

# Neoclassical and ecological economic approaches to sustainable development



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Critically assess the Neoclassical and Ecological Economic approaches to Sustainable development. Which do you think is more useful, why?

Environmental economics is one of the fields where there are varied approaches of how to deal with the different components. There are two extreme views in this aspect of economics, namely the neoclassical approach and the ecological approach. A number of ' hybrid' approaches which incorporate aspects from each of these main approaches exist as well. When it comes to their views of sustainable development (SD), the differences between approaches continue. According to the United Nations a development is said to be sustainable when it is able to “ meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). This paper aims to first briefly explain the fundamental characteristics of both the neoclassical and ecological economic approaches to sustainable developments, then to contrast and identify the main differences and finally critically analyse which I believe is a more useful view of sustainable development.

### Neoclassical Approach

The neoclassical view, or weak sustainability view, is currently the mainstream economists' view of sustainable development. Neoclassical theory is based on marginal analysis. This assumes that individuals make decisions by comparing the changes in satisfaction or revenues to changes in cost. Natural resources are not views as a constraint on economic activity (Prato, 1998, 59). Sustainability, from a neoclassical point of view can be defined as the maximization of human welfare over time, in other words

promoting a high growth view. Some economists simplify this to the maximization of utility derived from consumption which allows for an easy measurement. This simplification, however useful, has been criticised as an oversimplification. (Harris, 2003). Broadly speaking in terms of this approach, nature and capital do not possess an intrinsic value, they are merely instruments used to achieve maximum utility. Neoclassical economists do not completely reject the view that natural resources are non-renewable, however they believe that this does not suggest that economic growth needs to be limited. (Hussen, 2004)

Neoclassical economists' view SD as a reflection of societies desire to have a non declining well-being over time. Therefore it is important to ensure that savings rates are sufficiently high enough to ensure that the available capital stock available remains constant inter-generationally. The neoclassical school of thought is based on four key assumptions: (Hussen, 2004)

Market prices are indicators of scarcity, the market system is effective and information is conveyed swiftly.

Resources have high rates of substitution

Technology developments improve the scarcity of resources

The human economy can be treated separately to the natural ecosystems which in turn is exogenously determined.

Environmental resources are valued in terms of consumer preference. This in turn is reflected via the market system. It is believed that markets

automatically adjust for scarcity via the price system. Therefore as a <https://assignbuster.com/neoclassical-and-ecological-economic-approaches-to-sustainable-development/>

resource become scarcer, its factor price will always respond to acute scarcity and the corresponding price increase will induce the development of mechanisms to prolong the factor use as well as alternatives (backstop technologies)[1]. The price system is assumed to effectively value the various resource capitals which in turn should generate the rate of substitution between resources. Neoclassics recognise the existence of externalities within the market, but feel that slight adjustments will account for these factors. (Vivien, 2008)

A key assumption of the neoclassical approach is the view that natural capital and created capital are perfect substitutes. Natural capital can be defined as all renewable and no-renewable resources such as fossil fuels, plant species and forestry. Manufactured capital, also referred to as man-made capital or created capital comprises of all products be it machines or tools used in the economic process. This form of capital can be generated from natural capital, manufactured capital or a combination of the two. Both forms of capital comprise the total capital stock. Solow (1974) in his model determining the conditions under which continual growth of an economy would be possible, the concept of finite resources did not dampen the existence of indefinite growth. Additionally, he felt that current generations can utilise these finite resources, provided they added to the manufactured capital stock (Gutés, 1995). Therefore with a high substitutability of natural for created capital, the overall capital stock may increase constantly with no end. In the Cobb-Douglas method, this unit elasticity will lead to a rising marginal and average productivity of capital, even as the ratio of natural to produced capital tends towards zero. This substitution property is one of the

key underlying requirements of most neoclassic models including that of Solow in 1974. In his works, Robert Solow identifies that an exchange takes place over time where the current generation uses more of the natural capital and in exchange provides more created capital to the future generations. One of the assumptions in the Cobb-Douglas method, which formed the basis of Hartwick's rule (1977), is that the rate of technical development must be relatively high in relation to the population growth rate and the total share of natural capital. The rents generated from the use of non-renewable natural resources must be reinvested in technical capital. This allows for an increasing, or at least constant transfer of capital through time (Faucheux et al., 1997). This approach regards sustainability as the remaining of capital constant over time, regardless of the proportion of created capital to natural capital.

Technology possesses an important role for neoclassical theory. Technology can be defined as the manner in which inputs are used to generate outputs. Therefore technological innovations are the constant generation of outputs using fewer inputs. The assumption of perfect substitutability between forms of capital eradicates the problem of resource availability within an economy. Technology is said to have no limitations to the improving of scarcity within natural resources. (Hussen. 2004)

The neoclassical view of the environment is strictly anthropogenic. Valuing the environment is done on the bases of the utility gained. The broader ecological role of natural resources is not considered in its economic value. It is the view of neoclassical economic theories that conventional national accounting calculations such as gross domestic product (GDP), reveal the <https://assignbuster.com/neoclassical-and-ecological-economic-approaches-to-sustainable-development/>

wealth of a nation. These national economic accounts record monetary flows and transactions within the economy but also signal human well being or development. The contribution of nature to the production process is ignored in these calculations. Therefore sustainability is in essence seen by neoclassical economists as a problem of managing the national portfolio of capital, maintain it at a fixed level.(Ayres et al., 1998). Pearce and Atkinson (1993) formed a sustainability index to indicate the level of SD that had occurred. This index can be defined as the difference between the savings rate and the overall depreciation rate of both natural and manufactured capital.

The final facet of neoclassical theory that will be analysed is discounting. This is a tool used to weigh the time value of money. Discounting reflects the desires of people to value current time frames more than the distant future. Discounting is an appropriate process according to the neoclassic theory as it reflects the preferences of people. In order to maximise ones utility, the opportunity costs of investment need to be weighed. In this sense, discounting is treated as rational, optimizing human behaviour. Harold Hotelling derived a rule commonly known as Hotellings rule, for determining the appropriate discount rate. According to Hotelling efficient allocation of resources inter-generationally occurs when the present value of marginal net benefits is equal across time frames. In order to determine the rate at which benefits should be discounted between two time frames Hotelling proposed the following calculation: Discount rate = the percentage difference between marginal rents or costs.

#### Objections to Neoclassical theory

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There are a number of objections to the key assumptions on which neoclassic theory is based. The main objections include, but are not limited to, the one dimensional view of the environment, the assumptions that the price system correctly reflects relevant information and the assumption of perfect substitutability between natural and manufactured capital.

Neoclassical economics views the social and biological environment in a one dimensional view namely, in the market place. At such a level, all decisions are not made in a holistic manner. Neoclassical theory therefore not only generates a poor framework for general social and environmental economic theory required for long term human existence, but if the functioning of natural capital, other than the anthropogenic ones are to be accounted for, then economic efficiency will not suffice for sustainability. (Harris, 2003).

Even if natural resources are viewed one dimensionally, Victor (1991) identifies that difficulties are experienced in attempting to establish correct prices for manufactured capital and more so when dealing with natural capital. The calculation of the total capital stock value does not account for reduction of fossil fuels, decline in biodiversity or the environmental regulating role of many natural resources. Natural resources play radically different functions in comparison with manufactured capital within the economy and this is not accounted for in the market generated capital prices. (Gowdy, O'Hara, ). The neoclassical view that sustainability is achieved provided the total capital stock is maintained is therefore detrimental to the survival of animals, plants and the natural environment. A further problem in attaining numerical values is the method of estimate the depreciation rate of natural capital and how to value the degradation of the

environment. This is a fundamental value in calculation the Pearce and Atkinson's sustainability index, Sustainability estimates by Pearce and Atkinson (1993) indicate that Japan is the most sustainable economy, Poland, Germany, The Netherlands, and the United States are said to be marginally sustainable economies. This is a surprising result to most economists. (see Martinez-Alier (1995) )

The mathematical form assumed in many of the neoclassical theories may also provide biased outcome. A greater level of substitutability than is there in reality can be implied. Forms such as the Cobb-Douglas function, allow natural resources to diminish with a constant output, provided the natural capital is replace by the manufactured capital. This elasticity of substitution is assumed to be constant and high and is argued by Daly & Costanza (1992) to have modest logical or factual support. They argue that this assumption was made for mathematical convenience rather than on a factual basis. Gutés (2005) is of the opinion that " Unless substantial empirical support exists for such a limiting assumption, the usefulness of the concept would definitely be restricted." Solow (1974) himself admits that " the presumption that the elasticity of substitution between natural resources and labour and-capital is no less than unity which would certainly be an educated guess at the moment." In highlighting his doubts in the restrictive nature of the assumptions of weak SD, Gutés (2005) poses that the purpose of weak SD could therefore rather be a base case from which economists can determine the relationship between the environment and the economy.

Discounting, not only in neoclassical theory, has attracted a large share of controversy. Discounting is acknowledged as being required to determine <https://assignbuster.com/neoclassical-and-ecological-economic-approaches-to-sustainable-development/>



relative prices in the market place, but, it places a prejudice on stocks of resources (provides smaller more constant and continuous service) in favour of monetary funds (immediate usage). Georgescu-Roegen (1976, p. 31). Furthermore, discounting is based on individuals time preferences' which is largely subjective therefore unlikely to result in a sustainable outcome being reached. Discounting allows the exhaustion of resources and environmental damage to be considered acceptable and in some cases optimal, according to the neoclassical criteria of economic efficiency. Current generations' preferences are given undue weight when considering environmental issues that usually take many years to form. Cline (1992, cited in Harris, 2003) therefore suggests that if intergenerational equity is to be achieved, low discount rates or an alternative sustainability rule needs to be adopted.

#### Ecological economic approach

Ecological economic theory is based on the interrelations and inseparability between the functions of nature, an insight into the biophysical constraints that exist, the continual combined evolution between the economy and environment that occurs at a number of levels, as well as an acknowledgement of complexity and scientific uncertainties that exist within the environment (Klaassen and Opschoor, 1991; cited in Ã-zkaynak et al., 2001). The ecological economic approach to SD also known as strong sustainability views sustainability as non-declining life opportunities (Daly and Cobb 1989, 72). SD should therefore be achieved by not merely conserving the total capital stock, but conserving human capital, technological capability, natural resources and environmental quality individually (Brekke, 1997, Cited in Ayres et. al, ).

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Ecological economic theory is based on a number of key principles; these include, but are not limited to: (Hussen, 2004)

The environmental resources that exist within the broader biosphere[2] are finite and therefore relatively scarce.

The survival of the biosphere is dependent on the acknowledgement that a mutual interdependence amongst the components exists.

The economy is a division of the larger biosphere and to assume that its purpose is a merely an input in the production process is 'dangerously misleading'.

The natural trend of technology towards simplification if the natural systems ultimately reduce the stability, resilience and reduce the diversity of ecological systems.

Ecological theory views natural capital as encompassing certain characteristics that cannot be substituted by manufactured capital. Natural capital can be broken down into two types. A portion of natural capital can be substituted by manufactured capital and may in fact be perfect substitutes, but there also exists a portion that is irreplaceable, this is often referred to as 'critical natural capital'. Ecological economists highlight that complexities that exist within the biosphere, therefore seemingly small changes may result in larger impacts. The use of marginal analysis can fail to spot such impacts (Hussen, 2004). Furthermore, performance of an economy should not be purely assessed on an efficiency criterion; factors such as

distributional and ethical considerations should be taken into account, both from a human and non-human perspective. (Daly, 1991)

Ecological theory does not deny the role of technology in expanding the usefulness of natural resources; they do however deny that through technological development, natural and manufactured capital perfectly substitutes. One of the central pillars in ecological economics is the notion that these forms of capital are complementary factors of production. Manufactured capital is created by natural resources therefore to produce more manufactured capital more natural capital is required. This is the definition of complementary factors. (Daly, 1999)

Ecological economists do not believe that the market is self-regulating and prices fully reflect the scarcity of resources. Daly argues that as growth exceeds the environment's ability to sustain that growth, an increasing number of negative externalities develop. He therefore advocates adjusting the price level of resource to adequately reflect these negative externalities. Unlike the neoclassical view that there are no upper limits on economic growth, and a high growth strategy should be promoted, Ecological economists believe that high growth will exacerbate the damage to nature and environment. This growth is most likely to lead to ecological disasters. They also argue that the notion that economic growth leads to an increase in social welfare is a weak assumption. Social welfare is not comprehensively measurable, and therefore a number of alternative calculations can be done (van den Bergh, 2000).

The ecological view is one in which the natural systems exist subject to the laws of thermodynamics, and that limits of time, space and energy will be encountered thereby limiting the upper limits of growth (Holling, 1994). This implies that specific measures other than those in the normal market need to be developed in order to conserve natural capital. This may include limits on a macroeconomic level; it is not possible for the economic system to grow beyond the boundaries of the regeneration process as well as the waste-absorption capacities of the environment (Harris, 2003). Increasing numbers of economists are realising that if the environmental resources are not included in calculations, a holistic view of the factors of production cannot be obtained. Daly has proposed an alternative to neoclassic growth theory, namely steady state economy (SSE), this model differs to that of growth theory in that it endeavours to incorporate the biophysical limits and ethical considerations highlighted by various ecological economists. It is his view that the concept of unlimited growth as adopted by neoclassic economists does not incorporate the biophysical limits that exist. Ecological economists including Daly feel that high growth is unrealistic as it does not incorporate the notion that human ambitions may surpass material wealth. Furthermore, humans are a part of a larger biosphere and through the knowledge of this, their care for future generations is not solely based on material aspects. (Hussen, 2004)

Daly (1991) has established three key objectives if SD is to be achieved from an ecological perspective:

Renewable resources should be used at a rate equal to or less than their natural rate of regeneration. Non-renewable resources should be used at a rate less than or equal to the rate of technological change

Waste flows for the economy should be less than the assimilative capacity of the environment

The revenue from non-renewable resources should partially be used to develop substitutes and partially for consumption.

Limitations of the ecological economic approach

The ecological approach, which attempts to incorporate the various facets of natural resources, experiences a number of limitations.

Although it is acknowledged that the factors of production cannot be holistically viewed without considering the biophysical impact of such usage, the integration of ecological services and their corresponding levels of degradation in the conventional national accounting calculations pose a number of problems, both in identification as well as quantifying the impact on a monetary level. As a result principles such as safe minimum standards which stipulate the levels below which plant or animal species must not fall below were established. According to this rule, reductions in the natural capital below the Safe minimum standards must be prevented provided it is socially optimal to do so. Contingent valuation methods are also used to obtain monetary values for non-market goods but these values cannot be completely accurate.

The fundamental basis of the ecological view is strongly rooted in physical laws. Little attention is placed in dealing with the socio-economic, political and technological aspects of SD. It can therefore be argued that the ecological economic approach to SD is merely the other side of the coin and provides little direction as to the practicality of achieving SD in reality.

Both the neoclassical and ecological approaches to SD highlight some meaningful aspects of SD. The neoclassical, more market orientated view however does not account for the inherent make-up of natural capital therefore ignoring the fundamental or prime characteristics of this form of capital. The assumptions within the theory are highly simplified and cannot meaningfully be adapted to reality. The Ecological is far more precautionary in terms of its view of the market system and the ability of prices to reflect scarcity. Historical analysis of market systems reflects that in some cases prices are poor indicators of scarcity and markets seldom internalise externalities without assistance. Mainstream neoclassic growth theory centres on the institutional limitations to growth alternatively ecological economists are inclined to focus on the physical foundation within the economy. The holistic integration of economics with science allows the opportunity for scientific findings to have a greater impact on policy making and political decision with regard to environmental policy. The ecological view of little or growth however is not a viable aim in my opinion. The importance of the environment and its conservation is undeniable, but other social agendas may be of priority. A delicate balance between both schools needs to be established if we are to promote both environmental and human development.