



PAPUA NEW GUINEA

COUNTRY REPORT

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PAPUA NEW GUINEA

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Introduction

1. Introduction

Growth in both population and the economy in the face of limited capacity of the environment to assimilate wastes and supply resources necessary to the production process and its essential life-support services raises the concern about sustainable development.

PNG has suffered from some serious environmental problems since the start of its economic development. Some of the most pressing issues include unsustainable logging operations, dumping of tailings into rivers by mining companies, dynamite fishing and so on. One way of addressing the issues related to environmental management is the establishment of an environmental database and an accounting system, which may provide a clearer picture of the status of the environment and its policy implications to the policy makers.

PNG may fall in the category, where population density and growth are low, large land area and high level of dependence on natural capital, combined with some serious environmental problems, reinforce the need for sound management and monitoring of environmental impacts. Environmental accounting may provide the answer to such problems and is also a matter of national interest.

2. Structure of PNG Economy

The main components of the country's formal economy are agriculture, forestry, fishery, manufacturing and mineral resources. If environment statistics is to be collected then it will concentrate on the key sector of the economy.

2.1 Agricultural Sector

Although, the total land area is large, only about 7% of it have been cultivated for agricultural activities. Agriculture is the main source of livelihood of about 85% of the total population and much of it is considered subsistence. In the

rural areas, people cultivated small plots of land for gardens to meet the household consumption. Any surplus production is then sold or bartered.

The main agricultural exports for PNG include coffee, cocoa, copra, rubber, tea and palm oil. The formal agricultural sector accounts for almost one third of GDP. In 1983, the sector accounted for 33% of the total export revenue and 75% of the total non-mineral export revenue of the country. In 1996, the sector contribution to the export revenue was 10% and increased to 25% in 1997, which has been greatly improved. Although subsistence economy is very significant it is not considered in the main stream economic planning. For example, official GDP do not include measured estimates of subsistence agriculture, and therefore grossly understated its contribution.

2.2 Mineral Sector

PNG has considerable reserves of mineral resources. For some time the BCL was the single important contributor to both foreign exchange and the government revenue. Before its closure in 1989, due to militant activities, the mine contributed 9% of GDP, 35% of total export revenue, 15% of government revenue and employed 1.2% of total workforce in PNG.

Another large scale mine the OK Tedi, began producing copper in 1984 and gold in 1987. After the closure of BCL, Ok Tedi became the main mining project and accounted for 46.8% of the total revenue. This followed by several other projects including Misima in 1989, Porgera in 1992, Kutubu oil in 19992 and Lihir in 1997. Porgera is considered to be the largest gold mine outside South Africa and Lihir mine has the rich reserves of alluvial gold.

The sector has played a crucial role in PNG's development strategy and will continue to do so over the next few decades with several other projects coming

up. In 1996, the sector accounted for 68% of the total exports, of which 36% from mining alone. Mineral sector contributed to two thirds of GDP.

Government continues to give high priority to the promotion of foreign investment in the sector. It generally provides revenue to the government in terms of taxes, royalties, and dividends from shareholding. However, since mining is an enclave activity and capital intensive, it has few backward linkages to the rest of the economy.

3 Concern for Environmental Issues in PNG

Environmental issues were added to the government's political, economic and social agenda in the Fourth National Goal and Directive Principles of the 1975 constitution, which states *"natural resources and environment (are) to be conserved and used for the collective benefit of the future generations"*. Because of this goal and several Acts of parliament, the Office of Environment and Conservation (OEC) was established in 1974.

Due to dramatic economic transformation and the government's concern for the environmental issues, OEC was upgraded to a Department under the Minister for Environment and Conservation. During that time several environmental management and conservation programmes were established under various Environmental Acts and Regulatory Systems.

One of the programmes was the Environmental Management for Sustainable Development (EMSD). The EMSD aims to improve management and conservation practices in PNG. The programme was targeted to develop a national strategy, review existing legislation and enact additional legislation required, improve database on resources, raise public consciousness of environmental issues, institute conservation projects and improve monitoring and

enforcement procedures. The programme has yet to be fully implemented, due to lack of government budgetary support. For example, in 1994 4.8 million kina was the budgetary allocation for the Department of Environment and Conservation and in 1998 reduced its status back to Office of Environment and Conservation level.

Environment statistics are collected and compiled by the OEC in physical units for their own purpose and monitor the state of the environmental damages in the country.

4 Environmental Problems

Environmental problems in PNG include deforestation, species extinction, land degradation, pollution, which are caused by both human and natural events. Some of the most pressing ones are discussed below.

4.1 Deforestation

Forests cover about 36 million hectares of the total land area. Estimates of 3 million hectares of forests are harvested annually from poor logging operations. Forest development in PNG is on the increase and occurring at unprecedented proportions. At the current rate of forest exploitation PNG is most like to completely deplete its forest in less than 10 years.

4.2 Species Extinction

Species are disappearing due to deforestation and hunting. About 75 of land is covered by tropical rain forest and are rich in biodiversity, which contains over 10,000 species of flora including 1200 tree species, 36 species of birds of

paradise and wide array of insect species. Estimates shows that between 5 to 10 species of animal and one plant species are being extinguished each day.

4.3 Pollution

Environmental pollution comes in various forms, land, water and air pollution. Water pollution is mainly caused by manufacturing activities, illegal dynamite fishing in most coastal areas and dumping of tailings by mining companies into rivers. Coastal villages in most parts of the country also contribute to pollution by dumping household wastes into the ocean. Land pollution is mainly caused by disposal of solid and household wastes.

4.4 Land Degradation

Sources of land degradation in PNG are many and complex. Sometimes one solution to a particular problem leads to creation of another. Soil erosion, which is probably the most serious of land degradation problems has mainly exacerbated by human activities such as agriculture, mining and deforestation and natural cause like landslides. Estimates shows that 3 million hectares of land is cleared annually by forest activity and a million tons of topsoil is washed away.

5 PNG Case Study – Mining Sector

The study by World Bank in 1991 covered 9 mines in operation. The aim was to test the applicability of the adjustment in the national accounts to include environmental information using user cost and the net price methods.

5.1 Objectives of the Study

- (1) to apply the SEEA framework in the country which is at its early stage of industrial development and environmental problems are not of much concern
- (2) to warn policy makers about the seriousness of the natural resource depletion and degradation of environmental quality
- (3) to test the possibility of including SEEA in a country with limited statistical and accounting capacities
- (4) to locate appropriate statistics from different institutions and place them in the integrated accounting framework
- (5) identifying environmental protection services and corresponding expenditure
- (6) introduce balance sheet for produced and non produced tangible assets into the SNA

The results of the study presented in tables 1, 2 and 3 below. The estimates were done for the mining sector only and also cover the period from 1985 to 1990 when BCL was still in operation.

Table 1: Analysis of the User –Cost Approach (million kina)

| Year> | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|----------------------------------|--------|--------|--------|--------|--------|--------|
| User cost | 8.8 | 8.6 | 8.7 | 8.8 | 8.9 | 9.0 |
| Value Added | 239.2 | 329.8 | 490.0 | 609.5 | 352.7 | 377.9 |
| Adjusted Value Added | 230.4 | 313.6 | 450.4 | 585.0 | 343.5 | 342.1 |
| Adjusted Value Added/Value Added | 96.3 | 95.1 | 91.9 | 96.0 | 97.4 | 90.5 |
| Gross Domestic Product (GDP) | 2423.9 | 2550.0 | 2831.1 | 3140.9 | 3013.7 | 3103.1 |
| Adjusted GDP | 2415.1 | 2538.8 | 2791.5 | 3116.4 | 3004.5 | 3067.3 |
| Adjusted GDP/GDP (%) | 99.6 | 99.4 | 98.6 | 99.2 | 99.7 | 98.8 |

The user cost estimates are deducted from the GDP to obtain adjusted GDP and from value added to derive adjusted value added. The user cost of 9.0 in 1990 implies that the owners of the mines would have had made depletion allowance

of 9.0 million kina, which would reduce the value added of mining by 9.5% and reduced GDP by same percentage points.

5.2 USER COST METHOD

To calculate user cost, the stream of net revenues from the sales of a natural asset must be converted into a permanent income stream by investing a part of the revenues (which is the user cost allowance) over the lifetime of the resource in question. The remaining amount of the revenues is then considered as true income. Variables need for the calculation are net revenue of the resource must be given, discount rate and the life span of the resource.

5.3 Physical Assets

Table 2: Sub Soil Asset Physical Account

| Year | 1986 | 1987 | 1988 | 1989 | 1990 |
|----------------------|--------|--------|---------|---------|--------|
| Opening Stocks | 1750.0 | 2648.7 | 3983.7 | 1584.4 | -154.7 |
| Depletion | 126.8 | -209.7 | -106.3 | -25.2 | -180.7 |
| Other Volume Changes | 9.0 | 122.8 | 175.6 | -383.3 | 0.0 |
| Revaluation | 1016.5 | 1121.9 | -2168.6 | -1330.6 | n.a |
| Closing Stocks | 2902.3 | 3683.7 | 1584.4 | -154.7 | n.a |

In table 2, we can say that increase in the minerals through discoveries and extensions and upgrades of ores would be recorded in the SNA as capital accumulation that would affect NDP. NDP is derived in the SNA by taking away depreciation of produced (man made) asset. If produced asset depreciates through use and natural assets depreciate through depletion, which is the same concept. Depletion can be recorded in the SNA as changes in stocks in the stock account.

Table 3: Net Price Calculation of Depletion Costs and Discovery

| YEAR > | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|--------------------------------------|--------|--------|--------|--------|--------|--------|
| Depletion Cost | 74.1 | -126.8 | 209.7 | 106.3 | 25.2 | 180.7 |
| Value Added | 239.2 | 329.8 | 490.0 | 609.5 | 352.7 | 377.9 |
| Adjusted Value Added | 165.1 | 203.0 | 280.3 | 503.2 | 327.5 | 197.2 |
| Adjusted Value Added/Value Added (%) | 69.0 | 61.6 | 57.2 | 82.6 | 92.9 | 52.2 |
| Gross Domestic Product (GDP) | 2423.9 | 2555.0 | 2831.1 | 3140.9 | 3013.7 | 3103.1 |
| Depreciation of produced asset | 216.6 | 241.5 | 262.0 | 279.2 | 315.5 | 342.8 |
| Adjusted GDP or (NDP) | 2415.1 | 2538.8 | 2791.5 | 3116.4 | 3004.5 | 3067.3 |
| Adjusted GDP/GDP | 96.6 | 94.5 | 91.8 | 96.3 | 99.1 | 93.5 |
| Discoveries | n.a | 9.0 | 122.8 | 175.6 | -383.3 | 0.03 |

The depreciation of mineral assets through depletion is deducted from the traditional GDP to derive adjusted GDP or the NDP. The net domestic product (adjusted NDP/traditional NDP) declines by the range between the 0.9% to 8.2% during the period. The major contributing factor to the changes was the fluctuation in the world market prices of minerals. For example, average gold price per ounce dropped by about half from 1987 to 1988, then recovered from 1989 to 1990.

5.4 NET PRICE METHOD

In the net price, value of natural resource is calculated as the product of the quantity of the resource stock and net price. The net price of the asset is defined as the actual market price of the raw material minus its marginal exploitation costs including a normal rate of return of the invested produced capital. Example, in the case of non-renewable resource like minerals its stock comprises only the proven reserves, which are exploitable under the present economic conditions and therefore have a positive net price.

6 Conclusion

The current SNA has been criticized, because it does not consider new natural resource stocks and social costs of environmental degradation caused by economic activities. Environment statistics are collected and compiled by the Office of Environment and Conservation for their own use and purpose. The SEEA framework is the mechanism that tries to link the two data systems together to create a complete picture of the relationship between the environment and the economy. NSO is the key player to execute this. Some key indicators such as GDP or adjusted GDP can be derived using the two approaches, user cost and net price.