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# The Contribution of Resource Rents from Minerals and Fisheries to Sustainable Economic Development in Namibia

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## Abstract

**A Natural Resource Accounting project is currently underway to document the status of the nation's resources and their economic use. Minerals and fisheries account for much of Namibia's GDP and export earnings, and feature prominently in this project. Extractive resources like minerals and fisheries are capable of generating a great deal of "resource rent," that is, income above the normal return to capital invested in economic activities in the country, an income attributable to the scarcity of the resource relative to demand for the resource on the world market. From an economic perspective, sustainable and equitable management of these resources requires that resource rent be recovered by the government through appropriate taxes. This study reports estimates the amount of rent generated by these extractive industries and analyses the success of the government in recovering this rent for the good of the people of Namibia. The findings indicate that while the resource rents generated by mining have been captured, through taxes the rents generated by fisheries are not yet fully captured by the fishing quota levies**.

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## 1. Introduction: Minerals and Fisheries in the Namibian Economy

Namibia is highly dependent on its natural resource base: mining, agriculture, fishing, and wildlife-based tourism. In the past, natural resources were exploited with little planning for the provision of future income. The government of Namibia has now undertaken the construction of Natural Resource Accounts (NRA) as one of several economic tools to promote sustainable management of its resources. Broadly speaking, there are two approaches to the management of natural resources: natural resources can be commercially exploited to maximize economic rent, which is then appropriated by the government for use on behalf of society, or resources can be managed to achieve a combination of economic and social or political objectives in which the assessment of the purely economic benefits and costs of a given resource management strategy may play a more limited role in decision-making.

Like most countries, Namibia has adopted the first approach (commercial exploitation) for some resources and the second approach (use for both economic and non-economic objectives) for other resources. The large resource stocks and well developed industrial infrastructure make minerals and fisheries suitable for commercial exploitation. Since artisanal activities in both sectors account for a negligible amount of production, there are no additional social policy objectives that might warrant modification of policies designed to achieve purely economic objectives.

Briefly, the economic rent, or resource rent, is an income in excess of a "normal" return to capital earned in other economic activities; rent is attributable to the scarcity of the resource. (Rent is discussed in greater detail in section 2.) Resource rent is used to calculate the value of the stock of a resource, which is necessary for an economic assessment of the state of Namibia's natural capital and decisions about resource management. The recovery of resource rent by the government is essential for sustainable management of both renewable resources like fisheries and non-renewable resources like minerals. For the former, taxing the resource rent is necessary to remove the economic incentives for overfishing; for the latter, taxing resource rent and reinvesting part of the rent in other economic activities is necessary to provide alternative sources of income and employment once the minerals are exhausted.

Mining and fisheries (in this paper, defined to include both the fishing and fish processing sectors unless stated otherwise) are important contributors to GDP and export earnings (Figure 1). In addition, mining has provided essential infrastructure (schools, clinics, etc.) in towns at Oranjemund, Uis, Kombat, Rosh Pinah, and Arandis (Chamber of Mines, 1995), and fisheries provide an important source of employment. The combined contribution of mining and fisheries to GDP peaked at over 40% in 1980, dominated in early years by mining, mainly diamonds and uranium. Their contribution has since declined to about half that (20%) in 1995, due in part to the rapid growth of other sectors of the economy. Since 1990, the economic importance of fisheries has grown while mining has declined, so that they are now contributing nearly equal shares to GDP. Though the combined share of mining and fisheries in GDP has declined over the past 15 years, their share in exports has not changed very much; they currently account for about 70% of export earnings, down from a peak of about 80% in 1986. The share of fishing in export earnings, relative to the share of mining, increased considerably since 1990.

**Figure 1A Percent Contribution of Minerals and Fisheries to GDP, 1980 to 1995**

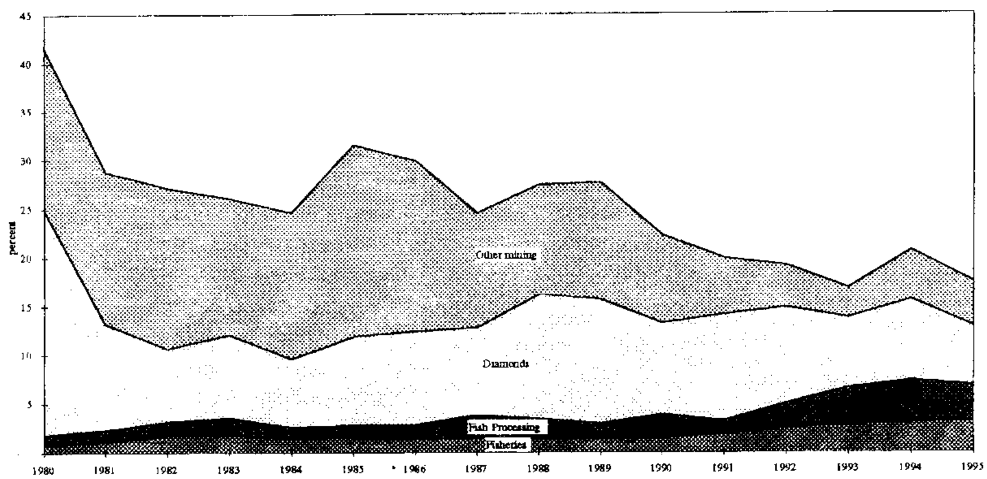



**Figure 1B Percent Contribution of Mining and Fisheries to Exports, 1980 to 1995**

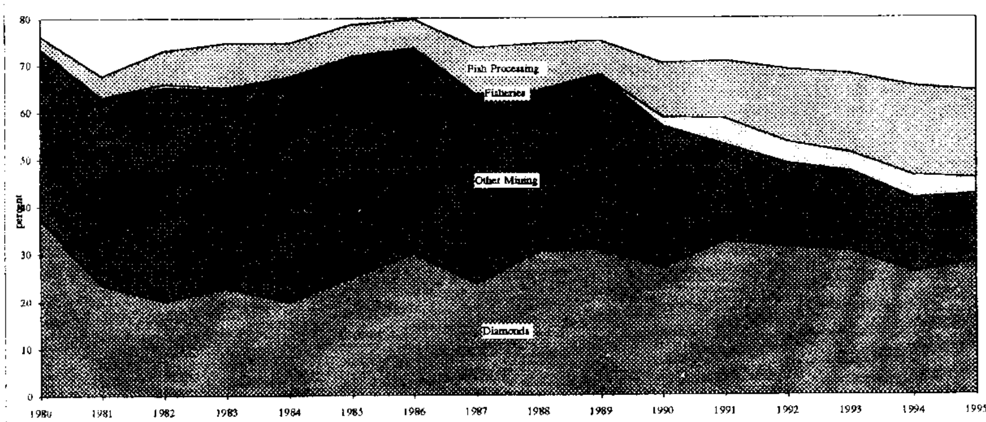
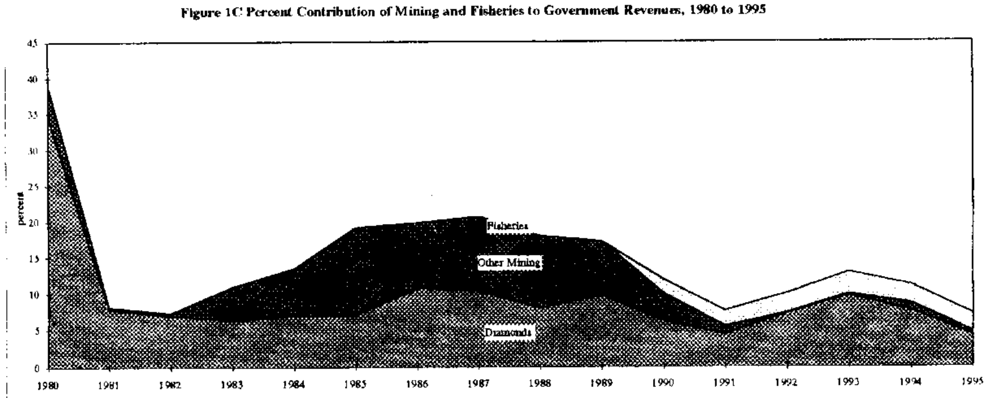



**Figure 1C Percent Contribution of Mining and Fisheries to Government Revenues, 1980 to 1995**




Source: CSO, 1996a, 1996c; Ministry of Finance, 1989, 1990, 1995.

By contrast with their contribution to GDP, mining and fishing account for a noticeably lower percentage contribution to government revenues, except for the year 1980.[1,2] In most years, their percentage contribution to government revenue is two-thirds or less than their percentage contribution to GDP. A partial explanation for the years 1980-1989, is that fishing quota levies, the tax on fisheries, were only introduced in 1990. However, the introduction of quota levies has not changed the combined contribution for the period 1990 to 1995 of minerals and fisheries to revenue (averaging 10% annually) relative to their combined contribution to GDP (averaging 19% annually). The major sources of government revenue, accounting for over 50% in most years, are sales taxes, customs and excise compensation (mainly from the Southern African Customs Union), and taxes paid by individuals on income and profit (CSO, 1996c; van der Linden, 1992). The relatively low contribution of mining and fisheries may initially appear surprising since commercially exploited resource sectors often generate considerable rents, a potential source of government revenue.

By changing the effective prices that producers and buyers face, taxes and subsidies can have a considerable distorting effect on an economy. From an economic point of view, it is best to structure revenue sources in a way that minimizes this distorting effect. The economically appropriate contribution to revenues from commercially exploited extractive industries like mining and fisheries is the resource rent they generate. Whether their present contribution to government revenues is, in fact, too low, can be determined by comparing the various taxes, fees, and royalties they pay to the amount of resource rent they generate.

This paper reports the use of the NRA to estimate resource rents for mining and fisheries and to examine whether the rents are being fully recovered by the government through various taxes. Section 2 begins with a brief description of the Namibian NRA, then explains the concept of resource rent and its economic importance, concluding with a description of the methodology to measure rent. Section 3 provides an estimate of resource rent generated by mining and compares the rent to the various taxes levied on that sector over the period 1980 to 1995. A similar analysis for fisheries is provided in section 4. Section 5 summarizes the policy implications of the findings and describes additional work in this area that will be carried out by the natural resource accounting project in the future. Supporting information is provided in the appendices.

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[1] This high figure in 1980 results from a combination of 1) high diamond production and taxes along with 2) a very low contribution to Namibian government revenues from South Africa, relative to the years 1981-1989.

[2] The income tax paid by fish processing is not included because this data could not be obtained in time for the report. The omission of this tax is not expected to significantly affect the trend.

## 2. The Namibian Natural Resource Accounts and Resource Rents

### The Namibian Natural Resource Accounts

The Namibian NRA generally follow the UN's SEEA (System of Integrated Environmental and Economic Accounts) approach (UN, 1993), though strongly influenced by the Norwegian system (Alfsen, 1996; Alfsen et al., 1987) with its emphasis on compilation of a detailed physical database and the integration of NRA with economic models for policy analysis. In addition to minerals and fisheries, the NRA constructed for Namibia include water, livestock, land, land degradation, forestry, energy, and wildlife.

The NRA for minerals and fisheries include both stocks of resources as well as annual extraction, or use, of resources. Accounts are compiled first in volume units (usually tons) and, where possible, in monetary value. The stock accounts record the estimated reserves of major minerals (though these cannot be publicly released) and the estimated adult biomass of major commercial fish species: hake, pilchard, and horse mackerel. The use accounts record the annual extraction of major minerals and fish landings for the major commercial species. These accounts are presented in sections 3 and 4, respectively. Though the stock of minerals in the ground or fish in the sea do not generate any income until they are extracted and sold, these resource stocks have an economic value because of the **potential** income they can generate. The value of the resource stock is calculated using the resource rent.

### The Economic Importance of Resource Rents

Typically, because natural resources are scarce, there is an economic return to the resource itself above the return needed to cover intermediate input costs, labor costs, and the opportunity cost of capital invested in the business. This return to natural resources is called a resource rent and is measured as the difference between the revenue obtained by selling a resource and the opportunity costs of extracting that resource. In the absence of government policies to recover this rent, it accrues as "windfall" profits to operators of natural-resource-based industries. While resource rents are measured in essentially the same way for all resources, the economic significance of the recovery of rent from non-renewable and from renewable resources is somewhat different; each is discussed below.

***Resource Rents and Non-Renewable Resources***

Non-renewable, or exhaustible, resources like minerals will eventually be depleted, and the employment and incomes generated by this activity will come to an end. This will also happen with renewable resources like fisheries if they are not managed sustainably. A major objective of governments is to recover resource rent and to use it for the benefit of the country. It is especially important that rents from non-renewable resources, or from the depletion of renewable resources, be invested in other kinds of economic activity which can replace the employment and incomes of the resource-based industries once they are exhausted. In this way, exploitation of the resource can be **economically** sustainable -- because it creates a permanent source of income -- even though non-renewable resources are, by definition, not biologically sustainable. The following example illustrates some of the choices regarding management of non-renewable resources which governments and the private sector face.

***An Example of the Role of Rent in the Management of Non-renewable Resources*[3]**

Suppose a country has an oil field containing 100 barrels of oil. This constitutes its "natural capital." The country can hire an international oil company to pump its oil at a cost of $1 a barrel. This cost includes payments for labor, intermediate inputs like electricity, for accounting and marketing services, and for the use of capital equipment needed to extract the oil. Since oil is a scarce resource, the price of oil on the world market gets bid up to $2 a barrel, which is well above the $1 a barrel cost of extraction. This scarcity results in a **resource rent** of $1 a barrel from its production.

The country has a choice of extracting the oil (or some part of it) now for the economic benefit of the current generation, or leaving it in the ground for future generations to extract and sell. If all 100 barrels are extracted in one year, the country earns an economic profit, or resource rent, of $100 (the revenue of $200 minus extraction costs of $100), but leaves no oil for future generations. What might the country do with this profit? The country has a choice of either spending it on current consumption or investing it in other economic activities which will generate income and employment in the future. If the resource rent is used only for consumption by the current population, for example, buying television sets for all the country's citizens, then nothing is left for future generations. Future generations are worse off than if the oil had been left in the ground because there is nothing left for them to extract.

On the other hand, the country could invest the $100 (or some part of it) in produced capital or in an investment fund to replace the now-depleted natural capital. As long as this investment is intact, it will generate income and employment, benefitting both current and future generations. The current generation will not have as much to spend as if they had spent the entire $100 profit, but this policy ensures that all citizens, current and future, will have some benefit from the country's natural. An example of such a fund is the Permanent Fund created from oil revenues in the state of Alaska in the U.S. Part of the resource rents are held in an investment fund and the annual proceeds from this fund, above the amount needed to keep the real value of the fund intact, are distributed to all residents of the state.

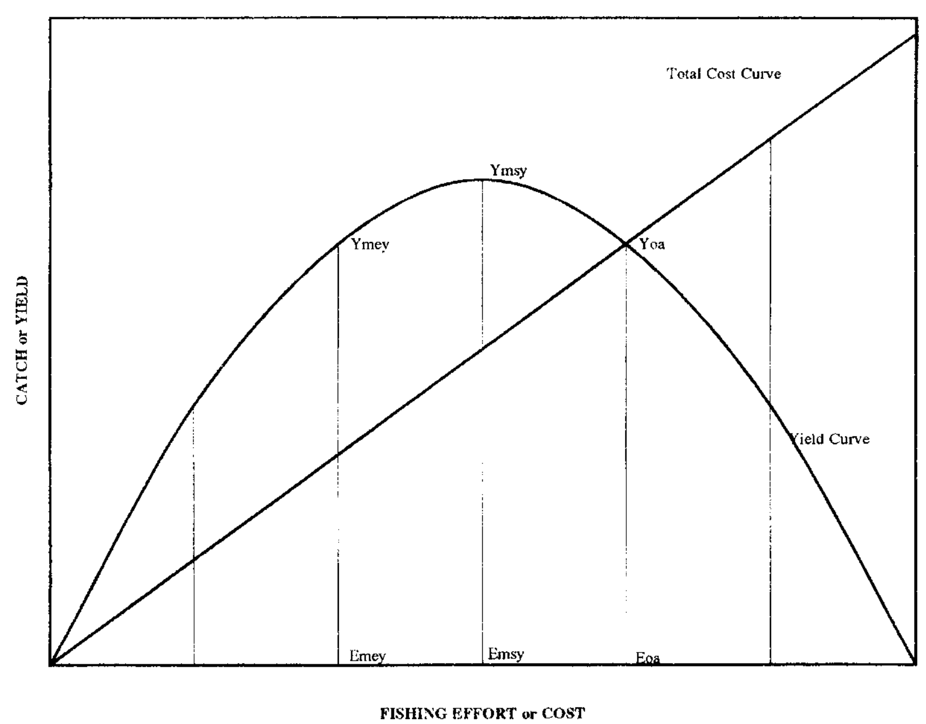
***Resource Rents and Renewable, Open-Access Resources***

Marine fisheries are often characterized as an open-access resource. It is difficult to control access to the resource both because the resource itself is mobile (Namibia's fish, for example, may migrate outside of Namibian jurisdiction to Angolan territorial waters) and because it is difficult to establish effective territorial boundaries in the ocean. The optimal exploitation of renewable resources like fish has both an ecological and an economic dimension. The ecological optimum is the level of the fish population which results in the Maximum Sustainable Yield (MSY), that is, the largest number of fish that can be harvested each year without reducing the fish population. The economic optimum is the level of fishing that generates the maximum profit, or Maximum Economic Yield (MEY). This level is determined both by the population dynamics of the fish population and by the costs of fishing.

Figure 2 shows a simplified version of the relationship between the ecological and economic dimensions of fishing. The vertical axis shows the yield, or the amount of annual catch (measured

[3] Based on Goodstein (1994).

**Figure 2. Ecologically-Optimal and Economically-Optimal Levels of Fishing**




Note:
Ymey and Emey are the Yield and Effort, respectively, associated with the maximum economic yield.
Ymsy and Emsy are the Yield and Effort, respectively, associated with the maximum biologically sustainable yield.
Yoa and Eoa are the Yield and Effort, respectively, associated with levels of fishing under open access.

either in tons of fish or in dollars), and the horizontal axis shows the level of fishing "effort" (determined by the number of boats, catching capacity of each boat, and the days fished). The yield curve shows the catch, or yield, as a function of the level of fishing effort. As fishing effort increases, the catch increases up to a peak, the MSY at the point $Y_{msy}$; after that point, the catch declines even though the level of fishing effort increases because the additional fishing effort depletes the fish population. The cost curve shows the costs (including a "normal" profit which is the opportunity cost of investing capital in a business) for increasing levels of fishing effort[4].

In the absence of any regulation to restrict fishing, fishermen will fish up to the point at which it is no longer economically profitable -- this occurs at point $Y_{oa}$ with a cost of $E_{oa}$, where the cost curve and the yield curve meet and total costs are exactly equal to revenues. At this point, no resource rents are earned. Fishermen would not fish beyond this point because costs would be greater than their revenues. Yet, the annual fish catch could be **increased** if the fishing effort (for

[4]The straight line assumes a linear cost function which is unlikely to occur in the real world. It is used to simplify the presentation and does not affect the conclusions about the optimal level of fishing.

example, the number of boats and days fished) was reduced. In addition, at levels of fishing less than $Y_{oa}$, fisherman would be earning higher profits (and positive resource rents) because costs would be less than revenues. If the fish catch could be increased and fishermen's profits increased simply by reducing the amount of fishing, why doesn't this occur in an unregulated fishery? It doesn't occur because each fisherman considers only his individual economic return and not the effect his fishing effort will have on the fish stock and, consequently, the profitability of everyone's fishing. As long as a fisherman earns at least enough to cover his costs, he has an economic incentive to fish.

The greatest number of fish that could be caught is $Y_{msy}$ , but while this point is the optimum ecological level of fishing, it does not produce the maximum economic yield. The economically optimal level of fishing occurs at point $Y_{mey}$, where **profits** (measured by the distance between the yield curve and the cost curve) are greatest. Note that in this diagram the same number of fish is caught at $E_{mey}$ as at $E_{oa}$. The economic difference between those two points is in the effort, or cost, of catching that number of fish. The economy (and any individual fisherman) is better off if it catches a given number of fish ($Y_{mey}$) at the lower cost of $E_{mey}$ rather than at a cost of $E_{oa}$. The capital invested in fishing equipment for $E_{oa}$ is wasted because it brings no additional income to the country and could better be used for other economic activities.

Governments use a number of instruments to move the fishing industry away from $E_{oa}$ and closer to $E_{mey}$. The instruments include setting quotas to limit the amount of fish that can be caught and levying fees to provide an economic incentive not to overfish. The excess profit, or resource rent, at the economically optimal level of fishing is represented by the difference between cost and yield (revenue) at $Y_{mey}$, $E_{mey}$. If this resource rent were taxed away by quota levies, then the excess profits of fishermen would disappear, and it would not be profitable to increase fishing effort beyond the economically optimal catch. (Just as it is not profitable for fishermen in an unregulated market to fish beyond $Y_{oa}$.) Thus, the recovery of resource rent through appropriate quota levies plays an important role in the sustainable management of fisheries by removing the economic incentives for overfishing and depletion of the resource.

## Measuring Resource Rent and Valuing Resource Depletion

There are three methods of calculating the value of resources: Net price, Discounted (present) value, and User-cost allowance. (See Appendix A and UN (1993) for a discussion of these methods.) The Net-price method, popularized by the work of Repetto (Repetto et al., 1989; Tropical Science Center and World Resources Institute, 1991) is often used because it requires less information than either of the other methods and is simpler to calculate. The Net-price method can be calculated from information reported in national accounts and does not require assumptions about rates of extraction of resources into the future, discount rates, or future prices and extraction costs (Hartwick and Hageman, 1993). The Net-price method is used to estimate rent for Namibia, partly for these reasons and partly because the data required for the other methods were not always available.

From a policy perspective, it would also be useful to estimate the User-cost allowance version of rent for minerals because it attempts to distinguish the amount of resource rent from a non-renewable resource that needs to be reinvested in order to maintain a constant stream of income and any amount leftover that can be consumed as current income, as discussed in an earlier part of this section (El Serafy, 1989). Unfortunately, this method could not be implemented because it required the use of confidential information which could not be publicly reported and detailed economic information which was not always available.

The Net price of a resource is calculated as the market price of the resource minus its marginal exploitation costs, including a “normal” rate of return on invested produced capital which is the opportunity cost of the capital invested in a particular business. The idea of opportunity cost in this instance is that an investor always has at least several alternative investment opportunities. To convince the investor to put his or her money in any one activity, like a fishing company, the profit on the investment must be at least as great as the opportunity for profit from other economic activities he or she could invest in.

In practice, the opportunity cost, and therefore the “normal” rate of return on capital, is difficult to measure and is, thereofre, often defined as the average return on capital in an economy, or sometimes the social discount rate, which is lower than the average private return on capital. The opportunity cost of capital can vary from country to country, can vary over time within a country, and can vary among industries due to factors like risk and uncertainty. Because of the difficulty of measuring a normal rate of return, a sensitivity analysis may be performed in which the normal profit is estimated for different rates of return to capital stock. In Norway, for example, a 7% return was used (Luras, 1995); the United States used a range of 3%, 6%, and 10% (Bureau of Economic Analysis, 1994); 10% and 15% were used in the Philippines (International Resources Group, 1994), and rates from 8.8% to 11.4% were used in Papua-New Guinea (Bartelmus et al., 1993). These percentages are fairly low; in Namibia, the average net return to capital stock in recent years has been around 17%, though there is tremendous variation from one year to the next (authors’ calculations based on (CSO, 1996a and 1996c). The calculations for Namibia estimate rent using a 10%, 20%, and 30% rate of return on capital stock (see Appendices B and C).

In actual implementation of the Net-price method, average cost is used rather than marginal cost because data about marginal cost are not available. This practice introduces an upward bias into the measure of rent because average cost is often lower than marginal cost. Under these circumstances, the Net-price method then represents an upward bound on the estimate of resource rent. Despite this limitation (none of the three methods for measuring rent are without limitations), this method is widely used because it provides a reasonable estimate of rent and is easy to implement. The exact method and data used for calculating rent are discussed in Appendix A.

## 3. Resource Rent from Mining

There are over 40 active mines in Namibia producing more than 30 minerals and metals, including precious and semi-precious stones, precious and base metals, dimension stones, industrial minerals, and uranium (CSO, 1995). The most important minerals are diamonds, uranium, copper, gold, lead, zinc, and silver. Diamonds and uranium alone accounted for nearly 80% of both value-added and exports generated by mining in recent years (Ministry of Finance, 1995). The easily accessible reserves of Namibia's most important mineral, diamonds, are rapidly being depleted. New diamond reserves, located off-shore, are being developed, but require large capital investments to exploit. Uranium, the next most important mineral, suffered from a decline in world demand in the past few years, but is expected to recover with the recent signing of a long-term contract. Newly discovered off-shore natural gas reserves and the prospects for commercial development of copper reserves along Namibia's southern border may provide the country with significant revenues in the future.

**Stocks and Use of Minerals**

Ideally, stock accounts would be constructed for the major minerals: diamonds, uranium, and, perhaps, copper. Stock accounts for diamonds have been constructed but cannot be publicly reported; confidentiality prevents the construction of stock accounts for uranium. Accounts for copper and natural gas have not been constructed yet, but will be constructed in the future if a major mine is commercially developed. Information about annual extraction is available for diamonds and uranium and is reported in Table 1. There is virtually no domestic processing or use of minerals.

The different minerals each earn very different per unit rents and the stock of a given mineral must be valued with its own rent. For example, the value of the stock of diamonds must be estimated with the resource rent per carat of that mineral and not, for example, with the per unit rent generated by zinc (which is likely to be much lower). The total resource rent generated by all mining activities can be calculated from the national accounts as described in section 2. However, data problems prevent the disaggregation of the total rent by type of mineral. It is reasonable to assume that most rent is generated by diamonds and uranium because these two minerals account for most of the profit from mining. Since the rent for each mineral cannot be calculated, the value of the stock of any specific mineral cannot be calculated.

**Table 1. Stocks of Selected Minerals, 1980 to 1994**

A. Diamonds (thousands of carats)

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Opening Stock | cannot be publicly reported | | | | | | | | | | | | | | |
| Extraction | na | 1,251 | 1,040 | 969 | 931 | 910 | 1,010 | 1,030 | 975 | 927 | 673 | 1,187 | 1,549 | 1,141 | 1,312 |
| Net Additions | cannot be publicly reported | | | | | | | | | | | | | | |
| Closing Stock | cannot be publicly reported | | | | | | | | | | | | | | |

B. Uranium oxide (tons)

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Opening Stock | cannot be publicly reported | | | | | | | | | | | | | | |
| Extraction | 4,764 | 4,692 | 4,459 | 4,387 | 4,368 | 3,992 | 4,097 | 3,992 | 4,144 | 3,630 | 3,787 | 2,890 | 1,973 | 1,976 | 2,242 |
| Net Additions | cannot be publicly reported | | | | | | | | | | | | | | |
| Closing Stock | cannot be publicly reported | | | | | | | | | | | | | | |

na: not available

Source: CSO (1995), Ministry of Mines and Energy (1996), and World Bank (1992).

The obstacles to calculation of rent for each mineral include:

1. information about stocks of the most important minerals is confidential. While this information can be provided to the natural resource accounting programme, it cannot be reported in any public document, nor can the results of any analysis using such data be reported if it would be possible for someone to calculate the stocks on the basis of the results presented.

2. certain economic information needed to calculate rent for each mineral is confidential, i.e., value-added information for uranium (and, consequently, for many other minerals since the value added for uranium could be deduced if one had value-added information for all disaggregated mining sectors except uranium)

3. Finally, certain economic information needed to calculate the rent is simply not available from the national accounts, i.e., capital stock for each disaggregated mining activity.

Methods to overcome some of these obstacles are discussed in the final section of this report.

**Resource Rent**

Resource rents generated by the mining sector have varied a great deal over the past 15 years (Figure 3A). Rents were fairly high in 1980 and in 1985-1989, but in the past six years, resource rents have mostly been negative, assuming a 20% rate of return on capital invested. This "negative" resource rent indicates that the net return to the amount of capital invested in mining provides **less** than the average rate of return. These short-term downturns are not unusual in a highly capital-intensive industry subject to wide fluctuations in world demand and price, such as diamonds and uranium. Uranium mining has been operating at well under capacity for several years. In addition, the diamond industry recently undergone large increases in its capital stock as it developed capacity for off-shore mining and would not expect to see a positive return on that investment for some time.

Despite apparently poor years for the Mining sector in terms of resource rents, the tax revenues (including royalties, levies, and special taxes) obtained by the government have stayed high. Net rent accruing to the private sector, resource rents minus taxes (Table 2), is near zero or negative in most years, indicating that the government has been highly successful in recovering resource rents generated in this sector of the economy. Since taxes are much greater than resource rent in all but 4 of the past 16 years, the mining industry has actually earned considerably less than a 20% rate of return on capital invested.

As discussed in section 2, the rates of return used by other countries, both industrialized and developing, to calculate their resource rents were generally much lower than the 20% used for Namibia. At a 10% rate of return to capital, resource rents from mining in Namibia are positive in all years and greater than taxes in 11 of the last 16 years (Figure 3B; net rents in Table 2). This result seems to indicate that even though the average return to capital in the Namibian economy has been around 20%, the opportunity cost of capital in the mining sector may, in fact, be lower and closer to the rates of return in other countries.

Figure 3A Resource Rent and Taxes from Mining Assuming a 20% Return to Capital Invested, 1980 to 1995

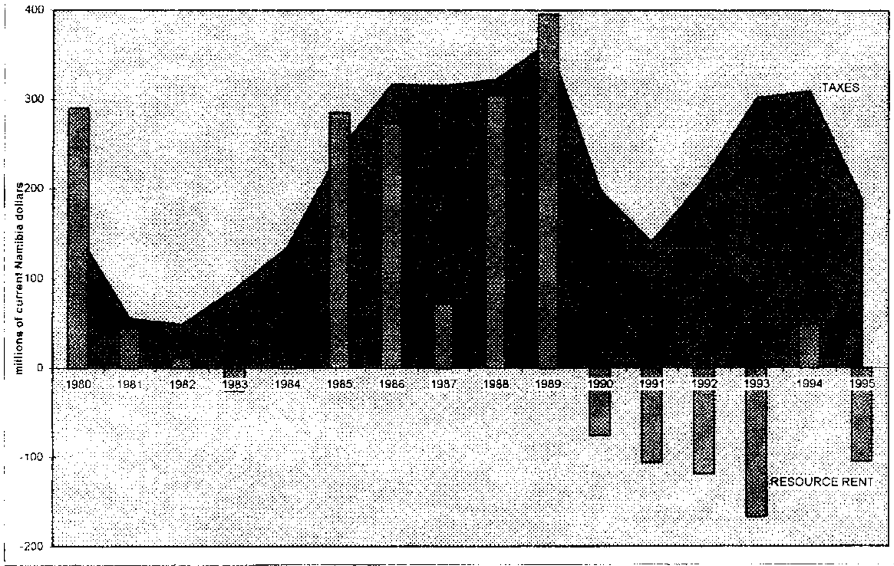
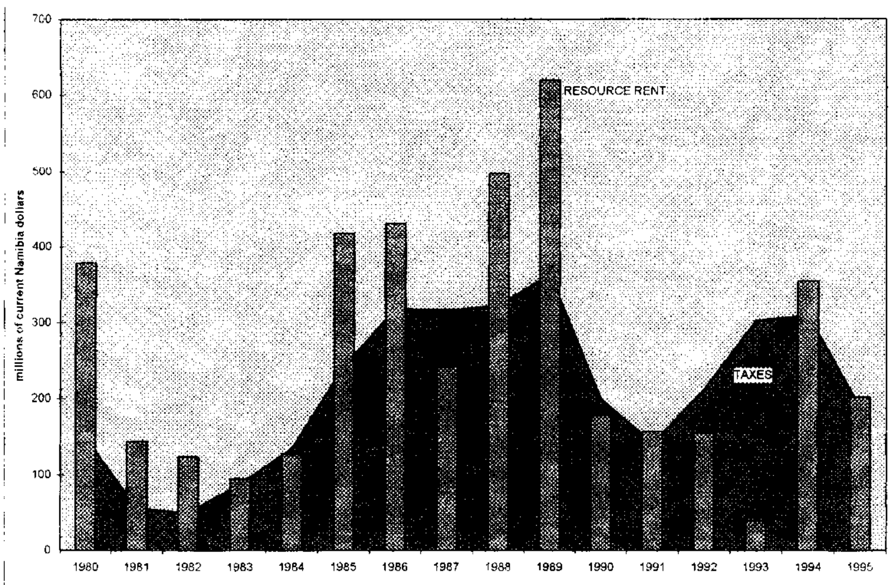



Figure 3B Resource Rent and Taxes from Mining Assuming a 10% Return to Capital Invested, 1980 to 1995




Note: The difference between resource rent and taxes is the net rent accruing to the private sector.

Source: Authors' calculations based on (CSO 1996a, 1996c; Ministry of Finance 1989, 1990, 1994) using the Net-price method. See Appendix B for supporting data.

**Table 2.** **Recovery of Resource Rents from Mining in Namibia, 1980 to 1995** (millions of Namibia dollars in current prices)

| | Taxes | Net Rent Accruing to the Private Sector for Different Rates of Normal Profit 10% | 20% |
|---|---|---|---|
| 1980 | 183 | 231 | 107 |
| 1981 | 151 | 89 | -106 |
| 1982 | 55 | 75 | -43 |
| 1983 | 48 | 8 | -75 |
| 1984 | 110 | -6 | -105 |
| 1985 | 134 | 176 | 152 |
| 1986 | 242 | 114 | 31 |
| 1987 | 317 | -72 | -245 |
| 1988 | 315 | 176 | -9 |
| 1989 | 322 | 256 | 74 |
| 1990 | 199 | -21 | -275 |
| 1991 | 140 | 16 | -247 |
| 1992 | 211 | -56 | -331 |
| 1993 | 302 | -263 | -469 |
| 1994 | 309 | 46 | -260 |
| 1995 | 188 | 15 | -294 |

Note: Resource rents calculated using the net rent method. Net rent accruing to the private sector calculated as resource rent minus taxes.

Source: Authors' calculations based on (CSO, 1996a, 1996c; Ministry of Finance, 1989, 1990, 1995) given in Appendix B.

## 4. Resource Rent from Fisheries

The coastal waters of Namibia provide a rich habitat for a number of commercially valuable species including hake, pilchards, horse mackerel, anchovies, and many others (Ministry of Fisheries and Marine Resources, 1996a). Fishing is an important sector of the economy and has been identified as a sector with potential for rapid growth and may also provide an opportunity for development of related industries in Namibia (National Planning Commission, 1996; World Bank, 1992). Consequently, fishing is critical to Namibia's strategy for economic growth in the future. However, to make this contribution to Namibia's development, fisheries will require careful management to prevent the recurrence of overfishing experienced in the past.

**Stocks and Landings of Fish**

Prior to Namibia's independence in 1990, the fishing industry was subject to little monitoring or regulation (Moorsom, 1984, 1994). Many foreign operators fished the area during that time and reliable data about fish landings are not available. Despite the paucity of data, stock accounts for the major commercial fish species have been estimated for the past three decades and some information about fish landings is available (Figure 4 and Table 4). The Ministry of Fisheries is currently negotiating to obtain data about landings from earlier years which will improve fisheries accounts.

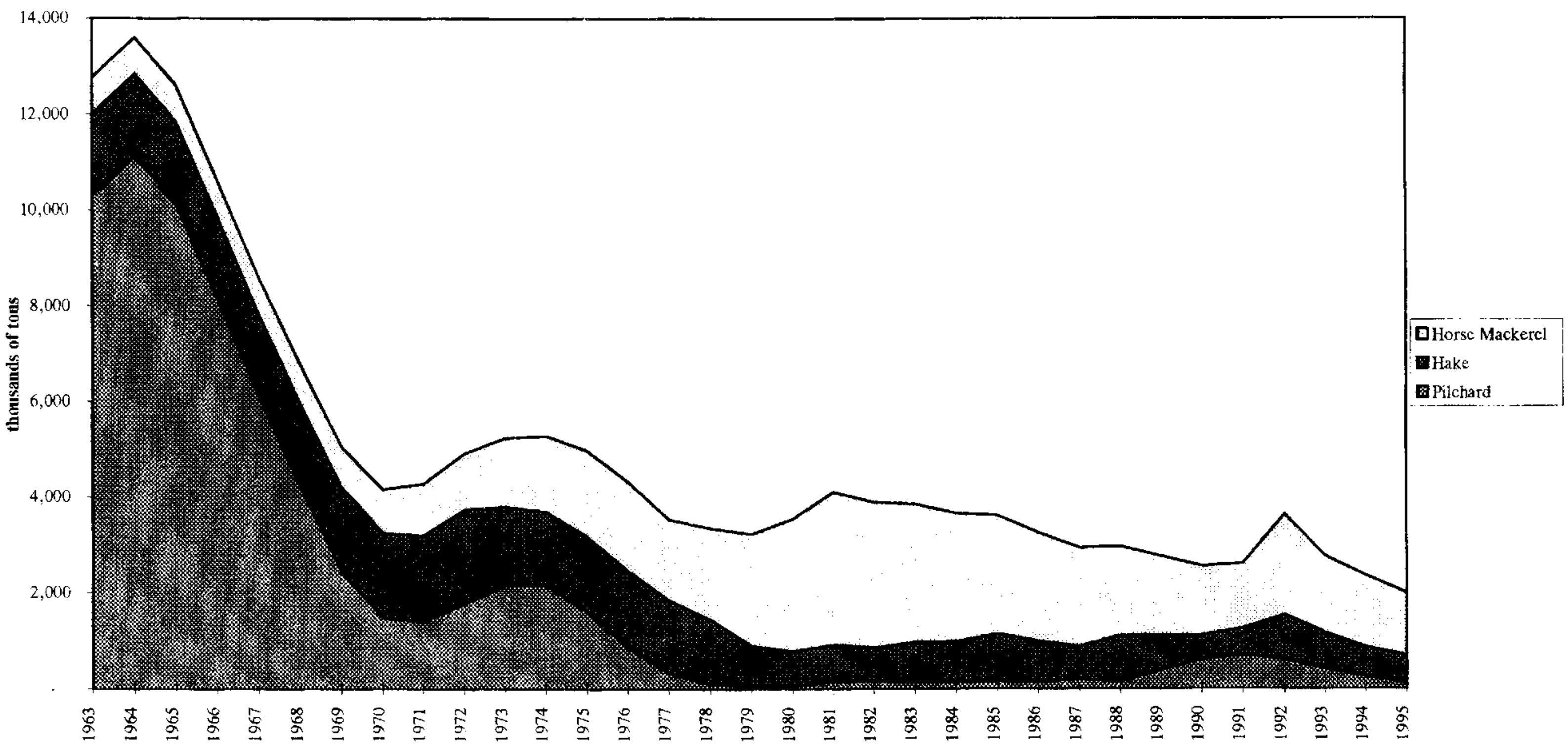
In the 1960's and 1970's, Namibia's fisheries have been subject to significant over-fishing, resulting in the collapse of some commercial species, especially pilchard. While the less valuable horse mackerel seemed to expand to fill the niche left by the collapse of pilchards, total fish biomass has declined significantly since the 1960's from a peak of around 14 million tons of adult biomass to less than 3 million tons in the 1990's, and even horse mackerel has declined over the last decade. The decline of the fish stock has resulted in reduced landings of fish and a loss of income to Namibia.

At Independence, the government established a 200-mile exclusive economic zone and instituted a quota system and a system of quota levies for the major commercial species; the former to limit the annual catch to sustainable levels and the latter in order to capture the resource rent generated by fisheries. The government also introduced policies to promote the establishment of a domestic fishing and fish processing industry to replace the largely foreign operations of the past. Government policies have sought to promote competition in the fishing and the fish processing industry in order to create incentives for low-cost operations which maximize the amount of resource rent generated.

Though management of fisheries has improved dramatically in recent years, the fish stock has suffered adverse environmental conditions which have prevented as fast a recovery of the stocks as had been anticipated (Ministry of Fisheries and Marine Resources, 1995, 1996b). It is notable that even at reduced stock levels fisheries continue to contribute significantly to the national economy. The Ministry of Fisheries is optimistic that the fish stock will recover from its current depleted state as environmental conditions improve.

As with mining, resource rent differs by fish species and it has not been possible to estimate the resource rent generated by individual fish species. Lack of sufficiently disaggregated economic data has made it impossible to calculate rent for each type of fish and, consequently, to calculate the value of the depletion of the fish stock. In the case of fisheries, the obstacle has not been confidentiality, but simply a lack of detailed economic information necessary for the calculation of rent by fish species. Information about the revenue generated by each species is available, but not information about cost. There has been some investigation of the (unofficial) trading prices for fish quotas in 1996 by (Peter Manning, personal communication, 1997) which should approximate the resource rent for each species, but since this trading is not officially allowed, it is not clear how representative these figures are. More detailed

**Figure 4. Adult Biomass of Pilchard, Hake, and Horse Mackerel, 1963 to 1995**




Note: Horse mackerel, 1963-1983, is for fish 2 years and older; 1990-1995 include all ages; data for 1984-1989 are interpolated

Source: Ministry of Fisheries and Marine Resources, Marine Information and Research Centre, 1996

**Table 3. Landings of Major Commercial Fish Species, 1980 to 1995** (thousands of tons)

| Year | Pilchard | Hake | Horse Mackerel |
|---|---|---|---|
| 1980 | 11 | 165 | 546 |
| 1981 | 52 | 213 | 590 |
| 1982 | 51 | 306 | 660 |
| 1983 | 44 | 339 | 600 |
| 1984 | 56 | 370 | 607 |
| 1985 | 54 | 412 | 460 |
| 1986 | 52 | 407 | 500 |
| 1987 | 66 | 299 | 547 |
| 1988 | 62 | 334 | 559 |
| 1989 | 78 | 326 | 446 |
| 1990 | 89 | 55 | 400 |
| 1991 | 68 | 56 | 434 |
| 1992 | 82 | 87 | 426 |
| 1993 | 116 | 108 | 474 |
| 1994 | 117 | 110 | 460 |
| 1995 | 43 | 130 | 311 |

Source: Ministry of Fisheries and Marine Resources (1995, 1996a) and Marine Research and Information Centre (1996).

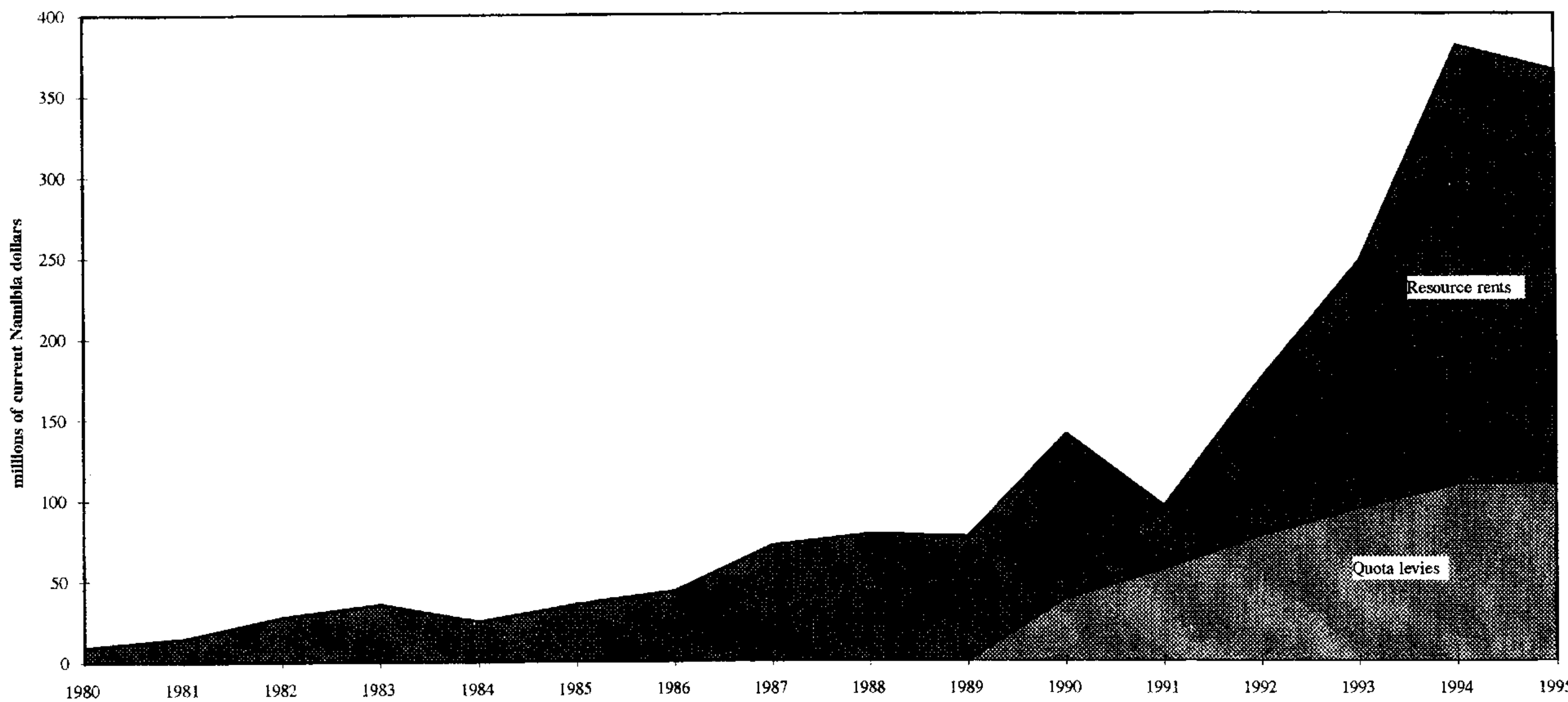
information about costs will be available in the future from the Ministry of Fisheries which should make it possible to calculate rent by species.

## Resource Rent

Fishing and fish processing are highly integrated economic activities in Namibia and operate largely as a single industry. National accounts require that they be treated as two separate activities, but their high degree of integration makes the disaggregation difficult. The treatment of the two industries in the national accounts is currently under revision; until such time as revised data are available, the two industries are combined for the purposes of estimating resource rent. (This issue is discussed in further detail in Appendix C.)

In contrast to mining, resource rents have been positive throughout the past 16 years even at a 20% rate of return on capital invested and have risen dramatically since 1990 when domestic operators began to enter the industry. Prior to Independence, all resource rents accrued to the fishing industry because there were no quota levies or special taxes as there were for mining. Through the use of quota levies, the government has recovered a substantial amount of the rent over the past six years. However, the analysis indicates that a large amount of the rent continues to accrue to the private sector (Table 4, Figure 5). The percentage of resource rents captured by quota levies reached a high of 60% of resource rent in 1991 but has since declined to 30% in 1994 and 1995.

**Figure 5. Resource Rents from Fisheries and Fishing Quota Levies, 1980 to 1995**




Source: Authors' calaculations based on (CSO 1996a, 1996c) using the Net-price method and assuming a 20% return on invested capital. See Appendix C for supporting data.

**Table 4.** **Recovery of Resource Rents from Fisheries in Namibia, 1980 to 1994** (millions of Namibia dollars in current prices)

| | | Net Rent Accruing to the Private Sector for Different Rates of Normal Profit | |
|---|---|---|---|
| | Quota Levies | 10% | 20% |
| 1980 | na | 12 | 9 |
| 1981 | na | 17 | 14 |
| 1982 | na | 31 | 28 |
| 1983 | na | 39 | 35 |
| 1984 | na | 28 | 25 |
| 1985 | na | 39 | 35 |
| 1986 | na | 48 | 43 |
| 1987 | na | 78 | 72 |
| 1988 | na | 85 | 78 |
| 1989 | na | 85 | 77 |
| 1990 | 38 | 111 | 102 |
| 1991 | 57 | 53 | 38 |
| 1992 | 77 | 134 | 98 |
| 1993 | 94 | 207 | 153 |
| 1994 | 109 | 334 | 271 |
| 1995 | 110 | 325 | 255 |

na: not applied in this year.

Note: Resource rents calculated using the net rent method. Column 3 calculated as resource rent minus quota leveies.

Source: Authors' calculations based on (CSO, 1996a, 1996c) given in Appendix C .

## 5. Policy Implications for Resource Management

Full recovery of resource rent is necessary for sustainable and equitable (from a tax perspective) management of commercially exploited resources like Namibia's mining and fisheries. In general, the government has been fairly successful at recovering resource rents. However, there is a major difference between the mining and the fisheries sectors in terms of the recovery of rents. The government has been quite successful in designing economic instruments -- taxes of various kinds -- to capture the rent generated by mining over the past 15 years, perhaps because there is extensive experience in dealing with Namibia's long-established domestic mining industry. This is not the case with fisheries; quota levies are considerably lower as a share of rents than that obtained in the mining sector.

It is understandable that the government is cautious in introducing high taxes in fisheries because fishing is a relatively new domestic industry requiring substantial investment, much of it foreign. The government has chosen to sacrifice some of the resource rents in the interest of developing local fishing industry through a system of differential quota levies, based on the degree of Namibian participation (in terms of both ownership and on-shore fish processing). The caution over taxation is compounded by the great uncertainty in the fishing industry created by poorly understood environmental factors affecting the fish stock. In the future, as the domestic industry becomes better established, the level of quota levies may be re-examined. Full rent recovery would eliminate windfall profits to fishing company owners and generate funds that could be used to support development of other sectors of the economy.

From a policy perspective, the mixed success with recovery of resource rents has a number of implications. Section 1 raised a question about the appropriate taxation of the resource sectors since it appeared from Figures 1A and 1B that mining and fisheries might be able to contribute more to government revenues than they are contributing at present (Figure 1C). The analysis indicates that, in fact, mining is contributing at least as much as its current rent would warrant while fishing is contributing considerably less. The relatively high current level of taxation of mining may be appropriate to the extent that it reflects the longer-term rent-generating capacity of the industry. From an economic perspective, it appears that the fishing industry could afford to pay higher taxes.

Regarding the use of rent-capturing taxes to ensure sustainable resource management, it is important that the revenues from non-renewable resources are reinvested in other forms of capital to replace the depletion of "natural capital," as explained in section 2. It is not possible to determine whether the depletion of mineral assets is being offset by the accumulation of other assets. Under current practices, the rent obtained through taxes goes into general government revenue and is not earmarked for a specific purpose such as a resource depletion fund. However, the government of Namibia is investing a great deal in the development of human capital -- nearly 40% of its budget is for education and health expenditures which amounted to nearly 13% of GDP in 1995 (Central Statistics Office, 1996a).

With substantial rents generated by fisheries, the current level of fishing In Namibia is clearly below $Y_{oa}$. However, the quota levies capture only 30% of excess profits in fisheries, so the levies are clearly too low to provide a strong economic incentive to limit fishing to the most profitable level, $Y_{mey}$, as discussed in section 2. The lack of detailed information about fishing costs and the extreme annual fluctuations in the fish stock due to environmental conditions makes it extremely difficult to identify the economically optimal level of fishing for each type of fish and, hence, the appropriate quota levy. Fortunately, the government does not rely solely on economic incentives to control fishing; a quota system based on frequent evaluation of fish stocks limits fishing to a sustainable level. In a competitive market in which quotas are distributed through auctions, the auction price can provide a good indication of resource rent. In the future, the introduction of quota auctions in Namibia might result in better recovery of resource rent while eliminating the need to estimate the eeconomically appropriate quota levy.

Over the next few years, the natural resource accounting programme will extend the work on minerals and fisheries. In mining, there are some estimates by (Hartmann, 1986) of some of the missing economic data which may be used in future work, if the other data problems are resolved.

Discussions will be held with the appropriate ministries to work out an agreement about reporting at least some of the components of the NRA while satisfying the needs for confidentiality. For example, the NRA programme might use confidential, detailed information about mineral stocks and economic data to calculate rent for each major mineral and the changes in values of mineral stocks. However, the agreement might stipulate that only an aggregate figure for total mining rents and changes in the total value of mineral stocks be reported. In fisheries, the NRA programme will work with the Ministry of Fisheries to process and analyze an annual survey of fishing companies that will provide the basis for an estimate of rent by species. In addition, efforts will be made to integrate these results with work that has been done at the microeconomic level on trading prices for fish quotas.

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## Appendix A. Alternative Methods of Calculating Resource Rent

The economic value of a capital asset is defined as the discounted stream of net benefits which the capital stock is expected to generate over its lifetime. This principle applies to the value of natural assets as well. Net benefit, or rent, is defined as the revenue at time t (price x quantity extracted at time t) minus the costs of exploitation at time t. There are three methods defined for the United Nations' system of environmental accounting for calculating rent: Present (discounted) value, Net price, and User-cost allowance (United Nations, 1993).

The Present discounted value method of calculating resource rent requires forecasting the net revenue in each year a resource is used and discounting it to the present time. The drawback of this method is that it requires making projections about several highly unpredictable factors: the future price of a resource, future resource availability and rates of extraction, and future costs of extraction (which are determined by future technological innovations and the future prices of inputs to extraction). The extremely high degree of uncertainty surrounding each of these factors makes this method rather difficult and unreliable to use. To consider the difficulties, one has only to look at the movements in the price of oil over the past 30 years. Mistakes have been made by many companies in projecting the oil price based on extrapolation of past trends, either over- or under-estimating future price. In addition, the choice of the discount rate is always controversial. Consequently, Present value is a rather unreliable method, except over relatively short periods and for individual extraction sites (like mines) rather than for an entire industry.

The User-cost allowance is a specialized case of the Present discounted value method which applies to depletion of exhaustible resources. This method requires fewer projections because it makes two (rather unrealistic) simplifying assumption: 1) that the net annual returns (calculated in the manner that net rent is calculated) are constant over the lifetime of the resources and 2) the rate of extraction is constant as well. Consequently, only the discount rate and the lifespan of the resource must be determined. The contribution of the User-cost allowance method is that it splits the value into two components: the part that must be reinvested in order to maintain a constant stream of income as a resource is depleted, and the part that can be consumed.

The Net-price method has already been discussed in section 2. The net-price, or net rent method is based on the well-known theoretical work of Hotelling which shows that, in a competitive market equilibrium, the net price of the marginal unit of non-renewable mineral extracted will equal the nominal interest rate. Thus, there is no need to discount future net earnings; the value of the stock is independent of when it is extracted and is equal to the current per-unit rent times the stock of the resource. While this condition may be true in the long run, there are likely to be extended periods of disequilibrium when this is not true. Despite the problems of this assumption, net price has been the method of choice by many countries because, "...given the problems in forecasting volatile mineral prices, technology, etc., this simple assumption may yield results as good or better than other methods (BEA, 1994, fn p. 54)."

Using the Net-price method, total rent can be estimated with data from the national economic accounts in the following manner:

1. Total Rent =
2. Value of output
   minus
3. Intermediate consumption
4. Compensation of employees (this includes wages, salaries, and fringe benefits paid by an employer)
5. The following components of Gross operating surplus
6. capital consumption allowance
7. a "normal"profit on invested capital stock
   plus
8. Taxes (or minus any subsidies) on production

9. Per unit rent = Total Rent/Quantity of output

10. Value of Resource Stock = Per unit rent x Quantity of economic reserves

All of the data required to calculate Total Rent are reported in the national accounts except for line 7, a normal profit. The normal profit is calculated as the product of a normal rate of return on capital (as described in section 2) and capital stock, which is compiled by the Central Statistics Bureau.

The national accounts' value-added category, Gross operating surplus, is sometimes called a "mixed-income category" because it can also include the earnings of the self-employed business owners. This type of income is included because in such businesses it is not easy to separate what the business owner earns as a return to the time he or she puts into the business and what the owner earns as a return on the capital invested in the business. In some countries, the self-employed account for a large share of production in resource sectors -- for example, the fishing industry in Norway, the United States, or some West African countries. To estimate rent under such circumstances, an effort must be made to distinguish the two components of the earnings of the self-employed. In Namibia the earnings of the self-employed in mining and fisheries are virtually zero because these industries are dominated by companies, not small-scale, self-employed operators. Consequently, this issue can be ignored for the calculation of rent.

## Appendix B. Resource Rent for Mining Based on Alternative Assumptions about a Normal Rate of Profit

The data used to calculate resource rents are given Tables B1 and B2. All economic data in Table B1 are from the published national accounts of the CSO (1996a) or from unpublished worksheets. The information about various taxes is obtained from the Ministry of Finance (1989, 1990, 1995).

**Table B1. Output, Gross Operating Surplus, Capital Stock, and Rent in Mining, 1980 to 1995**

(in millions of current Namibian dollars)

| Year | Output | Gross Operating Surplus | Capital Stock | Capital Consumption Allowance | Diamond Export Duties | Return on Capital Stock Calculated for Different Rates of Profit | | | RESOURCE RENT: Gross Operating Surplus Plus Export Levies Minus (Capital Consumption Allowance and the Return for Different Rates of Profit) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 10% | 20% | 30% | 10% | 20% | 30% |
| 1980 | 913 | 491 | 891 | 64 | 29 | 89 | 178 | 267 | 379 | 290 | 201 |
| 1981 | 706 | 294 | 987 | 72 | 18 | 99 | 197 | 296 | 144 | 45 | -53 |
| 1982 | 742 | 302 | 1122 | 85 | 22 | 112 | 224 | 337 | 124 | 12 | -101 |
| 1983 | 773 | 290 | 1209 | 96 | 23 | 121 | 242 | 363 | 94 | -27 | -147 |
| 1984 | 862 | 330 | 1224 | 101 | 21 | 122 | 245 | 367 | 127 | 5 | -117 |
| 1985 | 1228 | 630 | 1324 | 117 | 39 | 132 | 265 | 397 | 418 | 286 | 153 |
| 1986 | 1500 | 686 | 1583 | 153 | 50 | 158 | 317 | 475 | 431 | 272 | 114 |
| 1987 | 1422 | 552 | 1709 | 177 | 42 | 171 | 342 | 513 | 243 | 72 | -99 |
| 1988 | 1804 | 836 | 1919 | 206 | 64 | 192 | 384 | 576 | 497 | 306 | 114 |
| 1989 | 2243 | 1015 | 2237 | 247 | 74 | 224 | 447 | 671 | 619 | 395 | 172 |
| 1990 | 1961 | 646 | 2547 | 274 | 61 | 255 | 509 | 764 | 178 | -77 | -331 |
| 1991 | 2078 | 617 | 2633 | 285 | 91 | 263 | 527 | 790 | 156 | -107 | -370 |
| 1992 | 2179 | 624 | 2746 | 289 | 94 | 275 | 549 | 824 | 155 | -119 | -394 |
| 1993 | 1880 | 367 | 2064 | 236 | 114 | 206 | 413 | 619 | 39 | -168 | -374 |
| 1994 | 2618 | 858 | 3062 | 319 | 145 | 306 | 612 | 919 | 355 | 49 | -258 |
| 1995 | 2510 | 693 | 3088 | 330 | 108 | 309 | 618 | 926 | 203 | -106 | -415 |

Source: (CSO, 1996a, 1996c; Ministry of Finance, 1989, 1990, 1995)

**Table B2. Taxes, Royalties, and Other Fees Paid to Government by Mining, 1980 to 1995**

| | Tax on income and profit | | Other taxes, royalties, fees | Total contribution to government revenues | | |
|---|---|---|---|---|---|---|
| | Diamonds | Other Mining | Diamond | All mining | Diamonds | Other Mining |
| 1980 | 102 | 17 | 29 | 148 | 132 | 17 |
| 1981 | 35 | 2 | 18 | 55 | 53 | 2 |
| 1982 | 24 | 2 | 22 | 48 | 46 | 2 |
| 1983 | 27 | 37 | 23 | 87 | 50 | 37 |
| 1984 | 47 | 65 | 21 | 133 | 68 | 65 |
| 1985 | 50 | 153 | 39 | 242 | 89 | 153 |
| 1986 | 121 | 146 | 50 | 317 | 171 | 146 |
| 1987 | 114 | 159 | 42 | 315 | 156 | 159 |
| 1988 | 78 | 180 | 64 | 322 | 142 | 180 |
| 1989 | 132 | 157 | 74 | 363 | 206 | 157 |
| 1990 | 62 | 76 | 61 | 199 | 123 | 76 |
| 1991 | 23 | 26 | 91 | 140 | 114 | 26 |
| 1992 | 115 | 3 | 94 | 211 | 209 | 3 |
| 1993 | 182 | 6 | 114 | 302 | 296 | 6 |
| 1994 | 126 | 38 | 145 | 309 | 272 | 38 |
| 1995 | 62 | 19 | 108 | 189 | 170 | 19 |

Source: Ministry of Finance, 1989, 1990, 1995.

## Appendix C. Resource Rent for Fisheries

### Integration of Fishing and Fish Processing

In contrast to mining, there is a considerable amount of domestic processing of fish.. The fishing and fish processing activities are highly integrated and an investigation into the data in the national economic accounts for these two industries indicated that the value used to price fish as an input to fish processing was much too low. For example, between 1980 and 1995, the annual rates of return to capital stock in fish processing were often an order of magnitude higher than returns to capital in other manufacturing sectors. The average return to capital stock over the period was 127% for fish processing, ranging between 80% and 236%, while the average return for other manufacturing was only 16%, ranging from 7% to 31%.

As a result of the undervaluation of fish input to fish processing, a considerable amount of the resource rent generated by fish was inadvertently transferred to fish processing. The best way to handle this situation was to treat fishing and fish processing as a single activity for the purposes of calculating rent. The data for calculating rent from each activity are provided in this Appendix as Tables C1 and C2. The combined data and total resource rent generated by fisheries is given in Table C3.

### Capital Stock Estimates for Fishing

The capital stock in Fishing, reported in Table B1, is greater than the figures published in (CSO, 1996a) because the figures in Table B1 assume a 35-year lifespan for vessels instead of the 25-year lifespan assumed in (CSO, 1996a; personal communication with J. Redeby, Central Statistics Office, 1995). A decision was made to use the 35-year lifespan based on data about the age distribution of vessels; roughly half were over 25 years old, many more that 35 years (personal communication with D. Evans, Fisheries Statistics, 1995). The Consumption of fixed capital in Table B1 increased over the amount reported in (CSO, 1996a) by a corresponding amount. The higher capital stock estimates result in higher "normal" profits and lower rents than would have been generated under the assumption of a 25-year lifespan of capital.

**Table C1. Output, Gross Operating Surplus, Capital Stock, and Rent in Fishing, 1980 to 1995** (in millions of current Namibian dollars)

| Year | Output | Gross Operating Surplus | Capital Stock | Capital Consumption Allowance | Quota Levies | Return on Capital Stock Calculated for Different Rates of Profit | | | RESOURCE RENT Gross Operating Surplus Plus Quota Levies Minus (Capital Consumption Allowance and the Return for Different Rates of Profit) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 10% | 20% | 30% | 10% | 20% | 30% |
| 1980 | 126 | 4 | 11 | 1 | na | 1 | 2 | 3 | 3 | 2 | 1 |
| 1981 | 141 | 8 | 12 | 1 | na | 1 | 2 | 4 | 6 | 5 | 4 |
| 1982 | 190 | 16 | 14 | 1 | na | 1 | 3 | 4 | 13 | 12 | 11 |
| 1983 | 185 | 17 | 16 | 1 | na | 2 | 3 | 5 | 14 | 13 | 11 |
| 1984 | 144 | 15 | 17 | 1 | na | 2 | 3 | 5 | 12 | 11 | 9 |
| 1985 | 177 | 21 | 20 | 1 | na | 2 | 4 | 6 | 18 | 16 | 14 |
| 1986 | 158 | 22 | 27 | 1 | na | 3 | 5 | 8 | 17 | 15 | 12 |
| 1987 | 189 | 26 | 32 | 2 | na | 3 | 6 | 9 | 21 | 18 | 15 |
| 1988 | 201 | 34 | 35 | 2 | na | 4 | 7 | 11 | 28 | 25 | 21 |
| 1989 | 229 | 37 | 41 | 3 | na | 4 | 8 | 12 | 30 | 26 | 22 |
| 1990 | 336 | 22 | 48 | 3 | 38 | 5 | 10 | 14 | 52 | 48 | 43 |
| 1991 | 482 | 27 | 93 | 5 | 57 | 9 | 19 | 28 | 70 | 61 | 51 |
| 1992 | 601 | 54 | 212 | 8 | 77 | 21 | 42 | 64 | 102 | 81 | 60 |
| 1993 | 658 | 63 | 297 | 11 | 94 | 30 | 59 | 89 | 116 | 87 | 57 |
| 1994 | 668 | 95 | 329 | 13 | 109 | 33 | 66 | 99 | 151 | 125 | 92 |
| 1995 | 684 | 121 | 354 | 14 | 110 | 35 | 71 | 106 | 182 | 146 | 111 |

na: not applied in this year.

Source: CSO, 1996c

**Table C2. Output, Gross Operating Surplus, Capital Stock, and Rent in Fish Processing, 1980 to 1995** (in millions of current Namibian dollars)

| Year | Output | Gross Operating Surplus | Capital Stock | Capital Consumption Allowance | Return on Capital Stock Calculated for Different Rates of Profit | | | RESOURCE RENT Gross Operating Surplus Minus (Capital Consumption Allowance and the Return for Different Rates of Profit) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10% | 20% | 30% | 10% | 20% | 30% |
| 1980 | 32 | 11 | 12 | 2 | 1 | 2 | 4 | 9 | 8 | 6 |
| 1981 | 39 | 13 | 13 | 2 | 1 | 3 | 4 | 11 | 9 | 8 |
| 1982 | 66 | 20 | 15 | 2 | 1 | 3 | 4 | 17 | 16 | 14 |
| 1983 | 95 | 28 | 17 | 2 | 2 | 3 | 5 | 24 | 23 | 21 |
| 1984 | 77 | 19 | 18 | 2 | 2 | 4 | 6 | 16 | 14 | 12 |
| 1985 | 87 | 25 | 22 | 2 | 2 | 4 | 6 | 21 | 19 | 17 |
| 1986 | 115 | 36 | 26 | 2 | 3 | 5 | 8 | 31 | 28 | 26 |
| 1987 | 183 | 62 | 29 | 3 | 3 | 6 | 9 | 57 | 54 | 51 |
| 1988 | 195 | 63 | 34 | 3 | 3 | 7 | 10 | 57 | 54 | 50 |
| 1989 | 163 | 61 | 39 | 3 | 4 | 8 | 12 | 54 | 50 | 46 |
| 1990 | 231 | 104 | 43 | 3 | 4 | 9 | 13 | 97 | 93 | 88 |
| 1991 | 189 | 49 | 56 | 4 | 6 | 11 | 17 | 40 | 34 | 29 |
| 1992 | 327 | 134 | 153 | 9 | 15 | 31 | 46 | 109 | 94 | 79 |
| 1993 | 530 | 222 | 240 | 13 | 24 | 48 | 72 | 185 | 161 | 137 |
| 1994 | 748 | 332 | 303 | 17 | 30 | 61 | 91 | 285 | 255 | 225 |
| 1995 | 770 | 307 | 344 | 19 | 34 | 69 | 103 | 253 | 219 | 184 |

Source: CSO, 1996c.

**Table C3. Output, Gross Operating Surplus, Capital Stock and Resource Rent for Fisheries (Combined Industries of Fishing and Fish Processing), 1980 to 1995** (In millions of current Namibia dollars)

| Year | Gross Operating Surplus | Capital Stock | Capital Consumption Allowance | Quota Levies | Return on Capital Stock Calculated for Different Rates of Profit | | | **RESOURCE RENT** Calculated for Different Rates of Profit | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10% | 20% | 30% | 10% | 20% | 30% |
| 1980 | 16 | 23 | 2 | na | 2 | 5 | 7 | 12 | 9 | 7 |
| 1981 | 22 | 25 | 2 | na | 3 | 5 | 8 | 17 | 14 | 12 |
| 1982 | 36 | 29 | 2 | na | 3 | 6 | 9 | 31 | 28 | 25 |
| 1983 | 44 | 33 | 2 | na | 3 | 7 | 10 | 39 | 35 | 32 |
| 1984 | 34 | 36 | 3 | na | 4 | 7 | 11 | 28 | 25 | 21 |
| 1985 | 46 | 41 | 3 | na | 4 | 8 | 12 | 39 | 35 | 31 |
| 1986 | 57 | 52 | 4 | na | 5 | 10 | 16 | 48 | 43 | 38 |
| 1987 | 88 | 61 | 4 | na | 6 | 12 | 18 | 78 | 72 | 65 |
| 1988 | 97 | 69 | 5 | na | 7 | 14 | 21 | 85 | 78 | 71 |
| 1989 | 98 | 80 | 6 | na | 8 | 16 | 24 | 85 | 77 | 69 |
| 1990 | 126 | 91 | 6 | 38 | 9 | 18 | 27 | 149 | 140 | 131 |
| 1991 | 77 | 149 | 8 | 57 | 15 | 30 | 45 | 110 | 95 | 80 |
| 1992 | 188 | 365 | 17 | 77 | 37 | 73 | 110 | 211 | 175 | 138 |
| 1993 | 285 | 538 | 24 | 94 | 54 | 108 | 161 | 310 | 247 | 193 |
| 1994 | 427 | 632 | 30 | 109 | 63 | 126 | 190 | 443 | 380 | 317 |
| 1995 | 428 | 697 | 33 | 110 | 70 | 139 | 209 | 435 | 365 | 295 |

na: not applied in this year.

Source: Calculated from Tables C1 and C2 above

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