"Summary of article by Jan Tinbergen and Roefie Hueting: GNP and Market Prices: Wrong Signals for Sustainable Economic Success That Mask Environmental Destruction"

Consumer preferences dictate the goods and services that are generated in a market system. The market works efficiently and stimulates productivity, enhancing the quantity, quality and diversity of goods available to the consumer. The national income accounts were devised in the 1930s to measure the level of production and its change from year to year. While economic policy over the last forty-five years has been directed towards increasing the growth of national income, there are a number of problems with this measure as an indicator of human welfare. The increase in production of manmade goods and services has resulted in widespread environmental destruction, leading to a number of natural disasters that threaten the living conditions of future generations.

THE RELATIONSHIP BETWEEN GROWTH AND ENVIRONMENTAL DESTRUCTION

The three factors that determine the burden of increasing production on the environment are the population level, the per capita activity, and the nature of the activity. An analysis of the Dutch national accounts shows that the more burdensome an activity is for the environment, the greater is its contribution to GNP. This result is probably true for all industrialized countries. Thirty percent of activities account for seventy percent of the growth, and production and consumption in these activities harm the environment the most. These activities include oil, petrochemical, and metal industries, agriculture, public utilities, road building, transport and mining.

The adoption of all available technical measures, including end-of-pipe treatment, process-integrated changes, recycling, increasing energy efficiency, terracing agricultural slopes and sustainably managing forests, is necessary to save the environment and maintain current lifestyles as much as possible. These measures require an increase in labor input, and will therefore result in a decrease in labor productivity and an increase in product prices. However, although these measures will check the growth of GNP, unemployed workers will be absorbed into the economy.

Due to price changes, the adoption of these technical measures may result in changes in consumption activities towards environmentally benign activities, but in some cases additional changes may be required. For example, in a number of cases technical measures will not solve the problem, but will only help retard the rate of deterioration. In other cases no technical measure may be available. Therefore, in addition to technical measures, behavior patterns must

be influenced by rules, incentives and taxes. A shift in production and consumption activities towards environmentally benign activities (e.g., cycling instead of using cars) will check the growth of GNP. Saving the environment will therefore lead to lower levels of national income, but this reduction in GNP should not upset policy makers, since present GNP estimates do not account for environmental losses that result from production and consumption.

CORRECTION OF NATIONAL INCOME BASED ON SUSTAINABLE USE OF THE ENVIRONMENT

Humans are dependent on the environment, which provides a number of functions. Loss of function occurs when the use of one function by an activity is at the expense of the use of a function by another activity. When the use of one function comes wholly or partially at the sacrifice of another function, then environmental functions are scarce goods.

Shadow prices for environmental functions must be estimated to make them comparable to the prices of manmade marketed goods; this can be done by constructing supply and demand curves for environmental goods. Supply curves can be constructed by estimating the costs of measures that eliminate the burdens on the environment, arranged in order of increasing costs per unit of burden avoided. Constructing demand curves is more difficult, since preferences for environmental functions are rarely manifested via market behavior. However, since the publication of the Brundtland Report in 1987, preferences have been voiced by society in favor of sustainable environments, which opens the possibility of using standards for the sustainable use of environmental functions as a basis for these demand curve calculations.

One way to correct GNP for environmental losses is therefore to start by defining the physical standards needed to maintain the sustainable use of environmental functions, and then to identify measures for meeting these standards. The difference in GNP between systems that do and those that do not apply these measures will indicate, in monetary terms, how far society has drifted from sustainable use of the environment. This method can also be used to do cost-benefit analyses of projects with long-term environmental effects.

OUR DEBT TO FUTURE GENERATIONS

Based on energy use and the resulting CO_2 emissions, we can calculate a rough estimate of the debt owed to future generations and how it can be paid off. One approach to sustainability could be to keep the rate of consumption of fuels, expressed as a percentage of known reserves, equal to the rate of increase in the efficiency of energy use. This implies that sustainable use of fuels requires that goods be produced and consumed with ever smaller amounts of energy. For example, calculations show that in 315 years, today's output must be produced with only 0.5 percent of today's energy use if we are to achieve sustainability. It is therefore important that new technologies such as flow (solar) energy be developed. In addition, to avoid greenhouse effects world output should be reduced by half. Resources should be directed towards the development of substitutes and of technologies to improve recycling, and population growth should be reversed.