for an estimated population increase between 2000 and 2001.

- The sum of the above two estimates, which was used as a proxy for the value of output, was then multiplied by a value-added to output ratio (87%) used by BPS in computations for this sub-sector.

9. Other Services

Government: Here we have included the value of services provided by UNTAET in its status as a "resident" institution acting on behalf of the East Timorese government. Because of the size of its contribution, we have listed it separately. We have also included the contribution of other agencies including: INGO's/NGO's, bilateral agencies, TFET and ETTA. Value added of these services was basically the sum of their employee compensation and consumption of fixed capital. In computing these flows, two things are particularly noteworthy:

- First, the data obtained were highly detailed, covering individual line items of individual projects. Expenditures on explicitly identified sectors (e.g. agriculture, construction, power, transportation etc.) were allocated to those sectors, with the implicit implication that the remaining expenditures covered functions generally undertaken by the government.

- Secondly, for all the above agencies, a distinction was made between expenditures which should not be part of East Timor's GDP (e.g. peace keeping, diplomatic assignments) and those which should be (e.g. technical assistance, project expenditure etc.), and only the

[13] This was based on the question: "Estimate the amount of rent you could receive as rent if you let this dwelling to another person."

latter type of expenditure was included.[14]

Moreover, budget figures, which were based on fiscal years, were converted to calendar years by using semi-annual cumulative disbursements.

In calculating consumption of fixed capital, an amortization rate was assigned to every relevant fixed capital line item by type of fixed asset as follows:

- roads and similar infrastructure: 2%
- buildings: 4%
- machinery and equipment: 10%
- vehicles: 25%
- computer equipment: 25%

Private: With no independent sources for data on this sub-sector, we assumed that its share in non-oil/non-UNTAET GDP was slightly smaller than the average share in non-oil GDP that it exhibited in the past (i.e. between 1993 and 1998).

C. GDP in US Dollars

Special problems arise in expressing the GDP of one country or currency area in units of another currency. Such conversion is clearly useful for comparing the size of different economies, for comparing standards of living, and for other purposes. But there is no one best method of making the conversion. The paragraphs below discuss three methods of expressing the GDP of East Timor in US dollars: conversion using monetary exchange rates, conversion using purchasing-power-parity (ppp) exchange rates, and direct measurement in dollars.

1. Using Monetary Rupiah-Dollar Exchange Rate

In years when the rupiah was the official currency of East Timor, the simplest method of conversion to US dollars was division by the monetary exchange rate. For questions related to traded goods and international capital flows, the monetary exchange rate is clearly the relevant conversion factor. A company, for example, that sells its products in the US for dollars and pays

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[14] For UNTAET, only allowances paid are included. For bilateral donors, all wages and salaries (as well as allowances) paid by these agencies for technical assistance were considered paid to residents as defined in the SNA. With no information separating wages paid to individuals serving less than one year (the cut-off for residency) from those serving at least one year, our assumption was that the *positions* that these individuals held during 2000 were planned and held for at least one year. In other words, wages were assumed to have been paid for positions rather than for individuals.

its workers and suppliers in rupiahs clearly cares about the monetary exchange rate. But it has long been recognized that the monetary exchange rate may differ substantially from the relative prices (that is, rupiah per unit divided by dollars per unit) for non-traded goods and services and even for goods and services that are traded, if they have high costs associated with trading or if special factors are distorting exchange rates. Conversion of GDP or similar macroeconomic totals using a monetary exchange rate may therefore be a poor indicator of the comparative size or standard of living of an economy.

Monetary exchange rates are especially likely to be misleading for these macroeconomic totals when exchange rates are heavily influenced by factors unrelated to trade--for example, by massive capital flows or by unstable expectations about an economy. Clearly, these factors have been of major importance in accounting for the enormous fluctuations of the rupiah-dollar exchange rate in recent years. Consequently, using monetary exchange rates to convert the pre-independence GDP of East Timor to dollars is especially likely to mislead in recent years.

2. Using PPP Rupiah-Dollar Exchange Rate

To deal with the shortcomings of monetary exchange rates for converting macroeconomic totals, the now widely used approach is to use purchasing-power-parity (ppp) exchange rates. These are based on periodic surveys of the prices of a sample of goods in many countries. They are analogous to standard price indexes, except that instead of measuring prices in one country at different periods of time, they measure prices in different countries at the same period of time. The well known index number problems of choosing weights and formulas apply to ppp exchange rates just as they apply to ordinary price indexes.

Conversion using ppp exchange rates in the year or years when surveys of prices are actually conducted is straightforward once decisions have been made about weights and formula. For other years, a common approach is to extend the converted series (e.g., East Timor GDP in dollars) by multiplying the change in real GDP in one country (e.g. East Timor) by the change in some appropriate price index for the other country (e.g. the U.S.). This approach is an approximation because the formulas and weights underlying the real GDP measure and the price index are almost surely not the same as the ones underlying the ppp exchange rate; but clearly the approach is correct in focusing on changes in real GDP and dollar prices as the most important factors. In addition, it makes possible a continuous series even when the official currency in East Timor changes, as long as key indicators of real change are still available.

A feature of the ppp approach not often emphasized, but probably relevant to East Timor, is the averaging over regions that characterizes the basic survey of relative prices. The ratio of

rupiah price to dollar price for, say, a kilo of rice, is really the ratio of some average rupiah price in many regions to some average dollar price in many regions (exactly what kind of average depends on the detailed survey methodology). The ratio of rupiahs per kilo of rice in East Timor (when the rupiah was still the official currency) to the average dollar price will be different from this overall average ratio if the cost of rice in East Timor differs from the average cost of rice in Indonesia. Some prices probably vary little from region to region. But for goods and services with a high local labor content, prices are likely to be systematically lower in poorer regions than in wealthier ones. In addition, housing prices usually vary substantially from region to region.

3. Direct Measurement in Dollars

Usually, direct measurement of GDP in US dollars is not possible in countries outside the US. For East Timor in 2000, however, direct measurement is possible because dollars are the official medium of exchange (although many transactions in fact are still conducted in rupiahs).

For many purposes, direct measurement is the preferable approach when it is possible. Businesses are clearly interested in their actual dollar receipts and costs, when transactions are conducted in dollars. Donor groups considering how to finance a budget deficit or a balance of trade deficit clearly want to know the magnitudes in terms of directly measured dollars. Direct measurement, furthermore, clearly avoids the problems of using monetary exchange rates; it is based on prices and quantities of all goods and services and is not subject to distortion by capital flows.

The relation of direct measurement in US dollars to the ppp approach is a bit more complicated. Direct measurement reflects dollar prices of goods and services in East Timor, which can differ substantially from average prices of the same goods and services in the US. Thus, if employing a housekeeper to clean a house in East Timor costs one tenth of the average cost of cleaning a house in the US, the contribution of housekeeper services to GDP through direct measurement will be far lower than the contribution would be if it were measured in average US dollar prices. As an indicator of the size or standard of living of East Timor, direct measurement is misleading when dollar prices in East Timor are different from average dollar prices in the US.

Thus, for measurement of living standards, the ppp approach can mislead when rupiah prices in East Timor differ from average rupiah prices in Indonesia, while the direct measurement approach can mislead when dollar prices in East Timor differ from average dollar prices in the US.

4. Choosing a Useful Approach

It should by now be apparent that the most useful approach to measuring East Timor's GDP in dollars depends on the purpose of the measure. For donor countries interested in

the size of various dollar gaps that need to be dealt with, such as government budget deficits, direct measurement is the most useful approach. It is the directly measured gaps, not their purchasing power after correcting for relative price differences, that need to be financed.

In contrast, for comparative measurement of the size of the East Timorese economy (e.g. in terms of proportion of world, or southeast Asian, output) or for measuring the East Timorese standard of living, the ppp approach seems preferable to the direct measurement approach.

These issues were discussed at length, not because they have a direct bearing on our estimates of the size or structure of the East Timorese economy in 2000, but rather to caution users about the need for prudence in interpreting these data should they decide to compare pre- and post-independence figures.

IV. SOURCES & METHODS: EXPENDITURE ACCOUNT

Components of the expenditure side of GDP represent the final uses of output. They were measured in this report as follows:

A. Government Final Consumption Expenditure

This is defined as the value of goods and services produced by the government for its own current use. This is obtained by summing up three flows:

- Compensation of employees: these were the "wages and salaries" computed above in the production account
- Consumption of fixed capital: these were the estimated flows also computed above in the production account
- Intermediate inputs: these were what the budget for various agencies in East Timor refer to as expenditure on "goods and services."

As was done in computing the value added of government services above, only expenditure of agencies in their status as "resident" institutional units were included.

B. Gross Fixed Capital Formation

This represents the net addition of producers to their stock of tangible fixed assets. Simply put, it is the value of fixed assets that they have added to their stock minus the value of those sold or scrapped. This flow is estimated in this report as the sum of two components:

- government gross fixed capital formation: this was estimated as the sum of the relevant government agencies' expenditure on "capital investment", which covers their relevant (i.e. non-military/diplomatic) construction activities during the year.

- private gross fixed capital formation: this covers the value of construction activities undertaken by the private sector as well as its acquisition of imported machinery and equipment. This in turn is divided into two components:

  a. Activities by businesses: these include construction activities measured in the production account, in addition to other capital expenditures undertaken by businesses. The latter was estimated using the same percentage of construction activities as that of the government.

  b. Residential construction: these refer to the same measure computed in the production account.

C. Changes in Stock

This flow measures the change, during the year, in the stock of:

- goods purchased by producers for intermediate consumption but not used during the year,
- goods produced during the year but not sold,
- work in progress and
- livestock raised for slaughter.

With no data on any of these components, the size of this flow was assumed to equal 10% of estimated gross fixed capital formation.

D. Exports of Goods and Services

This flow measures the value of all goods and services exported during the year. The estimated figure for 2000 was calculated as the sum of two components:

- coffee exports: figures were obtained from the Customs office covering "Value For Duty" (VFD) coffee exports for the March 20-

December 31, 2000 period. A 15% estimate for the January-March 19 period was then added to obtain a figure for the whole year.

- oil exports: the estimated East Timor portion of the value of production from the Timor Sea computed in Section III.B.2 was used here.[15] The implicit assumption was that all produced oil was exported.

E. Imports of Goods and Services

This flow measures the value of all goods and services imported during the year. The estimated figure for 2000 first computed the sum of three components:

- VFD taxable imports: figures were obtained from the Customs office also for the March 20- December 31, 2000 period. A 15% estimate for the January-March 19 period was then added to obtain a figure for the whole year.

- VFD exempt imports: here again, figures were obtained from the Customs office for the March 20- December 31, 2000 period. A 15% estimate for the January-March 19 period was then added to obtain a figure for the whole year.

- imports related to production activities in the Timor Sea. These were assumed to be 50% of expenditures relating to oil production.

Then the value of what UNTAET had imported for the use by its military personnel[16] was subtracted to arrive at the final estimate for total goods imports during the year.

F. Private Final Consumption Expenditure

This component includes primarily final consumption expenditure of households. As is done in many countries, it was calculated here as a residual. However, as a plausibility check, this number was compared with an attempt based on response to the 2001 poverty assessment household survey.

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[15] Note that here we use the value of *output* produced, not the value added used in the production account.

[16] These were included under line items "rations" and "recreation supplies" of the "military personnel costs".

When one uses consumption figures on food, non-food, rentals and utilities, and with a proper adjustment for population increase and inflation, the result is a figure very close to that residual.

V. RESULTS

Results of the above estimations are provided in Tables 5 and 6 respectively for the production and expenditure accounts.

Table 5
GDP of 2000 by Industrial Origin at Current Market Prices

Sector	GDP (US$ million)	Share in GDP	Share in non-oil GDP	Share in non-UNTAET non-oil GDP	Average non-oil GDP 1993-1998
1. AGRICULTURE, FORESTRY, FISHERY	83.3	21.2%	25.9%	35.0%	32.2%
a. Farm Food Crops	49.3	12.6%	15.4%	20.7%	19.6%
b. Non-Food Crops	28.6	7.3%	8.9%	12.0%	8.0%
c. Livestock	3.7	0.9%	1.2%	1.6%	3.6%
d. Forestry	0.8	0.2%	0.3%	0.3%	0.4%
e. Fishery	0.8	0.2%	0.3%	0.3%	0.6%
2. MINING & QUARRYING	74.5	19.0%			
a. Oil and Gas Mining	71.4	18.2%			
b. Quarrying	3.1	0.8%	1.0%	1.3%	0.9%
3. MANUFACTURING	8.7	2.2%	2.7%	3.7%	3.0%
4. ELECTRICITY & WATER	2.6	0.7%	0.8%	1.1%	0.7%
a. Electricity	1.3	0.3%	0.4%	0.5%	0.5%
b. Water Supply	1.4	0.3%	0.4%	0.6%	0.2%
5. CONSTRUCTION	45.9	11.7%	14.3%	19.3%	18.5%
a. Govemment	27.6	7.0%	8.6%	11.6%	
b. Non-Government	18.3	4.7%	5.7%	7.7%	
6. TRADE, HOTELS & RESTAURANTS	25.1	6.4%	7.8%	10.6%	9.3%
a. Wholesale & Retail Trade	19.0	4.8%	5.9%	8.0%	8.1%
b. Hotels	4.6	1.2%	1.4%	1.9%	0.2%
c. Restaurants	1.5	0.4%	0.5%	0.6%	0.9%
7. TRANSPORT & COMMUNICATION	23.2	5.9%	7.2%	9.8%	9.7%
a. Transport	19.8	5.0%	6.2%	8.3%	8.8%
1) Road Transport	16.0	4.1%	5.0%	6.7%	7.2%
2) Sea Transport	1.0	0.2%	0.3%	0.4%	0.5%
3) Air Transport	1.6	0.4%	0.5%	0.7%	1.0%
4) Services Allied to Transport	1.3	0.3%	0.4%	0.5%	0.0%
b. Communication	3.4	0.9%	1.0%	1.4%	1.0%
8. FINANCIAL, OWNERSHIP & BUS. SERV.	21.1	5.4%	6.6%	8.9%	3.9%
a. Banking	2.4	0.6%	0.7%	1.0%	1.6%
b. Non-Bank Financial Institutions	0.5	0.1%	0.1%	0.2%	0.5%
c. Building Rentals	18.0	4.6%	5.6%	7.6%	1.6%
d. Business Services	0.2	0.1%	0.1%	0.1%	0.1%
9. OTHER SERVICES	108.2	27.6%	33.7%	10.4%	21.7%
a. Govemment	106.3	27.1%	33.1%	9.6%	20.7%
1) UNTAET	83.4	21.3%	26.0%		
2) Others	22.9	5.8%	7.1%	9.6%	
b. Private	1.9	0.5%	0.6%	0.8%	1.1%
GDP	**392.6**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

MEMO ITEMS	
Population	712259
GDP per capita ($)	551
Non-oil GDP ($ million)	321.2
GDP without UNTAET ($ million)	309.2
Non-oil GDP without UNTAET ($ million)	237.7

Table 6
GDP of 2000 by Expenditure at Current Market Prices

Expenditure Category	GDP (US$ million)	Share
Private Final Consumption Expenditure	204.7	52.1%
+ Government Final Consumption Expenditure	170.0	43.3%
+ Gross Fixed Capital Formation	124.5	31.7%
+ Changes in Inventories	12.4	3.2%
+ Exports	83.4	21.2%
- Imports	-202.4	-51.6%
GDP	**392.6**	**100.0%**

VI. FUTURE STEPS

A. Annual Updates

With 2000 estimates completed, one can now turn to the issue of follow up. How can estimates for 2001 (and subsequent years) be computed? Two courses of action are discussed here: the first relies fully on existing data sources and the second assumes that new sources can be developed.

1. Using Existing Sources

If one wants to use the same sources of data that were used for the 2000 computations, then 2001 estimates can be done mechanically using the same methodologies documented in Sections III.B and IV above with a simple update of the entries in the spreadsheet files which have been provided. Although this option appears simple in theory, in reality some complicating factors need to be taken into consideration:

- One must remember that a *mechanical* application of a procedure does not guarantee plausible results. Evaluation of plausibility is an analytical, rather than a mechanical, skill which needs to be developed by the staff who will ultimately be responsible for producing annual GDP updates.

- Several sources of data used in the 2000 computations were obtained on a highly confidential basis, particularly the detailed line item government/UNTAET expenditure figures. In order to be able to replicate, even mechanically, the computations documented in this report, they will need to be acquired by the staff responsible for producing the annual updates. If the same level of detail cannot be obtained, assumptions will have to be made along the way, which will need to be tested for plausibility.

- While 2001 will probably be very similar in treatment to 2000 because of the significant UNTAET presence, subsequent years may not. It may be necessary to introduce substantial changes in the methodology after 2001 should reported data for those years warrant it.

Subject to the above three qualifications, this remains probably the most realistic course of action for producing 2001 and 2002 figures given existing structure and staffing.

2. Developing New Sources

A desirable future option, should circumstances allow it, is to develop new data sources (through censuses and surveys, of both households and establishments) in order to measure directly the size of critical variables. To that end, the priority should be to conduct surveys which enable more accurate measurement of agriculture sub-sectoral flows, given the importance of that sector and the current paucity of data on its activities. Adequate coverage of this sector will require a series of surveys:

- First, surveys which aim at measuring *levels* of various flows. These will require large samples and detailed questionnaires allowing, in addition to measurement of production and employment, a breakdown of cost structure.

- These can then be followed by surveys which aim at measuring *changes* in critical variables, e.g. production and employment. These will typically require smaller samples and simple questionnaires which will allow more timely data retrieval.

Although opting for this course of action is highly desirable, as it will ensure development of adequate statistical skills and systems for the country, it will require a substantial investment. Significant resources, both human and financial, will be required, with possibly little immediate payoff but a substantial one in the long run.

B. Introducing Constant Prices

The estimates produced for 2000 and documented in this report provide a reliable picture of the breakdown of the East Timorese economic aggregate into its underlying components. The most practical use of annual measures for policy makers, however, is in tracking *constant price* changes of the aggregate and its components. Therefore, using 2000 as a base, annual GDP updates will need to be produced in both *current* prices (i.e. prices of the year being measured) and *constant* prices of 2000.

To measure a particular variable in constant prices, three approaches can be used:

- revaluation: this approach takes the average price of a particular variable computed for 2000 and multiplies it by the quantity in the year being measured (e.g. 2001);
- deflation: this approach takes the value of a particular variable in current prices and deflates it by some price index; and
- extrapolation: this approach takes the value of a particular variable in 2000 and multiplies it by some index of production (as a proxy for quantity changes since that year).

Given the methodology documented in this report, the only method that is likely be applied is deflation. Moreover, since the only price index that can be computed is a Consumer Price Index (CPI),[17] this places particular weight on the necessity of ensuring that it is produced and made available to users on a regular basis. Without it, no deflation of aggregates will be possible and therefore no constant price series can be produced.

[17] As we understand it, prices for components of the CPI are being regularly collected and entered into a computer file. However, the CPI itself has not been computed.

APPENDIX A
INCOME ACCOUNT

Income accounts provide information about two features of a national economy. *First*, they show how the GDP of a country is divided among different types of income–wages and salaries of employees, profits and other property income, so-called "mixed income" of owners of unincorporated businesses, and production-related taxes less subsidies. *Second*, income accounts make adjustments for the differences between a country's total GDP and its total disposable income–differences arising when, for example, profits from domestic production are paid to foreign owners of an enterprise, or when transfers are received from another country or international body.

Unfortunately, for East Timor there is not enough basic data at this time to construct an income account. For a few items, such as wages and salaries of government workers and foreign aid, information is available. But this information is not enough to provide anything like a complete set, or even a meaningful partial set, of income accounts.

The best way to convey the statistical situation for East Timor is to list the main items necessary to construct an income account and, for each item, summarize the information presently available and additional surveys that would be required to provide a complete account. The summary below focuses on the most important aspects. For a more detailed discussion of definitions and accounting treatment, see *System of National Accounts 1993*, chapters VII and VIII (pp. 157-202).

A. Distribution of GDP by Income Type

1. Wages & salaries of employees

Data on wages paid by government (Section III.B.9 above) are available. They need to be supplemented by reliable data on wages paid by the private sector, preferably obtained from an establishment survey, although household survey data can also be used.

2. Profits and other property income

No data measuring directly this variable are generally available. This variable is usually derived as a residual. However, that would require data on 1, 3 and 4.

3. Mixed income

No data measuring this variable are available at this time. The most desirable way to measure it would be through a special survey or as part of a more comprehensive census.

4. Taxes on production less subsidies

No data could be obtained at this time from the tax department for either 2000 or 2001. We understand that the department is currently working on a new data processing system. Once this system is fully in place, it may be possible to obtain data for at least 2001.

B. From GDP to Disposable Income

5. Employee wages & salaries paid to, and received from, the rest of the world

This consists of wages and salaries due to production in one country but paid to residents of another country. Some of the wages of UNTAET workers may fall in this category. A reliable measure of this flow may require a survey of non-residents' incomes.

6. Profits and property income paid to, and received from, the rest of the world

This consists of profits and property income due to production in one country but paid to persons or businesses in another country. No data on this flow are currently available. A reliable measure would require reports from foreign-owned businesses and banks doing business in East Timor (as well as Timorese businesses receiving profits, interest, etc., from other countries, if any).

7. Current transfers from the rest of the world

This includes two types of transfer:

(a) Remittances between households in different countries: this consists of income transfers from Timorese residents to residents of other countries; and the reverse. No information is available for East Timor. In fact, very little is usually available for any country. A reliable measure would require special questions on household surveys.

(b) International aid

This does *not* include production financed by the rest of the world but conducted in East Timor; such production is already included in East Timor's GDP. Rather, it includes transfers that enable East Timor to buy goods and services from the rest of the world–for example, grants to finance purchases of food or medicine. Data on this flow can be obtained from financial statements used to estimate government value added.

APPENDIX B
DATA SOURCES

Following is a list of the sources used and/or reviewed in compiling the 2000 estimates in this report:

- Badan Pusat Statistik (BPS), *East Timor in Figures 1997*.
- Badan Pusat Statistik (BPS), *Gross Regional Domestic Product: East Timor Province 1993-1997*.
- Badan Pusat Statistik (BPS), *Gross Regional Domestic Product of Provinces in Indonesia: 1995-1998*.
- Badan Pusat Statistik (BPS), *Produk Domestik Regional Bruto Nusa Tenggara Timur Menurut Kabupaten 1996-1999*.
- Badan Pusat Statistik (BPS), data from various years' input output tables.
- Chen, Zhijun, *Strategy for Irrigation and Water Management in East Timor*, Agriculture Department UNTAET, June 8, 2000.
- East Timor Public Administration, data from a Hotel and Restaurant Survey in Dili and other sub-districts in 2001, Division of Industry, Mineral Resources and Tourism, Department of Economic Affairs and Development, 2001.
- East Timor Public Administration, *Status Report of the Industry Sector as of October 2001*, Division of Industry, Department of Economic Affairs and Development, November, 2001.
- East Timor Public Administration, *The East Timor Combined Sources Budget 2001-02, Mid-Year Update*, 2001.
- East Timor Transitional Administration (ETTA), *East Timor Annual Financial Report and Accounts for year ended 30 June 2001*, 2001.
- East Timor Transitional Administration (ETTA), *The East Timor Combined Sources Budget 2000-01*, 2000.
- East Timor Transitional Administration (ETTA), *The East Timor Combined Sources Budget 2001-02*, 2001.
- ETTA/ADB/World Bank/UNDP, *The 2001 Survey of Sucos: Initial Analysis and Implications for Poverty Reduction*, October, 2001.
- ETTA/ADB/World Bank/UNDP/JICA, data from the "Poverty Assessment Project Household Survey 2001".

- FAO/WFP, *Special Report: FAO/WFP Crop and Food Supply Assessment Mission to East Timor*, 19 April, 2000.

- IMF, *Staff Statement by Mr. Luis Valdivieso, Advisor, Asia and Pacific Department of the IMF, at the Donors' Meeting for East Timor*, Canberra, June 14-15, 2001.

- Pedersen, Jon and Marie Arneberg eds, *Social and Economic Conditions in East Timor*, International Conflict Resolution Program, School of International and Public Affairs, Columbia University and Fafo Institute of Applied Social Science, Oslo, 1 November, 1999.

- Queipo, Vincente C. *Survey of Small and Medium Industries in East Timor*, Division of Industry, Mineral Resources and Tourism, September, 2001.

- The East Timor Institute for Reconstruction Monitoring and Analysis, *The La'o Hamutuk Bulletin,* October 2001.

- The East Timor Institute for Reconstruction Monitoring and Analysis, *The La'o Hamutuk Bulletin,* December 2001

- Trust Fund for East Timor (TFET), *Report of the Trustee and Proposed Work Program for January-December 2000*, TFET Donors' Council Meeting, Brussels, December 4, 2000.

- Trust Fund for East Timor (TFET), *Report of the Trustee and Proposed Work Program for July-December 2001*, TFET Donors' Council Meeting, Canberra, June 13, 2001.

- Trust Fund for East Timor (TFET), *Summary of TFET Support by Aid Agencies (2001-2004)*, undated.

- Trust Fund for East Timor (TFET),*Update No. 5*, December 12, 2000.

- Trust Fund for East Timor (TFET),*Update No. 6*, February 9, 2001.

- Trust Fund for East Timor (TFET),*Update No. 13*, October 22, 2001.

- United Nations Mission in East Timor (UNAMET), *Status of Unliquidated Obligations Report as of 31 December 1999*, undated.

- United Nations Mission in East Timor (UNAMET), *Status of Unliquidated Obligations Report as of 30 June 2000*, undated.

- UNTAET, *Civil Registry in East Timor: Results*, July 2, 2001.

- UNTAET, *East Timor Consolidated Appeal Process (CAP) Review, Phase 1, Self-Assessment by Humanitarian Community*, Consolidated Inter-Agency Appel Process Steering Committee, UNTAET Humanitarian Assistance and Emergency Rehabilitation Pillar, May, 2000.

- UNTAET, *East Timor Update*, September 2001.

- UNTAET, *East Timor Update*, December 2001 - January 2002.

- UNTAET, *Regulation No. 2000/18 on a Revenue System for East Timor*, August, 2001.

- UNTAET, *Status of Allotments & Unliquidated Obligations as of 30 June 2000*, undated.

- UNTAET, *Status of Allotments & Unliquidated Obligations as of 31 December 2000*, undated.

- UNTAET, *Summary of Bilateral/Multilateral Donors' Support to East Timor By Sectors (2001-2004)*, undated.

- UNTAET, *UNTAET Financial Statements: December 1999, January 2000, February 2000*, undated.

- UNTAET, *UNTAET Financial Statements as at 31 December 2000*.

- Valdivieso, Luis M *et. al.*, *East Timor: Establishing the Foundations of Sound Macroeconomic Management*, IMF, 2000.

- Ximenes, V., *Tourism Sector Status Report*, Tourism and Investment Directorate, Department of Economic Affairs and Development, undated.