STRENGTHENING DATA TO BUILD COMPETITIVENESS: USING TOURISM AND ENVIRONMENTAL SATELLITE ACCOUNTS TO TRACK THE EGYPTIAN ECONOMY

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INTRODUCTION

Egypt's global competitiveness is closely tied to its tourist attractions. The country's fascinating history and its unparalleled natural resources have drawn visitors since antiquity. They come here from all over the world, contributing to income and job creation throughout the country. In the next decade, Egypt hopes to build on its successes to date and strengthen its competitive position in the tourist industry.

To do this, the country needs reliable data with which to quantify the contributions of both tourism and the environment to the economy. Detailed information is necessary to identify strategies to strengthen the tourist industry and the environment. The country also needs to ensure that investments in tourism actually benefit Egyptians, through increased employment opportunities and income, rather than seeing the jobs and revenue go out of the country to international hotel chains, airlines, and tour operators. At the same time, the country must ensure that tourist activities do not harm the natural and cultural assets on which they depend, through overuse, uncontrolled land development, or aquatic or terrestrial habitat destruction. Understanding how such factors as air pollution, waste, or unsafe drinking water may affect the competitiveness of the tourist industry is also important.

Conventional economic data do not provide the information needed to track the links between tourism, the economy, and the environment. The national income accounts, the primary source of national economic data, do not identify consumption, production, or investments based on whether they are generated by tourism, nor do they link the economy to the environment on which it depends.

Tourism and environmental accounts can provide the foundation for resolving these problems. These are what is referred to in national accounting lexicon as "satellite accounts," data systems linked to the conventional economic data but going beyond the national accounts in ways that cannot be fully integrated into the regular accounting data. The methodologies for developing both of these systems have been under development through United Nations agencies for several decades, and many countries regularly compile them as annexes to their national accounts. While they are distinct accounting systems, if they are designed in conjunction with each other they may be linked ways that strengthen the information provided by each.

This paper discusses and how the different kinds of accounts can be used to identify the economic roles of tourism and the environment. It provides a simple introduction to each set of accounts, and gives some empirical examples that may be relevant to Egypt. It then considers what may be expected from tourism accounts in Egypt, and discusses the work already underway in this area in the country.

WHAT CAN WE LEARN FROM THE SATELLITE ACCOUNTS?

The satellite accounts let us track a number of items that can be important for sound economic planning:

- **The contribution of tourist activity to economic output and employment.** In order to identify the role of tourist activity in the economy, it is essential to be able to calculate standard indicators for tourism that parallel those for other industries. Comparison between tourism and other industries is essential when limited resources or policy choices involve implicit choice among supported industries. Without information about

how much tourism contributes, it can be hard to choose the policies that in fact contribute most to the economy.

- **Productivity of capital investment in tourism, as compared with investment in other industries.** This information is needed to make well-grounded investment decisions in both the public and the private sectors.

- **Detailed information about tourism in the economy.** The TSAs can show the contribution of tourism to the country's balance of payments position, differential impacts of different types of tourist activity, and other questions that are useful in planning for tourism development.

- **How economic activity depends on the environment.** Environmental accounts identify use by each industry of environmental inputs, and therefore highlight how changes in environmental quality or depletion of natural resources will affect economic output.

- **How economic activity affects the environment.** The environmental accounts track pollutant emissions by industry, making it possible to determine which activities are harming the environment.

- **Capturing depletion or degradation of natural resources in GDP.** Conventional macroeconomic indicators depreciate man-made capital such as factories, but do not recognize that by depleting or degrading our natural resources we are reducing our productive capacity as well. The environmental accounts correct this oversight and give a fuller picture of actual output of the nation.

- **Links between tourism and the environment.** Egypt's tourism is heavily dependent on its environment. The integration of TSA concepts with the environmental accounts or can provide a framework for tracking them together, and ensuring that policies for the two sectors are developed jointly, so as to maximize both economic return and environmental benefit.

- **Framework for policy analysis.** Both tourism and environmental accounts provide a data framework for broad policy analysis. If they include the development of modified input-output tables, they can be used to calculate the impact on employment and output throughout the economy of changes in the environment or in tourist activity, as well as the impact on the environment or tourism of other economic change. While such full accounts are difficult to built, they are a powerful analytical tool.

WHAT THE SATELLITE ACCOUNTS COVER

Tourism Satellite Accounts (TSAs) are based on the economic data in the national income accounts (CEC et al, 1993). They provide additional detail to distinguish the travel and tourism components of final consumption expenditures, provide information about the industries supplying tourists, track the consumption of input goods and services (especially employment) by those industries, and the identify share of investments made specifically to meet the needs of travelers and tourists.

National accounting data on production are organized according to the International Standard Industrial Classification (ISIC) system, which provides data on consumption, supply, inputs, and investment, by industry group. Tourism, however, does not fall within a single ISIC code; rather, it cuts across much of the economy. Tourists could consume anything that anyone else might consume, including items produced by virtually any industry in the economy. For example, tourists purchase transportation, restaurant meals, and clothes, but so do local residents. Tourism as an "industry" is thus defined solely by who is consuming its output, rather than by the nature of the goods or services produced. TSAs reorganize the conventional accounting data to pull out and highlight the share of each type of expenditure that is driven by travel or tourism, making it possible to analyze the industry as a whole.

Environmental satellite accounts also build on the SNA, but they go much further than the TSAs. The environment plays many distinct roles in the economy. It is a provider of goods for both intermediate and final consumption, which are only sometimes purchased through markets and paid for. It is the unpaid destination for the byproducts of production, in ways that often harm humans and other species and sometimes reduce economic output. It provides non-marketed services to humans, sometimes called environmental functions; these include watershed protection, water filtration, air to breathe, crop fertilization, and man other services. Each of these roles of the environment must be handled differently, making environmental accounting a complex task.

The environmental accounts are organized through the System of Economic and Environmental Accounts (SEEA). (UN et al, 2003) Similarly, the water accounts for which methodology is now being developed through the United Nations and Eurostat may also provide a framework for analyzing the role of natural resources in tourism and the economy as a whole.

Tourism Accounts

The methodology for building TSAs has been developed through collaboration between the World Tourism Organization (WTO), the Organization for Economic Cooperation and Development (OECD), the United Nations Statistics Division, and Eurostat.[1] It builds on the 1993 System of National Accounts (SNA), the internationally-agreed structure for building national income accounts. In addition, aspects of the TSAs that are specifically oriented towards nature-based tourism may be based on the SEEA.

In practice, two approaches have been taken to the development of tourism accounts. The WTO approach calls for the development of sophisticated data systems that disaggregate much of the data in the SNA based on whether it pertains to tourists and other travelers or to consumers on their home territory. Developed countries such as Canada and the U.S. have the resources to collect these detailed data, but many developing countries do not. To enable them to reap some of the benefits of TSAs, but with less stringent data requirements, the World Trade and Tourism Council (WTTC) has focused on modeling approaches that estimate many of the TSA indicators directly from the SNA, based on rules of thumb and multipliers, without requiring collection of all of the underlying data. While such systems are less detailed and less accurate than full TSAs, they can be developed at much lower cost, and are therefore a reasonable compromise for many data-poor countries. Many of the concepts and classifications are the

[1] See CEC, OECD, UN & WTO, 2001, *Tourism satellite account: recommended methodological framework.* Their methodology is also described at http://www.world-tourism.org/statistics/tsa_project/TSA_in_depth/index.htm (most recently accessed 6/10/04).

same; however the TSAs are based to a greater extent on primary data, whereas there is more estimation and modeling in the WTO work.

The WTO approach to TSAs involves constructing a series of ten tables, listed in Table 1.

Table 1. Tables Included in the WTO Structure for Full TSAs

1. Final consumption expenditure by foreign visitors to the country.
2. Final consumption expenditure by domestic residents traveling within the country.
3. Final consumption expenditure by domestic residents traveling to other countries.
4. Total of tables 1 and 2 – final consumption expenditure within the country.
5. Production accounts of industries considered to be "characteristic" of tourism, i.e. those whose output is used entirely or almost entirely by travelers.
6. Computation of tourism value added and tourism GDP
7. Employment in the tourism industries.
8. Gross fixed capital formation (investment) in the tourism industry.
9. Collective consumption for tourism by level of government.
10. Tourism indicators not calculated based on monetary accounts

Source: WTO 2002

Developing the data to construct these tables is difficult. While some of the data are available for each category of tourist, and total consumption or production data are available by standard industry codes, determining how much of the consumption or supply of each industry is actually attributable to tourists and other travelers is not obvious. Often *tourism ratios* are applied to the total figures to allocate the share of consumption of production attributable to tourism. These ratios may be based on surveys of household consumption, sales, or other activities. The reliability of these ratios is a key determinant of the accuracy of the TSAs.

TSAs can track three broad classes of tourist expenditures:

1. *Direct* (or *primary*) *expenditures* are purchases made by tourists in the course of their travel, for transportation, lodging, food, gifts, entertainment, and so on.

2. *Indirect expenditures* are those resulting from the tourist expenditures; food and materials purchased by hotels and restaurants, salaries of businesses serving tourists, gasoline purchased by transportation companies, and so on.

3. *Induced expenditures* are the personal expenditures of those who receive salaries working in the tourist industry; the personal consumption expenditures of the employees of the hotels, restaurants, airlines, travel agencies, and shops selling to the travelers. Induced and indirect expenditures together are sometime referred to as *secondary expenditures.*

The expenditures of tourists or travelers are also organized into three broad types according to the extent to which they are made only for travel purposes. *Characteristic products* would not be produced at all if not for the travelers to purchase them; hotels and luggage are good examples. *Connected (or partially characteristic) products* are regularly consumed by tourists, but are also consumed by others; restaurant meals, entertainment, and taxi rides are clear examples. Finally *non-specific products* include anything else a tourist or traveler might buy, from clothes to office supplies to hardware to household items.

The simplest way to estimate the economic contribution of tourism is to consider only characteristic products, and to assume they are fully attributable to tourists. This is quite imprecise, however. This is where tourism ratios are used instead to determine the share of each type of consumption that should actually be allocated to tourism. These ratios can be quite crude – for example, estimating one ratio for all characteristic products, a second one for all connected products, and a third much lower one for non-specific products. If sufficient data are available, tourism ratios can be very detailed; there may, for example, be different ratios for each type of lodging, for different types of restaurants, and so on. Tourism ratios are usually calculated based on tourist and household expenditure surveys, so the frequency, accuracy, and detail of primary survey work in the country will be a major determinant of the accuracy of the TSAs.

It is also useful to think about which travel is part of the TSAs. The WTO defines tourism as "the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited." (WTO 2002) Table 2 shows how the WTO definition applies to some specific activities.

Table 2. The WTO Definition of Tourism

Travel included in the TSAs	Travel excluded from the TSAs
Leisure and vacation travel. Business trips by private sector or government. Other government travel.	Foreign students. Migrant workers. Diplomats. Members of the armed forces Refugees or nomads. Routine cross-border shopping trips. Travel to take up a new job or start a business.

Source: WTO 2002

TSAs are also used to identify the share of capital investment and assets used for travel and tourism. This is done in a manner similar to the other elements of the accounts; tourism ratios are identified with which to allocate shares of characteristic, connected, and non-specific investments to the tourism industry, based on the most detailed data available from other sources.

When countries can build full TSAs rather than focusing only on the aggregate indicators, they can distinguish a number of other issues that can be interesting in economic planning for tourism. Of obvious interest is the breakdown in expenditures between domestic tourists and foreign visitors, since foreign visitors bring foreign exchange and therefore strengthen the country's balance of payments position. Distinguishing between day trips and overnight visits is also useful, since it permits a stronger understanding of the relationship between expenditures for lodging and those for restaurant meals and entertainment. In some cases the use of second homes is also part of the tourist industry, though this requires a careful effort to decide how much of the investment and ongoing costs of second home use should be included in the TSAs.

The distinction between business travelers and those traveling for pleasure is also of interest. Pleasure travelers will spend money on entertainment, whereas business travelers may not; on

the other hand in some places business travel generates most of the hotel revenue, especially for meeting rooms and conference facilities. While for some analytical purposes only pleasure travel is considered part of tourism, from the perspective of hotels and air transport, business travel is often the engine that makes the industry possible. It is therefore essential to incorporate business travel in tourist accounts. This creates compatibility problems with the SNA, however, because for conventional accounting purposes business travel is intermediate rather than final consumption, so it is handled differently in calculating aggregate economic indicators. Distinguishing business from other travel is therefore essential, in order to make the adjustments needed to avoid double counting when linking the TSAs to the SNA.

Within the category of pleasure travel, it is quite interesting to differentiate between different kinds of pleasure activities insofar as possible. This is especially important in Egypt, where understanding the role of the natural environment in tourist activity is crucial in order to protect the country's resources. While tourists who come to go scuba diving on the Red Sea may well take a few days to see the pyramids as well, the ability to identify the number of days, and the amount of expenditures, devoted to each activity provides a good basis for tracking the contribution of the country's resources to the economy, and thereby making a strong case for defending them from pollution which threatens that contribution.

Environmental Accounts

The environmental accounts are considerably more complex than the TSAs, and go well beyond the SNA to include data on the physical environment and resources that are not part of the conventional accounts. The methodology for building environmental accounts has been under development through the United Nations Statistics Division, Eurostat, and other international organizations since the 1980s. The first set of guidelines on the accounts was released in 1993; a revised version should come out this year. These guidelines have been developed through collaboration among many countries engaged in building environmental accounts. The participants in that process often began by developing their own methods before coming together to standardize, so there is still a lot of experimentation going on, and individual countries may vary in the methods they use.

The environmental accounts encompass a range of issues:

Physical emissions accounts. The environmental accounts track physical data on pollutant emissions, waste management, and recycling by industry. These follow the structure of the SNA supply and use tables, where emissions by each industry are treated as supply and the waste management and recycling industries are considered to be the users. Some countries, notably Germany, have also experimented with development of physical input-output tables for physical flows.

Environmental protection expenditure accounts. This portion of the accounts disaggregates data from the SNA, determining the shares of final consumption, intermediate consumption, government expenditures, investment, and other transactions that are related to the environment. This requires the accountants to determine what constitutes an environmental expenditure, develop classification systems for such expenditures, and define the "environment industry." Again, the supply and use tables are used to structure the results. Because this portion of the accounts only treats data already in the SNA, it does not lead to any changes in conventional macroeconomic indicators. These data are used to observe links between changes environmental policy or environmental quality and costs incurred by industry, government and households. They also highlight the development of new industries producing

environmental protection equipment.

Natural resource accounts. These include physical and monetary data on stocks of natural resources and changes in those stocks due to natural processes and human use – that is, depreciation of natural resources such as forests and soil. They also include flow accounts that track resource use following the structure of the SNA supply and use tables. Specialized work has been done on a number of specific resources, notably forests, minerals, fisheries, land, and water. While relatively little work has been undertaken on resources like coral reefs, this may be an area in which Egypt would want to push the edges of environmental accounting methodology.

The resource accounts go beyond the data in the conventional accounts be expanding what is called the *asset boundary.* Where the SNA only includes assets that can be owned and that give an economic return to the owner, the SEEA includes assets that are not owned, if they can provide an economic return. This means that the SEEA can treat such resources as ocean fisheries, clean water, or coral reefs, which was not done in the SNA.

The SEEA asset accounts follow the structure of the SNA asset accounts and accumulation accounts, but expand on them in various ways. Underlying the expansion is a debate about which changes in asset value should be considered depreciation, and therefore be deducted from GDP to calculate NDP. The SNA only considers changes in value due to economic activity to be depreciation, i.e. due to investment, use, and price fluctuations. The SEEA provides the framework for estimating many other changes in value, including degradation due to pollution, natural growth of unmanaged resources, and new discoveries, but there is debate as to whether they should become part of the calculation of macroeconomic indicators like NDP. Investment in a natural asset includes management of such resources as forests. Much thought has gone into defining when a forest is managed and when it is not, because only the growth of managed forests is captured in the conventional SNA indicators. While these issues may seem arcane, they are directly tied into how Egypt might build resource accounts for its coral reefs.

Value of non-marketed environmental services. These include such uses of the environment as water filtration, waste absorption, and recreation. The SEEA addresses this issue and recognizes the work of environmental economists on methods for assigning economic value to such services. It does not, however, recommend that the results be included in the environmental accounts, for a number of technical reasons. Nevertheless, the accounts do provide a framework for structuring the results of analytical work in economics and linking them to other economic data.

Environmentally adjusted GDP. The SEEA discusses a number of ways in which conventional macroeconomic indicators could be modified to incorporate the environment, as shown in Table 3. The top portion of the table describes the conventional accounts; the lower portion describes the SEEA.

Depletion of natural resources, such as over harvesting of a forest, can be estimated fairly reliably; this is given considerable attention in the SEEA. The estimation of decreased value of natural assets due to degradation, such as harm to the forest from acid rain, has also been the subject of extensive analysis. Thus depletion-adjusted NDP can be calculated with relative ease – relative, that is, to some of the other possible adjustments. Putting a monetary asset value on human lives and measuring its change due to pollution is considerably more controversial, so this adjustment to GDP is less common. (This does not preclude

disaggregating expenditures on health care or income loss due to pollution-related illness in the flow accounts, however.) For this reason damage-adjusted national income is less likely to be calculated. Changes to the SNA to capture other roles of the environment are not seriously considered in the SEEA.

Table 3. Calculation of Adjusted Macroeconomic Indicators

	Conventional GDP
less	CFC, consumption of fixed capital, as in the conventional accounts
equals	Conventional NDP
less	Depletion of natural resources
less	Decreased value of assets as a result of degradation
equals	Depletion-adjusted net domestic product or depletion-adjusted national income
less	Pollution damage to health, valued as a change in asset value
equals	Damage-adjusted national income

EMPIRICAL WORK

Tourism

The WTO estimates that some 35 countries are developing TSAs, including many developed and a few less developed countries. (WTO 2002) Their experiences are illustrative when considering both the content of Egyptian TSAs and the process to be followed in building them.

Table 4 summarizes basic indicators from the tourism accounts of half a dozen countries, plus two estimates for Egypt. The two indicators of the broadest general interest are the contribution of the tourism industry to value added (or GDP) and it contribution to employment. A comparison of these two figures is also quite interesting, because it shows whether tourism is relatively labor-intensive compared with the rest of the economy.

This table shows the direct contribution of tourism to the economy, as differentiated from its indirect (or secondary) contributions. Since direct contributions include only the actual expenditures made by tourists and does not include input goods or the personal consumption of workers in the tourist industry, it is considerably lower than the full contribution of tourism to the economy. Direct contributions are easier to estimate than indirect ones, because they do not depend on use of a fully-developed input-output table. Many countries begin with this step, and only later move onto the full TSAs including indirect expenditures and production.

Table 4. International Comparison, Summary Tourism Indicators

Country	Year	Direct contribution of tourism to value added (%)	Direct contribution of tourism to employment (%)	Source
Australia	2000-01	4.7%	6.0%	Salma, 2002
Canada	1998	2.3%	3.7%	Barber-Dueck and Kotsovos, 2003
New Zealand	1999-2000	(a)	5.7%	Statistics New Zealand, 2003
Norway	2000	3.8%	6.7%	Statistics Norway, 2003
Switzerland	1998	3.4%	5.2%	Gaillard et al, 2003
USA	1996-97	2.2%	3.5%	Kass and Okubo, 2000
Egypt	2004	7.9%	7.0%	WTTC, 2004
Egypt	1996	2.9%	5.7%	Tohamy and Swinscoe, 2003

(a) The New Zealand TSA report only provides tourism value added as a share of the industry contribution to GDP, not as a share of total GDP. That figure is 4.8% in 1999-2000.

The share of tourism in the economy ranges across the first six countries from a low of 2.2% in the United States to a high of 4.7% in Australia. The differences among countries may partly reflect the complexity of the rest of the country's economy. As a result the United States, with a very complex economy, may show a relatively low tourism share even though the absolutely amount of tourist expenditure is very high. On the other hand, the data issues in development of TSAs are sufficiently complex that the variation across countries may be due to no more than different inaccuracies in the underlying data.

Employment in tourism is consistently higher than that industry's contribution to the economy. This means that labor is relatively unproductive in tourist activities. It may also imply that expanding the country's tourist industry may be an effective job-creation strategy, particularly for creation of relatively low-skill employment. The new jobs may also, however, pay less than the average wage, since workers in the industry are less productive than elsewhere in the economy.

The Egyptian data in this table come from two sources. The first estimates are from modeling work undertaken by the WTTC, through which they estimated key tourism indicators for most countries in the world. The second estimates are from an Egypt-specific analysis of the contribution of tourism to the economy, also based on a modeling approach rather than the construction of full TSAs. The wide difference in the results probably is due to the ability to consider more detailed country-specific data in the Tohamy and Swinscoe work, rather than the more generic data that the WTTC used in order to derive comparable estimates across over one hundred countries. The large difference suggests, however, that additional work on Egyptian tourism accounts is desirable in order to clarify the results.

Nature Tourism in the TSAs

The integration of TSAs with environmental accounts is at the cutting edge of both tourism accounting and environmental accounting. Although empirical work in this area has not yet

been undertaken, it has been explored in a regional accounting project underway in Namibia, Botswana, and South Africa. (Poonyth et al 2001) That project has proposed to build asset accounts to track the natural resources used for tourism, referring to these as Tourism Asset Resource Accounts, or TARAs. These would include both the economic assets tracked in the conventional SNA and TSAs and the environmental assets tracked in the SEEA. Following the structure of the SEEA, they propose to begin with physical accounts. These would track two aspects of the assets, their quantity (or stock) and their quality (or environmental health). Much of the resource-based tourism in southern Africa is based on wildlife, so these accounts would focus on land use, suitability of land for wildlife habitat relative to its suitability for other economic uses, and the animal populations in the area. The value of land for wildlife uses would be based on the economic returns to the major wildlife-based activities; viewing, hunting, and community wildlife and game ranching. Some of these have been estimated through other research projects, so there may be a basis for building the results into TSAs.

The Egyptian work on economic valuation of the Red Sea coral reefs (Cesar, 2003), although not organized following the structure of the accounts, nevertheless sheds some light on how tourism and environmental accounts may be linked. The study gathered primary and secondary data on reef-based tourism on the Red Sea, in order to estimate what in the TSA context would be termed expenditures on characteristic products. (The paper refers to them as "direct" and "indirect" expenditures; those for recreation are considered to be direct, while those for hotels, food, and other expenses are considered to be indirect.) Data were gathered for three different locations, Sharm El Sheikh, Hurghada, and Marsa Alam. Some of the results are summarized in Table 5.

Table 5. Expenditures on Reef-Based Tourism on the Red Sea, in millions of US$

	Diving or Snorkeling expenses	Other characteristic expenditures	Total, characteristic expenditure	Total expenditure per visitor
Sharm El Sheikh				
Egyptian	0.5	2	2.5	$151
Foreign	18.7	121.9	140.6	$457
Total	19.2	123.9	143.1	$441
Hurghada				
Egyptian	2.7	0.5	3.2	$285
Foreign (includes livaboards)	94.8	96.3	191.1	$692
Total	97.5	96.8	194.3	$676
Marsa Alam				
Egyptian	3.3	2.5	5.8	n/a
Foreign (includes livaboards)	113.5	218.2	331.7	$5,273
Total	116.8	220.7	337.5	

Source: Calculated based on Cesar 2003, Tables 7 and 13.

The huge difference in visitor expenditures in the three regions give a sense of the enormous economic contribution made by pristine coral reefs. Foreigners visiting Marsa Alam in order to take advantage of the reefs spend more than seven times as much per trip as visitors to Hurghada. The quality of the environment and the less developed nature of Marsa Alam are surely major factors in this difference. Data like these provide a clear case for maintaining a significant portion of Egypt's Red Sea coast in pristine condition, through tight control over the

quantity and form of tourist development permitted there, so that the country can continue to reap these financial returns from its environment.

These data are the result of surveys that so far has been conducted only once, although there is interest in updating them regularly so that changes over time can be identified. Systematic data such as these would be organized through the nature-based part of the TSAs, where expenditure data are disaggregated according to purpose. Moreover, they would form the basis for valuing the reefs themselves, based on the income stream that they could provide to the country if maintained in their current condition. The Red Sea valuation work models the expected impact on reef-based revenues of changes in environmental quality. While those are projections based on an analytical model, ongoing TSAs that distinguish nature-based activity would provide empirical data with which to observe actual trends in nature-based tourism over time. This would make it possible to evaluate the effectiveness and environmental impact of policies to protect the reefs, and would verify that the returns on a clean environment are being captured by the economy.

Environmental Accounts

Empirical work on environmental accounts is extensive and global in scale. Two decades ago, when the effort was new, it was possible to catalog all of the work underway; by now that is no longer feasible. The development of physical accounts on pollutant emissions and disaggregation of monetary data from the SNA to build environmental protection expenditure accounts was pioneered in Europe, but extensive systems have also been built in Taiwan, Korea, Japan, the Philippines, and an array of other countries. Countries all over the world have built natural resource accounts as well. Forests accounts have been the starting point for many environmental accounting systems, including seminal work in Indonesia, extensive methodological development in Europe and Canada, broad empirical work in the Philippines, and undertakings in a host of other countries. Mineral accounts have been the subject of study and methodological development in Europe, but detailed work has also been undertaken in the United States, Australia, and other countries with rich subsoil resources. England and the Netherlands have done pioneering work on land accounts, while Iceland and Namibia have been key players in the development of fisheries accounts.

Environmental accounting work in Egypt might begin with a focus on flow accounts for water quantity and quality on the Nile, or asset accounts for coral reefs and beaches. Some examples may give an idea of some of what has already been done on water; to date there has been little work on wholly nonmarketed resources like the Egyptian coral reefs.

Namibia, one of the most arid countries in the world, has moved ahead in the development of water accounts, looking at physical data on supply and the contribution of different water uses to the economy. They began by cataloging their water use by source, as shown in Table 6.

Table 6. Water Use by Source and Economic Activity in Namibia, 1996

	All Sources	Ground Water	Ephemeral Rivers	Perennial Rivers
AGRICULTURE	**142.9**	**48.6**	**30.6**	**63.8**
Livestock	58.2	40.7	-	17.5
communal	32.2	14.7	-	17.5
commercial	26.0	26.0	-	-
Crops	84.7	7.9	30.6	46.3
communal	17.8	1.6	-	16.2
commercial	66.9	6.3	30.6	30.1
MINING	**25.2**	**22.6**	**1.2**	**1.4**
MANUFACTURING	**5.3**	**3.8**	**1.5**	**-**
SERVICES	**5.6**	**3.9**	**1.4**	**0.3**
GOVERNMENT	**2.4**	**1.7**	**0.8**	**-**
HOUSEHOLDS	**73.8**	**47.1**	**14.8**	**11.8**
Urban	39.2	17.0	11.1	11.1
Rural, communal	10.3	5.9	3.7	0.7
Rural, commercial	24.3	24.3	-	-
TOTAL	**255.3**	**127.6**	**50.3**	**77.4**

Source: Lange, 2002

Using these data, the Namibian analysts compared the output of each commercial sector in 1993 and 1996 with its inputs of water, to estimate average value added per unit of water for the major economic sectors, as shown in Table 7.

Table 7. Value-added per cubic meter of water input, in $US

	1993	1996
Agriculture	2.6	4.0
Commercial	2.7	3.8
Subsistence	2.4	4.4
Mining	56.9	60.4
Diamond mining	56.0	69.1
Other mining	58.3	50.2
Manufacturing	173.6	165.2
Services	266.6	283.0
$GDP per m^3 of water input	**33.0**	**35.7**

Source: Lange, 2002

The Namibian work is still preliminary, but the overwhelmingly greater value of water in mining, manufacturing and services than in agriculture does raise questions about how the country uses its limited resources. The average product of water is clearly only one among many criteria that go into water allocation decisions. Namibia is a largely rural country, most of whose population makes its living from agriculture. Moreover unlike some forms of capital, water is place-dependent; it cannot simply be moved and reused elsewhere. Nevertheless, figures like these provide a basis for beginning to consider water use and pricing questions.

While few countries have gone far in valuing water in this way, a number of countries have organized physical flow data about water into the supply and use table format of the national accounts. Table 8 provides supply and use data from the German water flow accounts. Table 9

shows how data from Egypt's Ministry of Water Resources and Irrigation can be structured according to the same format.

Table 8. German Water Flow in 1995 (millions of m^3)

	Productive activities						House-holds	Environ mental assets	Rest of the World	Total
	Agricul-ture	Power and heat	Water supply	Sewage treatment	Industry	Total				
Supply table										
Natural water								48,909		48,909
Water abstracted								43,636		43,636
Ecosystem inputs								5,273		5,273
Products			5,613	0		5,613			0	5,613
Residuals	626	30,046	835	9,962	8,479	49,948	3,465			53,413
Wastewater for treatment	31	59	124	0	1,545	1,759	2,930			4,689
Wastewater for recycling	0	0	0	0	0	0	0			0
Net residuals	595	29,987	711	9,962	6,934	48,189	535			48,724
Wastewater discharged Cooling water Other	0	29,286 29,184 102	0	4,689 0 4,689	6,515 2,975 3,540	40,490 32,159 8,331	250 0 250			40,740 32,159 8,581
Water vapor	595	701	0		419	1,715	285			2,000
Water losses	0	0	711	0	0	711	0			711
Outside and rain water	0	0	0	5,273	0	5,273	0			5,273
Total supply	626	30,046	6,448	9,962	8,479	55,561	3,465	48,909	0	107,935
Use table										
Natural water	764	29,714	6,448	5,273	6,663	48,862	47			48,909
Water abstracted	764	29,714	6,448	0	6,663	43,589	47			43,636
Ecosystem inputs				5,273		5,273				5,273
Products	152	332	0	0	1,855	2,339	3,266		8	5,613
Residuals				4,689		4,689		48,724		53,413
Wastewater for treatment				4,689		4,689				4,689
Wastewater for recycling				0		0				0
Net residuals								48,724		48,724
Wastewater discharged Cooling water Other								48,740 32,159 8,581		48,740 32,159 8,581
Water vapor								2,000		2,000
Water losses								711		711
Outside and rainwater								5,273		5,273
Total use	916	30,046	6,448	9,962	8,518	55,890	3,313	48,724		48,724

Source: UN January 2002, Table 8.12.

Table 9. Supply and Use Table for the Egyptian Portion of the Nile River, 1996 (billions of m^3)

	Productive activities									
	Agriculture	Power and heat	Water supply	Wastewater disposal	Industry	Total	Households	Environ-mental assets	ROW	Total
Supply table										
Natural water										
Water abstracted								72,800		72,800
Ecosystem inputs								0		0
Products			4,540	0		4,540				4,540
Residuals	19,910	0	0	3,640	7,080		3,630			
Wastewater for treatment				0			3,630			
Wastewater for recycling	0	0	0	0	0	0	0			0
Net residuals										
Wastewater discharged	19,910	0	0	3,640	7,080					
Cooling water	0			0	0					
Other	19,910			3,640	7,080					
Water vapor			0	0	0					
Water losses			0	0	0					
Outside and rainwater			0	0	0					
Total supply	60,730	0	4,540	3,640	7,080					
Use table										
Natural water	60,730		4,540		7,530			72,800		72,800
Water within the region	60,730	0	4,540		7,530			72,800		72,800
Ecosystem inputs				0						0
Products	40,820		0	0	450					450
Residuals										
Wastewater discharged				3,640						
Treated				700						
Untreated				2,940						
Wastewater for recycling										
Net residuals										
Wastewater discharged										
Cooling water										
Other										
Water vapor										
Water losses										
Outside and rainwater										
Total use	101,550	0	4,540	3,640	7,980					

Source: Based on Egypt Ministry of Public Works and Water Resources 1996, presented in Hecht 2004, Table 11.9.

Comparison of the two tables helps clarify what is meant by some items in the tables and also demonstrates the huge differences between the two countries. The rows for natural water show how much water moves from the environment to the economy. The first line shows how much is extracted from the environment for use in the economy. The second line, ecosystem inputs, shows, in the German table, how much rainfall flows into the stormwater system but then runs out directly back into the environment. Because it does not rain enough in Egypt to generate flows through the storm sewers, this category has no water for the Nile. The column for environmental assets shows the environment as a final user of all of the residuals, as they flow back into the environment in one form or another.

In the supply table, the line for products shows how much water is produced as output. For both countries, this is the output of the drinking-water treatment industry. In the use table, this line shows how much water is embodied in the output of the different industries. Both countries have data on water embedded in industrial product. Egypt shows no water data for the energy sector because the energy data have been subsumed under industry. In agriculture, water is embodied in the product, as shown in the use table figure in the German accounts. German agriculture discharges a small amount of water to be treated and a much larger amount as water vapor.

The Egyptian data underlying this supply and use table show only how much water is consumed by agriculture, without distinguishing water vapor (evaporation from consumptive use) from water remaining in the plants. This causes the total water use to be much higher than the total extracted from the river or the residuals. In fact, a large share of the 40,820 cubic meters of water consumed in agriculture probably is released to the atmosphere as water vapor. If such detail were available, then the total for agriculture in the supply table would be much higher and the total for the use side would be much lower. The difference would reflect the amount of water actually embodied in the plants and in the livestock feeding on those plants.

The construction of a supply and use table for water is one of the first steps in linking these data to the economic accounts, in order to understand more fully how the resource and the economy are linked. On the Nile it may be interesting to expand this framework to distinguish among types of water by quality, since only relatively clean water may be used for specific purposes. It may also be interesting to add a spatial component to the analysis, to show where the water is flowing and how much is available or being used in different places along the river.

LINKING TOURISM AND ENVIRONMENT ACCOUNTS IN EGYPT

There is considerable interest in Egypt in both tourism and environmental accounts, as evidenced by work on tourism already underway in the Ministry of Tourism and the Ministry of Planning, and work under consideration on environment. As Egypt moves ahead in these areas, it is essential to link the two systems, in order to get the best use out of each.

The coral reef-based tourism on the Red Sea offers an exciting opportunity to link natural resource accounts to TSAs, as seen in the valuation work on the Red Sea. By disaggregating the conventional accounts to identify both economic flows for tourism, and within that economic flows specifically for nature-based tourism, it will be possible to track on a regular basis the contribution of the coral reefs to Egypt's economy. There is also a pressing need to track physical changes in the reefs, their contribution to the economy through dive-based tourism, and the links between the two. The SEEA natural resource accounts, organized so as to distinguish tourism activity from other activity, would provide an excellent framework for doing

this. Although this would be a challenging undertaking, it would be of considerable value for both tourism and environmental management.

Land accounts may also offer a valuable tool for tracking tourist development on the Red Sea. Such accounts would track all of the land within some distance of the water, looking at current uses, potential for tourist activity and wildlife habitat, and how land development affects water quality. The key analytical issue to be addressed through such accounts would be to determine an optimal level and pattern of land development. This must take into consideration how land development harms water quality, the need to protect terrestrial ecosystems along the shore, and the ways in which lower water quality or less attractive terrestrial ecosystems may reduce returns to tourism. This would require a combination of accounts that track coastal resources, on the one hand, and analytical work based on those accounts, on the other; it would be a complex undertaking.

Water accounting also offers significant potential for linking TSAs to the environment. Expanding on the water examples above, a methodology for building water accounts (Handbook, 2004) is now being elaborated through the United Nations Statistics Division. That work describes methods for building physical accounts for water, considering stocks and flows within hydrological systems, pollutant discharges into water bodies, extractions for consumptive use, natural recharge, and water returned to the environment through human activity, either where it was removed or elsewhere. In the water accounts now being developed, monetary entries are limited to the monetary flows stemming from economic transactions involving water. They do not incorporate the monetary aspects of water that is not sold, nor do they address quality issues such as the need for clean water to support coastal tourism. However, the water accounts clearly provide the point of departure for considering those values.

Links between the TSAs and the SEEA could also address pollution. The SEEA pollution accounts may be relevant to tourism in two ways. First, tourist activity can itself be a cause of pollution. Uncontrolled hotel development along the coast often results in runoff and sedimentation, as well as the discharge of untreated sewage. Second, the pollution from tourism and other economic activity can deter nature-based tourist activity, particularly when it harms beaches or coral reefs. Sewage and industrial pollution may be issues on the Alexandria beaches, while sewage and runoff due to uncontrolled coastal development may harm Red Sea beaches and coral reefs. Tracking these residuals and adjacent water quality would provide a basis for understanding the links between economic activity, water quality, and the returns to tourism. The SEEA physical flow accounts, if developed in enough detail to distinguish tourism activities and regions, could provide a basis for building this understanding.

ONGOING WORK IN EGYPT

The Government of Egypt has expressed considerable interest in moving ahead in the development of satellite accounts. The Ministry of Tourism is already developing a strategy for tourism accounts, to be carried out through a team that will also include the Ministry of Plan, CAPMAS, and a number of other organizations. Through the USAID-funded DATA project, the Government of Egypt will soon begin considering the options and challenges for building environmental accounts, a process that will also involve a wide set of interested stakeholders.

Tourism Accounts

The Ministry of Tourism and the Ministry of Planning are interested in initiating work on tourism accounts, and are now engaged in planning a strategy for doing this. To date their work has not considered the specific need to link environment and tourism issues in building satellite accounts; adding this element is now under discussion, however.

To build TSAs and link them to the environment, it will be necessary to expand on the data now available on tourism. One is data. The Central Agency for Public Mobilization and Statistics (CAPMAS) and the Tourism Development Authority (TDA) conduct a biennial survey of international tourists as they leave the country, asking about their backgrounds and their travel to Egypt. While the results of this survey are of considerable interest, and the fact that the same survey has been conducted successively five times over ten years means that there are reliable time series data, the survey does not provide the data needed to build accounts. Several gaps can be identified from a quick review that will have to be addressed in additional surveys:

- The survey gathers data only about international visitors to Egypt, and does not interview domestic tourists, nor does it interview Egyptians going overseas. To link tourist data to the national accounts, information must be available about all three groups.
- The survey asks about eight purposes of the visit, but does not include anything that would permit identification of nature-based tourism.
- The survey does not ask where in Egypt the visitors traveled or how many nights they spent in each place; this could serve as a proxy for identifying nature-based tourism.
- CAPMAS and TDA only survey travelers; they do not gather information about the supply side of the travel industry. For accounting purposes, extensive data is needed about the ownership and employment in businesses serving tourists, their consumption of goods and services, salary levels, and similar information.

The Ministry of Tourism receives data on hotels from the hotel trade association. These data are disaggregated by location, and therefore may be used as a rough proxy for estimating the extent to which tourism is nature-based (Red Sea, Sharm El-Sheikh), culture-based (Luxor), or mixed (Cairo). Unlike the survey data, the hotel data cover domestic as well as inbound tourism. Because the travel and expenditure patterns of domestic tourists are likely to be quite different from those of international visitors, however, the data about the latter cannot be used to estimate expenditures by the former. The hotel data do not include information on employment or other inputs to the supply side of the lodging market; this gap will need to be filled to build TSAs. Data on hotel ownership – by Egyptians or foreigners – will also be needed, to develop indicators showing who benefits economically from tourism.

The Ministry of Tourism is now designing an additional survey instrument with which to gather some of these data. It benefit from the contributions of tourism officials, national income accountants, and environment officials or consultants, to ensure that the data will gather will meet as many needs as possible. This should facilitate the integration of environment issues into the survey design and the TSAs.

Environmental Accounts

Work is also planned for this summer to scope out the potential for building environmental accounts in Egypt. The USAID-funded DATA project, which has been working with the Ministry of Planning on national income accounting and statistical infrastructure, will work with a wide range of stakeholders to develop a full understanding how environmental accounts could be used in the country. Partners to this collaboration will identify priority areas for beginning work on environmental accounting, based on policy needs and the availability of data. Since work is to begin on tourism accounting this summer, the links between environment and tourism are likely to be one area of initial focus for the environmental accounts. This will certainly include building information about nature-based tourism into the TSAs; it may also include developing asset accounts for the Red Sea coral reefs. Egyptian concern over the impacts of water quality on agriculture in the Delta suggests that water accounts may also be an area of initial priority. It is premature to identify more specific needs for development of the environmental accounts; these will emerge as the strategy is developed this summer.

REFERENCES

Barber-Dueck, Conrad and Demi Kotsovos, "The Provincial and Territorial Tourism Satellite Accounts for Canada, 1998." Income and Expenditure Accounts Technical Series. (Ottawa: Income and Expenditure Accounts Division, Statistics Canada, 2003)

Cesar, Herman, "Economic Valuation of the Egyptian Red Sea Coral Reefs." Study carried out for the Egyptian Environmental Policy Program, Monitoring, Verification and Valuation Unit. August, 2003.

Commission of the European Communities – Eurostat (CEC), International Monetary Fund, Organization for Economic Co-operation and Development, United Nations, World Bank, 1993, System of National Accounts 1993. (Brussels/Luxembourg, New York, Paris, Washington D.C.: CEC, IMF, OECD, UN & World Bank)

Egypt Ministry of Tourism, "Egypt 2002: Tourism in Figures." 2002.

Gaillard, Gabrielle Antille, Heinz Rütter, and Adrian Berwert, *Tourism Satellite Account Switzerland: Basic principles, methodology, and results. Summary.* (Neuchâtel, Switzerland: Swiss Federal Statistical Office, 2003)

"Handbook on Integrated Environmental and Economic Water Accounting," March 2004 Draft. Unpublished draft of document being developed by the UN Statistics Department, Eurostat, and other international organizations (full list not included on draft document).

Hecht, Joy E., *National Environmental Accounting: Bridging the Gap Between Ecology and Economy.* (Washington, D.C.: Resources for the Future, forthcoming October 2004)

Kass, David I. and Sumiye Okubo, "U.S. Travel and Tourism Satellite Accounts for 1996 and 1997." Survey of Current Business, July 2000, pp. 8-24

Lange, Glenn-Marie "Estimating the Value of Water in Agriculture: A Case Study from Namibia" Paper presented at the 7th Biennial Conference of the International Society for Ecological Economics, 6-9 March 2002 in Sousse, Tunisia.

Libreros, Marion Pinot, "Tourism Satellite Account (TSA) and the Input-Output Scheme." Annex 10 of Enzo Paci Papers on Measuring the Importance of Tourism, Volume 2.

Libreros, Marion Pinot, "What SNA brings to TSA and vice versa: how collaboration on is necessary for both." Annex 8 of Enzo Paci Papers on Measuring the Importance of Tourism, Volume 2.

Poonyth, D. , J. Barnes, H. Suich and M. Monamati, "Measuring The Economic Value of Tourism in Southern Africa: Tourism Satellite And Resource Accounts For South Africa, Namibia And Botswana." Final Report, June 2001, Natural Resource Accounting Project for Southern Africa.

Salma, Umme, "Indirect economic contribution of Tourism to Australia, 1997-98 to 2000-01" Australia Bureau of Tourism Research, Tourism Research Report, Volume 4, Number 2, Spring 2002.

Statistics New Zealand, "Provisional Tourism Satellite Account, 2000-2002." (Wellington: Statistics New Zealand, May 2003)

Statistics Norway, *Tourism satellite accounts, 1996-2002.* (Oslo: Statistics Norway, October 2003)

Suich, Helen, "Development of Preliminary Tourism Satellite Accounts for Namibia" DEA Research Discussion Paper Number 44. (Windhoek, Namibia: Directorate of Environmental Affairs, Ministry of Environment and Tourism, October 2001).

Tohamy, Sohar and Adrian Swinscoe, "The Economic Impact of Tourism in Egypt." Egyptian Center for Economic Studies Working Paper No. 40, June 2000

UN (United Nations), January 2002 "System of Economic and Environmental Accounts 2000 (SEEA 2000)". Draft for the UN Statistical Commission.

United Nations, European Commission, International Monetary Fund, Organization for Economic Cooperation and Development, World Bank, 2003, *Handbook of National Accounting, Integrated Environmental and Economic Accounting 2003*. Final draft circulated for information prior to official editing. To be issued in the series Studied in Methods, Series F, No. 1, Rev. 1 (ST/ESA/STAT/SER.F/1/Rev.1)

World Tourism Organization, *TSA in Depth: Analyzing Tourism as an Economic Activity.* WTO tutorial on TSAs, on the web at http://www.world-tourism.org/statistics/tsa_project/TSA_in_depth/index.htm (Madrid: WTO, 2002) (most recently accessed 6/10/04).

World Travel and Tourism Council (WTTC), "Travel and Tourism Forging Ahead: The 2004 Travel and Tourism Executive Research." Executive Summary. Prepared by Oxford Economic Forecasting for the WTTC. (Doha, Qatar: WTTC, 2004)