

# RESOURCE MANAGEMENT CHANGES IN THE CARIBBEAN: THE ECO-ECO-APPROACH

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Caribbean Studies in the last decade have dealt in general either with economic or with environmental problems. Integrative approaches have played a minor role. But since the beginning of the 1990s geography scholars and their studies reflect a more integrative or comprehensive approach. Investigations into the impact of hurricanes on island communities (Barker and Miller 1990; Clement 1990); the political and economic implications of the new law of the sea (Ratter and Sandner 1993); fishing conflicts or integrative agriculture (Berkes 1984; Barker 1993); water management and agricultural development (Watts 1995); sustainable development (Potter 1992; Barzetti and Rovinski (ed.) 1992; Potter and Dann 1994; Ramphall 1994); and ecotourism (Sharkey and Momsen 1995; Weaver 1994) illustrate a steady change towards new approaches in the study of economic development. These approaches show an increasing integration of the political, social and ecological perspective.

Our symposium in The Hague in August 1996 was designed to discuss these approaches and to integrate the different perspectives of society, culture, economy and ecology but also to integrate the terrestrial, coastal and marine environment. Especially on small islands, land, coast and sea have to be considered as a complex unity with a high degree of interconnectedness and interdependent influences. The three realms should not be separated by academic work or political decisions.

Growing ecological conflicts in recent years on a local, regional and global scale combined with a constant decrease in the quality of life for large parts of the earth's population have made the need for changes in development strategies substantial. The following contribution analyses resource assessment changes in the Caribbean, and illustrates the necessity for new comprehen-

sive approaches towards resource management and economic development.

Recent work in this field is influenced not only by the report of the World Commission on Environment and Development, *Our Common Future* (1987) but also by a number of discussions on holistic approaches towards ecosystem and landscape management (Urban 1994) as well as alternative economic development (Daly 1990; Daly and Townsend 1993; Meyer-Abich 1988; Sachs 1992; Strong 1980). In the meantime there is a consensus that, one, economic growth is not necessarily evenly distributed among the population and growth does not necessarily improve the quality of life for all people. Two, environmental degradation resulting from economic development can no longer be considered insignificant. The long term effects, in particular, will be destructive to the environment, the economy and society (Wackernagel and Rees 1996). And three, there must be made a distinction between economic growth and economic development, with the latter conceived as having a broader meaning than the traditional measure of economic performance (Binswanger and von Flotow 1994; Huber 1995).

Politicians and academics investigate new approaches towards so-called "sustainable development." As a whole, sustainable development has to imply the search for new strategies of development and for new definitions of environmental protection. The concept of sustainability, however, is more normative than analytical. It became the new categorical imperative of the late 20th century: "Act sustainably." Nevertheless, the fundamental question remains: How do we act sustainably? Nobody really knows what sustainable action or sustainable development means in daily life. The transformation of ideas into strategies and actions is still weak.

## 1. Changes In Resource Perception

Resources are the basis for any kind of economic development. Therefore, the analysis, assessment and management of resources becomes crucial. In this context we have to achieve a new understanding of resources and of environmental protection incorporating them into our life styles and our economic considerations. Common assumptions about the relationship between the environment and development, and thus between humans and nature, will have to be reconsidered. There are three premises which must be assessed:

*First*, we have to acknowledge that resources depend on the interest and perception of the stakeholders.

*Second*, we have to reconsider our resource management strategies making them more comprehensive, taking into consideration the complexity of development systems.

*Third*, we have to come to the conviction that concern for the environment is not necessarily contrary to development.

Perception of resources and consequently resource uses change over time. The famous Zimmermann phrase is still valid: "Resources are not, they become" (Zimmermann 1951). Stakeholders' interests, societal needs and technological possibilities together shape resource use (Mitchell 1995).

### *The case of the Turks & Caicos Islands*

The Turks & Caicos Islands are a group of islands in the northern Caribbean, south of the Bahamas and north of the island of Hispaniola. Geologically the islands belong to the Grand Bahamas Bank, consisting of coralline limestone from the tertiary period. They are predominantly flat and low. The highest elevation is Flamingo Hill on East Caicos at 50 m above sea level (Figure 1).

The Turks Islands include Grand Turk the capital and governmental site, Salt Cay and surrounding uninhabited smaller cays. They are separated from the Caicos Islands by the 40 km wide Turks Island Passage, a

channel which is about 2,000 m deep. The Caicos Islands are lined up like a necklace on the edge of a shallow submarine bank, the Caicos Bank. Of the more than 30 low-lying islands and numerous cays in the group only 8 are inhabited. The total land area of the inhabited islands and cays is about 380 km<sup>2</sup>.

The Turks and the Caicos islands have different types of terrestrial ecosystems. Both island groups have been altered throughout the centuries by anthropogenic impacts. The Turks Islands, Grand Turk, Salt Cay and later South Caicos, were occupied by Bermudians of British descent from the 1678 onwards. At first they came seasonally to gather salt that dried in the islands' lagoons. Later they enhanced the natural salinas with the construction of pond systems, controlling the flow of water with windmill-powered sluices (Pusey 1897; Sadler 1988/89; Smithers 1990). Salt was the resource and salt production the main economic sector.

Since the trees on the islands, mostly mahogany and casuarinas, encouraged rainfall, they were cleared in order to prevent disturbance of the salt production process. The result of this clear cutting carried out by the Bermudians - a very dry ecosystem dominated by scrub and bush - is still visible today. There is no ground water on the Turks Islands. Drinking water can only be obtained by collecting and storing seasonal rainfall in cisterns.

The Caicos Islands, with slightly more rainfall, small ground water resources and potential for agricultural use, were first used by British Loyalists who left North America during the War of Independence in the 1780s. They emigrated with their slaves from the southern British Colonies via Florida to the Bahama islands and further south to grow cotton and sugar (Kozy 1990). Agrarian resources became important on the Caicos Islands.

However, the plantations survived for only two or three decades. Soil exhaustion, insects and hurricanes led to their abandonment. When the planters went to Britain or died on the islands they left behind their slaves who tried to survive by means of subsistence farming on the abandoned plan-

tation lands. East and West Caicos have now been uninhabited for decades, while agriculture still exists on a more or less subsistence basis on North and Middle Caicos.

After the activities of the Loyalists ceased, the Caicos Islands sunk into obscurity, while the Bermudians continued to dominate the economic and political development of the Turks Islands.

In 1873 the islands were annexed by Jamaica after a severe depression in the salt trade. This rule lasted until 1962 when Jamaica became independent and the Turks & Caicos were placed under the authority of the Governor of the Bahamas. Finally, with the independence of the Bahamas in 1973, the Turks & Caicos Islands decided to stay with the British Crown and became a Dependent Territory with internal self-administration.

During the centuries the external contact of the Turks & Caicos Islands - situated on the outer edge of the Caribbean - was limited to the Bermudian salt traders, to passing Jamaican mail boats and minimal conch trade with Haiti to the south (Doran 1958).

After World War II the Turks & Caicos Islands became a resource for US strategic interests in the region. The *forgotten islands* were integrated into a regional context by the establishment of three US Army and Navy bases on Grand Turk and South Caicos. However, this interest lasted only a short time. In the 1970s when the Turks & Caicos government expressed the desire that the US Army should leave the islands, the US welcomed the idea and left. Not long afterwards it became obvious that this withdrawal led to a great loss of revenue and jobs. This was especially hard after the demise of the salt industry on Grand Turk in 1964 which had been the main source of export revenue for centuries.

The export of fresh conch and lobster, starting in the years after the Second World War, was not able to replace the salt trade in revenue or job provision. The effects of over-fishing led to a decline in this industry which was already visible in the 1970s. Thousands of Turks & Caicos islanders left for the Bahamas or the US in their fight for survival.

The discovery of Providenciales in 1966 as a hideaway for US holiday seekers led to the development of a new resource base. A lease-purchase agreement between the British and the local government on one side, and Provident Ltd. on the other side started a tourist development. The private investment group received permission to lease 4,000 acres of Crown land in exchange for the construction of an airstrip, the provision of roads linking the settlements of Blue Hills, The Bight and Five Cays, the erection of a hotel with at least 10 rooms, dredging Sellars Pond and digging a channel from the ocean to the pond which was then to be used as a harbour. The required infrastructural works were completed by 1971 and since then tourism - concentrated on Providenciales - has become the main economic sector for the Turks & Caicos Islands. The opening of a Club Med in 1984 constituted the second major developmental thrust. Sun, sand and sea became the most recent resource base for economic development.

Today the total population of the islands amounts to 12,350 (Census 1990, Government Statistical Unit 1993). Providenciales with 5,586 inhabitants is the most populous island. It also has the biggest expatriate population which continues to increase, because of the rapid growth of the tourism industry. Even former emigrants come back to Providenciales from the Bahamas to participate in the new development. All the other islands tend to have decreasing population. Grand Turk had 3,761 inhabitants, North Caicos 1,303, Middle Caicos 272, South Caicos 1,217 and Salt Cay 211 according to the 1990 census (Government Statistical Unit 1993).

There is another economic sector which should be mentioned. Offshore financial services, which have been developed since the mid 1980s, are becoming an increasingly important economic factor. The success that other Caribbean Islands have had with the establishment of an offshore financial sector induced the government of the Turks & Caicos Islands to follow the example (Hampton 1994; Possekel 1994; Roberts 1995; Ungefehr 1988) However, similar to the tourism sector this sector is dominated by expatriates

coming from the UK, Canada or the US. Most of the islanders have very little idea what offshore financial services are, so this sector can be considered as an *island* on the islands.

Changing interests coupled with changing technologies and market possibilities have altered the perception of resources over the years. A resource extraction period (salt as a saleable resource) was followed by an agricultural period of producing cash crops for the international market (island cotton and sugar). The turning towards marine resources started with the extraction of fish, conch and lobster - as well mainly for export. The trend towards an integration into the global market was continued by the establishment of an international tourism industry - using sun, sand and sea as a resource - and paramounted in participating in the global financial business utilising the advantage of being outside big taxes and governments. Though the ecological configuration of the islands have changed little since the 18th century, what was once viewed as a source for salt and subsistence agriculture is now a popular tourist and offshore business destination.

## 2. Complex Island Systems

The example of the Turks & Caicos Islands shows how different resources were valued over time. Each new perspective encourages new development strategies and consequently each new resource needs a special management approach.

On small islands the effects of development become much more drastic and obvious than on large land masses. This leads to the second premise: in a comprehensive development strategy the complexity of an island system must be taken under consideration.

*Complex* or *complexity* can mean different things. In this context complex has to be seen as different from complicated. A system is composed of different elements. A complicated system has many different types of elements but not necessarily many different relationships between these elements. In contrast, a complex system has many ele-

ments of many different types as well as many different types of relationships between them (compare Casti 1995; Lewis 1992).

A complex system is defined by the different relationships between the different elements and the forces of influence these relationships exert. In order to understand a complex system "...we must start asking about the interactions between natural and social systems... We must attempt to understand the mechanisms that keep the inter-connecting systems both individually and collectively (on the edge of chaos)" in balance (Dempster 1996, p.5). Economic and social processes can be better understood with the insight that they are lively processes of self-regulation in a mutual interaction of creativity and tradition (Waldrop 1992). The Science of Complexity teaches us that we must see how reality is and not how it ought to be. The function of a complex system is best understood as a process or a game in which we take part and at the same time the rules and regulations vary continuously so that you are obliged to discover the changes and new rules at any time (Waldrop 1992).

A complex resource management concept is therefore a resource management concept which takes into consideration the multitude of relationships between all relevant elements of the system. And to understand an island complexity one has to consider the following:

1. The size of an island does not limit the complexity of the system. Understanding requires analysis of just as many sectors on a small island as in a larger area. The ecology, economy, society, politics, administrative organisations, traditions, behaviours, and foreign relations all together form the island's system. The only thing which is limited is the size of each sector.

2. We also have to keep in mind the ecological system which forms a special unit with very close interactions and mutual influences (compare Lynch 1987; Urban 1994). Land, coast and sea should not be seen as separate, especially on small islands. This can be best illustrated by the chain reaction of clear cutting, land/soil erosion and reef

destruction and consequently its direct influence on beach erosion.

### *Island complexity on the Turks & Caicos Islands*

On the Turks & Caicos Islands, as in other places in the Caribbean, there seems to be only one promising direction for recent economic development: The Tourism Industry. It is considered to be a clean and easy-to-handle industry. Tourism dominates the economic structure in this area of the world - at least since the 80s. When the tourism industry is the only or the main economic sector on an island, it is very important to protect the basis of this industry and find ways to sustainably develop the resources (Ratter 1994). The resources which form the basis for development are the natural beauty; the sand, sun and sea; and sometimes special endemic or rare species or natural attractions like waterfalls and blue lagoons.

The people on the Turks & Caicos Islands historically tend to focus on marine and marine related economic sectors. Salt production and fishery have been dominant for centuries. There continues to be a strong emphasis on the marine environment and the coastal zones with the economic interest concentrating on fishing and tourism. The islanders seem to consider land, coast and sea as functioning independently.

This alone is not negative. A monolinear perspective - land or sea perspective - can be positive if appropriate methods of development are selected. However, the strong emphasis on tourism on the Turks & Caicos Islands has already had a negative impact on the islands' terrestrial and marine environment.

The long forgotten island Providenciales (Figure 2) has turned into the innovative centre of the archipelago over the last ten years. Provo is the biggest island with beautiful white sandy beaches, crystalline clear turquoise water and a magnificent surrounding reef.

The real thrust of the tourist development could be seen in 1984 when Club Med started

investing on the island. Since then the number of tourists has risen considerably. In 1987 there were already 28,100 arrivals on Provo alone. In 1993 the TCI had estimated earnings of US\$ 71 million in the tourism sector. And in 1995 the figure of tourist arrivals on the Turks & Caicos Islands rose to 78,957 (Tourist Board 1996). There is a kind of gold-rush feeling for incoming investors and the local industries. Provo has become *the* attractive centre that people move to, from the other islands.

However, conflicts arise, when it comes to the utilisation of the space available. For example at the main beach in Provo, interests of scuba divers and snorkelers collide with those of jet ski drivers who again bother swimmers or sun bathers looking for tranquillity. There is now a growing concern that the reef is being seriously damaged by over-use.

Apart from these very obvious conflicts in the coastal and marine area, there are some unnoticed but already existing problems on the island's terrestrial area:

The large number of tourists creates an extensive demand for fresh water, on an island where there are hardly any natural fresh water reserves. Most of the fresh water has to be collected in cisterns. The very few fresh water lenses have to be handled very carefully. The purchase of water from the Dominican Republic had to be stopped because the water quality suffered during transport. There is a private desalination plant on the island which was built to supply the golf course. The surplus can be purchased by local people, but the water produced is very expensive. There is also the question of where and how to dispose of the residues with their high salt concentration.

A further problem is the sewage treatment. The traditional septic tanks are no longer suitable for the growing population and the increasing number of tourists. Too many tanks, not sealed at the bottom, are dangerous to the ground underneath and consequently to the ecological system in general.

According to different officials, the population in certain areas suffers from

dental disease due to high concentrations of fluorine in fresh water. We have heard about infectious diseases in the Haitian community living under poor conditions - "a ticking bomb" one health officer declared.

Another problem is the supply of food for tourists and locals on an island where agricultural production is hardly possible. This problem has been solved so far by importing 100 per cent of the food products, mainly from the US. But this produces a huge amount of garbage on the island. There is no concept for solving the problem of waste disposal. The only way to deal with it is to burn the garbage on the only existing and unprotected landfill which is also not sealed at the bottom. There are no facilities for recycling materials or for incinerating less toxic substances. There is also little concern about the damage the landfill, based on limestone can cause to the ground water and consequently to the reefs.

This all sounds terrible but tourism on Provo is still attractive because of the fabulous reef and the beautiful beaches. *If* the negative impacts of tourism is growing to an extent that the reef is killed and the beaches are destroyed, then not only the reef is dead but the basis of the main industry of Provo has destroyed itself. This will have a domino effect on the construction industry, fishery and even on the most recently developed industry: the offshore financial services. "Money is a terrible coward." When the circumstances on the legal side and/or on the environmental side are no longer favourable, the move of a fax machine and laptop computer to another island can easily be arranged.

Even by concentrating on only one sector of economic development, tourism, one can see that there is a need for a complex and comprehensive resource management approach. The picture is even more complicated when the other economic sectors are considered as well.

The protection of nature is more than an end in itself or the dream of fanatic *Greens*. Environmental protection and methods for the proper management of resources are fundamental for preserving the basis of

economic development. However, the protection of nature cannot be restricted to closing off some uninhabited areas for untouched preservation and practising "business as usual" in the rest of the country. It is essential to respect the complexity of the mutual impacts.

There is a need for resource management changes. Comparable to the "total cost accounting approach" it has to be recognised the complexity of the system and comprehensively assess the resource base. Economic development with a single focus shows long term negative effects as has been shown in the past. Tourism can not be the only solution to economic problems. Protection of the environment has to be part of any development strategy.

The question is: how can we achieve new integrated development strategies?

### 3. The Eco-Eco-Approach

The idea of the "Eco-Eco-Approach" goes back to the Eco-Eco-Group, a body of young scientists and economists from a variety of disciplines who banded together in 1984 at the suggestion of a young Swedish economist, Johan Ashuvud. The forum's aim was to integrate different views on how society can continue to achieve economic development while at the same time protecting the ecological base on which such development depends (Folke and Kaberger 1991b). In this context integrating the ecological and the economic perspective can mean two things. One, *economising the ecology* and two, *ecologising the economy* (Archibugi and Nijkamp 1990; Svedin and Aniansson 1992).

#### Economising The Ecology

This option reflects the attempt to assign real costs to natural resources. This is one method for finding a different approach towards economic development (Bojö, Mäler and Unemo 1992).

Economic hard-liners like Peter Saunders (1995) declare: "Some of the problems identi-

fied by the green movement are real, and they demand a response, but this does not mean that the time has come to turn off the capitalist growth machine. The growth of capitalist economies will continue to cause environmental problems, but continuing economic growth and technical innovation within a context of market relations and private property rights arguably offers our best hope for overcoming them." (Saunders 1995, p.76)

Saunders' argument is to privatise common property such as whales in the open sea or elephants in the parks of Zimbabwe. This ensures that there is a responsible owner as well as a price to be paid for use of the *resource*. The idea is to overcome the tragedy of the commons by establishing private responsibility and ownership. The argument is that without clearly defined property rights, resources will be overexploited. "When resources have a market value and can be bought and sold as private property, they tend not to disappear, for owners then have an interest in maintaining and reproducing them." (Saunders 1995, p.70)

A second approach in this context looks for opportunities to incorporate externalities into the market. For example, in California in 1994 the government introduced the "polluter pays" principle and created a market in tradable pollution permits. A regional Clean Air Incentive Market was established to allocate pollution credits among the 390 companies which produce most of the industrial pollution in the area. Each credit allows a certain amount of emission. Companies who manage to stay below this limit can trade the rights at auctions. The principle makes sure that the "marginal external costs," which would typically be ignored, are taken into account in the cost-benefit analysis of a company. The argument here is that through the introduction of a market for pollution permits, a company can maximise their profits by minimising pollution (Anderson and Leal 1991).

A third approach is to play with the green ethic of consumerism. A growing public awareness has made it profitable to create environmentally friendly products and target

this special market. One international example is the British "Body Shop" which has achieved remarkable success by concentrating on a product line claimed to be environmentally and socially friendly. There are many other examples of big industrial firms which spend millions of dollars in environmental programmes and advertise their concern in public.

These approaches sound promising, just as any change of approach can be considered as promising. Behind these *capitalist* ideas of economising the ecology there is at least one important insight: There is no natural law that people behave rationally and responsibly. The individual self-interest has proven to be bigger than the collective responsibility for the society or for the environment. And furthermore, if there is no bottom-up understanding a top-down regulation will not show any success in the long run. As Saunders puts it: "The tragedy of the commons has less to do with the absence of government regulation on how the commons may be used than with the absence of any identifiable proprietorial interest in them... Government controls should be tried only when market-based solutions have proved inadequate." (Saunders 1995, p.70)

Nevertheless, putting a price label on natural goods can not be the single solution for our current environmental conflicts. And applying the polluter pays principle cannot work in all situations. The problem with assigning market value to all natural elements is at least twofold. First, not all elements are wanted by man, but are essential parts of the ecosystem. Second, not all elements can be owned and exchanged between people, e.g. the atmosphere or the oceans. Even Saunders declares: "Not all of the world's environmental problems can be resolved by pricing and privatising resources, nor might we find technological solutions in every case, but lasting solutions are more likely to be found by governments working with the grain of individual self-interest as revealed in market behaviour, rather than against it." (Saunders 1995, p.76).

The complementary approach to these market oriented ones would be to search for

ways to integrate ecological thoughts into economic politics or searching for a way to *ecologise* the economy.

### Ecologising The Economy

The Eco-Eco-Approach is based on the premises that there is a "...need to make economics more cognisant of ecological impacts and dependencies; the need to make ecology more sensitive to economic forces, incentives, and constraints; and the need to treat integrated economic-ecological systems with a common (but diverse) set of conceptual and analytical tools." (Folke and Kaberger 1991a, p.285).

In this context ecologising the economy becomes an alternative that seeks to merge social, economic, and ecological concerns into an integrated concept of development. For the Eco-Eco-Group "eco-development" - with "eco" standing for both economy and ecology<sup>1</sup> - is an approach for reconciling the human-nature relationship in terms of development which consciously draws upon knowledge from various social science disciplines. Economic studies "...increasingly have to deal with societal mechanisms, development strategies and their political contexts, the dynamics of national and multinational companies and of interest groups." (Svedin 1991, p.15)

This understanding reflects the above mentioned complex approach towards resource management. Both approaches recognise the fundamental importance of integrating social, political and environmental considerations in the context of an economic analysis. Therefore, eco-development as well as complex resource management requires several steps to understand, to assess and to manage resources and consequently to manage economic development adequately.

An understanding requires a behavioural analysis of the resource perception in the respective community. And there is also a need for a political analysis of the scope of action of politicians and decision-makers. A suitable management concept requires: the allocation and assessment of resources; the

acceptance of complex system structures and forces; the realisation of necessary initial and monitoring impact studies; the evaluation and integration of environmental education in order to create a common understanding for management requirements; and the analysis of potentials and constraints of international economic forces.

#### *Ideas for the eco-development of the Turks & Caicos Islands*

Assuming that the Turks & Caicos Islands have decided on tourism as the base for economic development, a suitable management concept has to take into consideration the following findings:

1. The resource base is the natural environment, sun, sand and sea. This must be consciously accepted by the population and the stakeholders. It also must be accepted that environmental protection of the three realms, land, coast and sea, is crucial and integrative part of a resource management concept. In this context passing environmental laws can not be sufficient. The introduction of concepts to privatise common property and the application of the polluter pays principle can contribute to an ecologically more sound behaviour on the islands. For example the "adopt a coral reef" idea could be one way of involving money-making hotels in the resource protection strategy.

2. In order to develop a broad base of acceptance and support for a resource management concept it is necessary to gain active participation of the local population. This can be reached via special participation programmes at an early stage as well as long term education programmes. The introduction of the Rock Iguana (*Cyclusa carinata*) by the National Trust as an environmental education symbol might be a first step in that direction.

3. The benefit of a green ethic of consumerism could be put to use within a resource management strategy. This can be achieved by the introduction of a *real* concept of ecotourism that targets the respective interna-



tional market niche. Real ecotourism justifies nature protection economically. The tourist pays for a healthy environment.

4. It is important to respect complex structures. This means also that economic diversification is crucial in order not to depend on only one economic sector. Complementary sectors should be developed and help to create a broader base for economic development. Adequate sectors could be offshore financial services, data processing, small industrial production, hydroponic farming, aquaculture, etc. However, it is important to keep capital investment minor especially in sectors where the profits flee the islands and involve the local population on all levels of production and management.

5. Sustainable development needs growth management. Growth to an extent where the resource base is ruined, has to be recognised as counterproductive. Initial impact studies and monitoring must support sound development processes (Gill and Williams 1991).

These are cornerstones of a possible sustainable development on the Turks & Caicos Islands. In general, the complex unity and mutual impacts have to be respected and a suitable management concept has to be developed in order not to disturb the basis for economic development in a time where future resources are not yet identified. However, untruthful concepts half-heartedly applied will hit back in the long run by disturbing the resource base and consequently disturb a sound economic development.

#### 4. Conclusion

An "Eco-Eco-Approach" can offer new methods for integrating economic and ecological systems. The two systems must be recognised as a cohesive unit which together provide a foundation for development. Methods for applying the sustainability principle must, therefore, incorporate the two perspectives. The Turks & Caicos Islands example illustrates both the need and the potential for complex and comprehensive approaches to resource management. Practi-

cal application of these ideas, however, will require interpreters who can encourage mutual understanding and overcome disciplinary boundaries. Geographers can play this role, acting as the "missing link" between ecology and economics. It is essential to recognise and understand changing perspectives on resources, economic influences and the unitary nature of land, coast and sea. The education of geographers on both sides in human as well as in natural science helps to understand and to interpret these links. In a complex system the different types of relationship between the different systems are just as important as the system itself. By understanding the complexity of island, and other, systems, geographers can aid in bridging the gap between ecology and economics, through development of complex approaches to resource management that can create the potential for sustainable development.

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#### *Notes*

- <sup>1</sup> The term "eco-development" was introduced by Strong (1980) but caused many critiques of being misleading because of the double meaning of "eco" - standing for ecology and economy - (compare Sachs 1992). In contrary to this discussion the Eco-Eco-Group considered this semantical twofold as fortunate and appropriate.

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