

The Physical Destruction of Nauru: An Example of Weak Sustainability

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I. INTRODUCTION

Basic to neoclassical economics is the sanctity of individual choice, the fungibility of economic goods and inputs, and faith in the market system to bring forth substitutes as relative prices change. These notions are part of what Joseph Schumpeter called the "pre-analytic vision" of neoclassical economics (Daly 1995) and they are central to the concept of weak sustainability, a topic of intense debate among ecological economists (Cabeza Gutés 1996; Gowdy 1997; Gowdy and O'Hara 1997; Martinez-Alier 1995; Pearce and Atkinson 1993; Tisdell 1997; Victor 1991). Weak sustainability stipulates that an economy is sustainable if its capacity to generate income for future generations, a capacity embodied in its capital stock, is maintained (Hartwick 1978; Solow 1991). The assumption of substitutability among different kinds of capital is crucial to weak sustainability. When, as in neoclassical theory, natural capital (non-renewable resources and ecological services, Folke et al. 1994) and manufactured capital are considered to be substitutes, it is permissible to focus only on total capital stock. Weak sustainability is achieved if an economy saves more than the combined depreciation of the various kinds of capital, even if it draws down its stock of natural resources (Pearce and Atkinson 1993).

An instructive example of weak sustainability in practice is the small Pacific island nation of Nauru. In 1900 phosphate was discovered on Nauru, and today as a result of just over 90 years of phosphate mining, about 80% of the island is totally devastated. At the same time, the people of Nauru have had over the past several decades one of the highest per capita incomes in the world. An examination of the causes of Nauru's current situation and the future prospects for that

country illuminates the interdependent relationships among markets, ecosystems, and human well-being, and illustrates the complexity of the arguments for and against weak sustainability. It also shows clearly that applying the weak sustainability criteria is consistent with a situation of near complete environmental devastation.

II. THE SELLING OF NAURU

Nauru is a small island, with a circumference of just under 20 kilometers, located in the central Pacific some 3,000 kilometers northeast of Australia and 40 kilometers south of the equator. Traditionally, the island supported a population of about 1,000 people living on fish and a variety of natural and cultivated crops, including coconuts and pandanus fruit (Anghie 1993).¹ Nauru was isolated from Western contact, except for the occasional runaway sailor or escaped convict, until the late 1800s. In 1886 Germany and Britain reached an agreement dividing up the islands of the southwestern Pacific, and Nauru became a German possession.

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¹ Undoubtedly, the early settlers of Nauru disrupted the existing environment they found. However, other early island cultures in the Pacific, like Nauru, reached a point where a balance was achieved between the new human species and the impacted ecosystems. Sometimes there was overshoot and collapse (Easter Island and Mangaia, for example), but in other cases the human population peaked at some sustainable level that was maintained through cultural mechanisms (Kirch 1997).

In 1900, one of the highest grades of phosphate rock ever found was discovered on Nauru. Phosphate, an absolute requirement for plant growth, is a primary ingredient in commercial fertilizers. Many soils are deficient in phosphate and almost all of Nauru's phosphate has been removed to support agriculture in Australia and elsewhere. In 1905, the German Chancellor granted the Pacific Phosphate Company the right to mine Nauru's phosphate. From 1907 until Germany lost possession of Nauru after World War I, approximately 630,000 tons of phosphate were mined from the island. The value of this phosphate was estimated to be about one million pounds sterling, of which Nauruans received about £1300 or less than one seven-hundredth of its value.² After World War I, the island came under a mandate of the League of Nations administered by Australia, New Zealand, and Great Britain. Even before the League's official mandate was given on December 17, 1920, the three nations signed the Nauru Island agreement of 1919 which not only guaranteed them the exclusive right to Nauru's phosphate, but also the right to buy the mineral at the cost of production, not at the going world price (Weeramantry 1992, 11). Following World War II, administration of the island came under a trusteeship of the United Nations, again carried out by the three mandate nations.

After almost two decades of negotiations, Nauru attained independence on January 31, 1968. Throughout the mandate period, from 1920 until 1968, Nauru was *de facto* administered by Australia. During the period from 1919 until 1968, approximately 34 million tons of phosphate, valued at about 300 million Australian dollars, were mined from Nauru. Mining continued after independence, with proceeds going to the people of Nauru, but it is estimated that the remaining phosphate reserves will be exhausted soon after the year 2000.

III. PHOSPHATE MINING AND THE TRANSFORMATION OF NAURU

The phosphate on Nauru was located in the center 80% of the island, on an elevated plateau called Topside. Phosphate mining

there involves scraping off the surface soil and removing the phosphate from between the walls and columns of ancient coral. What remains after mining are columns of coral and uneven depressions between them. The mined-out areas, except within a few feet of the gravel roads, are inaccessible to humans and totally unusable for habitation, crops, or anything else that might benefit the people of Nauru. Many of the indigenous plants and animals that inhabited Topside before mining began, including economically important species, are gone and many more are endangered (Manner, Thaman, and Hassall 1984). Apparently because of the vegetation loss on Topside, the micro climate of the island has become hotter and drier with the subsequent drop in the water table (Weeramantry 1992, 31).

Various proposals have been made to compensate the people of Nauru for the destruction of their home. Resettlement plans have been proposed, but rejected by the people of Nauru. In 1993, the people of Nauru received an out-of-court settlement of about \$A120 million from Australia for the rehabilitation of Topside (Mining Journal 1993). Rehabilitation has been considered but not seriously attempted. Even with the availability of restoration funds, it is unclear how much restoration can be accomplished and how long it will take Topside to recover enough to provide anything of value to the inhabitants of Nauru.

The process of colonization transformed the people of Nauru from a self-sufficient people, living within the constraints of the resources of Nauru, into economic persons (Rhone 1921; Wedgwood 1936a, 1936b; Weeramantry 1992). Over decades, more and more foreign foods and manufactured goods were sold in shops and through a steady process of acculturation a native market for

² The colonial attitude of the time is shown in an article the 1923–24 edition of the *British Yearbook of International Law*. Sydney University Professor A.H. Charters wrote of the small royalty payment to the people of Nauru: "The remuneration is small perhaps in the eyes of a civilized man in view of the immense value of the product in the Commonwealth, but it is not small to a child of nature who lives on coconuts and fish and sunshine." (Quoted by Angnie 1993, 500)

them was created. In time, imported foods came to be considered superior to fresh fish and fruits, and foraging became less common. As Topside was hollowed out to remove the phosphate, it was gradually lost as a source of food such as pandanus fruits, almonds, or the noddy birds that roosted in the tomano trees. With the increasing population, even fresh water had to be imported. The substitution of imported canned foods for local fresh products, the increased consumption of alcohol, and the adoption of other patterns of an industrialized-world lifestyle have adversely affected the health of the population. Life expectancy at birth for males in the early 1980s was 49 years, substantially less than that of other Pacific Islanders except for Papua New Guinea males which was also 49 years (Taylor and Thoma 1985). Nearly 30% of those over 25 and about 50% of those over 50 have diabetes (Van Atta 1997). Very high rates of heart disease and hypertension have also been reported.

Westernization would have come to Nauru without the presence of phosphate, just as it did to other Pacific Islands. The discovery of the great natural wealth of Nauru in 1900, however, meant that the Nauruans had little choice, and modernization came quickly and thoroughly. Over the course of a century, first foreigners, and then, after independence, Nauruans reduced the useful part of their homeland to a narrow strip of coastal land. Their once vibrant and unique culture has been transformed into one dependent upon a market economy.

IV. IS NAURU WEAKLY SUSTAINABLE?

Phosphate has given Nauru a high level of GDP per capita, about US\$10,000 in 1993. This compares to US\$2,400 for Papua New Guinea, US\$2,160 for Samoa, US\$2,590 for the Solomon Islands, and US\$2,160 for Tonga (The World Almanac and Book of Facts 1998). In addition to money paid directly to individuals from the mining operation, a trust fund has been established that is generally believed to be over US\$1 billion, although no official records have been made

public (Van Atta 1997). It is unlikely that any environmentally sustainable economic activity on Nauru would have generated an income flow equal to the interest income from such a large amount of money.

Although precise numbers about saving and investment rates are impossible to find for Nauru, based on the neoclassical definition Nauru appears to be weakly sustainable. Pearce and Atkinson (1993) define weak sustainability as follows. An economy is sustainable if

$$Z = [(S/Y) - (\delta_M/Y) - (\delta_N/Y)] \times 100 > 0 \quad [1]$$

where Z is an index of sustainability, S is savings, δ_M is the depreciation of manufactured capital, δ_N is the depreciation of natural capital and Y is income. According to calculations made by Pearce and Atkinson (1993, 106), the world's most sustainable economies are those of Japan, Costa Rica, and the Netherlands, with sustainability indices of 17, 15, and 14, respectively. These countries all have very high savings rates and low rates of natural capital depletion. The U.S. economy is weakly sustainable ($Z = 2$), but just barely because the U.S. savings rate is low. Interestingly, Japan and the Netherlands have, like Nauru, destroyed much of their original natural environments. This is the major reason that δ_N is so low for both countries; little natural capital is left to depreciate. This observation points to a flaw in the weak sustainability index: a country whose natural resources have been depleted will have a low depletion rate for natural capital simply because nothing is left to exploit. Weak sustainability is a short-run concept that does not take into account the environmental history of a region. It implicitly assumes that money is a substitute for anything.

Accurate and detailed economic data for Nauru are difficult to acquire because it is a very small country and also because much of the nation's financial records were destroyed in a fire in 1988 (Malik 1989). Nevertheless, it is possible to piece together an estimate of Nauru's sustainability index. The trust fund is reported to be about US\$1 billion. An 8% rate of return would yield an interest income

of \$80 million. A fairly conservative financial policy would be to reinvest one-third of the interest income (a savings rate of 33%) and live off of the other two-thirds, giving each of Nauru's 7,000 citizens an annual per capita income of US\$7,600.

In the next few years Nauru's phosphate deposits will be exhausted. When phosphate mining ceases, the depletion rate of natural capital will be zero as long as fishing stocks, the coconut trees, and other remaining environmental features are maintained. In fact, natural capital will most likely appreciate as parts of the mined-out areas are partially rehabilitated. Phosphate mining is the only significant capital-intensive economic activity on Nauru, so when that industry goes, the depreciation of manufactured capital will be negligible. Assuming that the only significant income for Nauru is the interest on their investments, this would give Nauru a sustainability index of 33 ($(S/Y) \times 100 = 33$, $\delta_M/Y = 0$, $\delta_N/Y = 0$), making Nauru one of the world's most sustainable economies, if not the most sustainable.

As speculative as these estimates for Nauru are, they illustrate that, if natural resources can be sold for a high enough price, a near-complete destruction of a nation's environment is compatible with the neoclassical definition of sustainability. It is certainly plausible, in such a case as Nauru's, for the savings rate to be substantially higher than the combined depreciation of manufactured and natural capital.

In spite of the physical destruction of the island, the negative effects of phosphate mining on the people of Nauru are tempered by the high per capita income. The Nauruans have no involuntary unemployment. Although their health is poor, it is improving with nutritional education and the excellent medical treatment that Nauruans can now afford. Several health clinics on the island, and when needed, specialized medical care is available in Australia; all free to the citizens of Nauru.³ An added benefit of living on trust fund income is that income differences are minimized; all citizens benefit from the trust fund revenues.

The traditional culture of Nauru would have been severely affected with or without

phosphate mining. But it may be that Nauruans are more free than their phosphate-poor neighbors to pursue their traditional culture because they do not have to work and have more leisure time. In the context of the new world order into which they were catapulted, and in spite of the fact that they were ruthlessly exploited, a case could be made that they are better off than if they had preserved their island home. Their phosphate-derived wealth permitted them to be full players in the world economy. This conclusion illustrates humanity's current predicament and the difficult prospects for environmental sustainability under the predominant socio-economic system. The same market logic that has permitted, perhaps driven, Nauruans to sacrifice their environment and culture for money is being played out on a planetary scale.

V. IS THE WEAK SUSTAINABILITY RULE A REASONABLE LONG-TERM POLICY?

Weak sustainability depends on the continued availability of substitutes for the natural capital that is depleted. Substitution, however, depends upon more than mere technological possibilities. It also depends upon smoothly operating markets and a culture that accepts and encourages trading and deal-making. Trade with the outside world is now essential for Nauruans to get the necessities no longer available locally. Trade is even more critical because of the increase in Nauru's population from about 1,500 in 1900 to about 10,000 (including non-citizens) in 1995. Like most places in the world, Nauru has a population much larger than its local environment can support. Survival depends on importing food and other necessities from

³ In a remarkable interpretation, an article in *Reader's Digest* titled "Paradise Squandered" (Van Atta 1997) not only blames the plight of Nauru on its inhabitants but also on its "rampant socialism." In the author's view, Nauru's devastation is not the result of imperialism or rapacious markets, but rather human nature: "Nauru's decline has to do with human nature," observes a Western diplomat. "It's what happens when incentives are taken away and people don't have to work."

other regions. For this to work: (1) the region must have something to trade for necessities or depend on charity; (2) markets and market institutions must exist to insure that the trade takes place; and (3) a surplus of the particular items needed (e.g., food, phosphate, water) must exist elsewhere.

Without the ability to trade for outside resources the population of Nauru could not be supported with local resources. With 80% of the island now in a severely degraded condition, the number of people the island's resources could support is even fewer than the 1,000 or so inhabitants that the island supported before Western contact. For Nauru, weak sustainability depends on income from financial capital. The Nauru trust fund must be kept intact so the people of Nauru can continue to live off of the interest.

Even if world economic growth continues, the specific investments of the trust fund must be growing. A major bad investment, or financial crisis in a particular sector, could substantially reduce the value of the fund. The current crisis in Asian financial markets serves as a warning about the volatility of market investments. Nauru's trust fund has suffered major losses in the past due to bad investments. For example, Air Nauru is estimated to have lost about \$US 250 million since 1970, (Van Atta 1997, 90). In 1993 at least \$US 2 million was lost in a failed musical based on the life of Leonardo da Vinci, co-written by one of Nauru's British financial advisors (*New York Times* 1995). The people of Nauru are now entirely dependent for their well-being on the stability and growth of their trust fund. Their prosperity no longer depends on the health of local resources, but on changes in real estate prices and stock market values, and on the whims of individual investors. Although natural environments are not steady and unchanging systems, the instability of market economies is expressed frequently and suddenly.

VI. SUSTAINABILITY AND THE TYRANNY OF SMALL DECISIONS

People the world over are making decisions in the same market context and with the same ultimate result as in the case of Nauru.

Although the consequences are easier to see in a small island nation like Nauru, the same process of substituting among increasingly degraded resources is happening all over the world. In a very real sense the decision to mine Nauru is the same as developing a small piece of land in upstate New York for a housing subdivision, or to log a portion of a rainforest in Indonesia, or to build a golf course in Hawaii. As resources are used up we simply move to another place and exploit the resources there.

Many cultures in the past have exhibited a pattern of increasing growth, and increasing substitution and technological complexity to compensate for resource degradation only to eventually collapse (Ponting 1991; Tainter 1988). Some suggest that the current world market culture may be different. We have an unprecedented ability not only to ferret out resources over the entire globe, but also unprecedented technologies to develop economic substitutes for natural capital. The more of the natural world we eliminate, however, the more dependent we are on the manufactured world we have created: money cannot be converted back into extinct species or their destroyed ecosystems. World culture has increased its economic wealth by transforming the biological and physical resources of planet earth into economic goods. The more we do this, the more we reduce the base that ultimately supports the pyramid of economic activity. As the case of Nauru shows, the logic of the world economy drives us toward increasing resource use and the substitution of financial and manufactured capital for natural resources.

Nauru, like most of the world, now depends on the health of the global economy for the well-being of its people, but must also face the unintended consequences of economic growth. Global warming, for example, has grave implications for the people of Nauru. If global warming predictions are correct, sea levels will rise significantly by the end of the next century. If this comes to pass, the only part of Nauru left above water may be the uninhabitable Topside.

The concept of diminishing returns is basic to economics. Diminishing returns from technology and from manufactured capital,

in the context of a shrinking natural resource base, have been shown to apply to many human societies such as those of Easter Island, Mangaia, the Mayans, Sumer, and many others (Kirch 1997; Ponting 1991). The question is, "Is our sophisticated technological society different than all the other civilizations that have collapsed in the past?" The wisdom of attempting to answer this question on a planetary scale as we are now doing, is questionable.

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