

Chile Litoral

DIÁLOGO CIENTÍFICO SOBRE LOS ECOSISTEMAS COSTEROS

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Education-Learning for the Natural History of the Coastal Region of Chile

JANIS ROZE¹

INTRODUCTION

New winds are bringing new perception of what our world is all about and the importance of understanding and learning about nature and the human environment in which our society is functioning. Many countries like Chile are awakening to the fact that we are living off from the generosity of the earth, Mother Earth, or Pachamama, as the Andean peoples call it. While she has been richly making available her resources for the "metabolism of the civilization", we, in turn, have been lately behaving like spoiled children spending all, dirtying all, and wasting an inheritance that must also take care of the generations of come – our children, grandchildren, great grandchildren. It is education, more specifically education about nature that emerges as a powerful tool for learning to use judiciously nature's bounty, thus "saving the earth" for us and for the future generations.

The 6435 kilometers of Chilean coastline with over 3000 hilly islands, principally in southern Chile, and its 8150 square kilometers of territorial waters require a very special scientific-educational understanding and treatment. The knowledge to be shared includes such unique issues of Chile as (a) the proportionally longest national coastline of the world, considered as length of coastline versus size of the land area, (b) the triangle nature of the Chilean national territory: mainland-Pacific islands-Antarctica that extend from the tropics to the South Pole, and (c) the ecological diversity from the desertic Atacama, temperate region coastline with its forests and surrounded by some of the cleanest, coolest and richest fisheries waters, to the frozen polar region. The overall

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Chilean coast assessment is provided by Hellman and Morales (2003) offering a multidisciplinary approach to the region. Education about natural history of the coastal zone of Chile is the foundation for any balanced human-nature relationships, be it socioeconomic, esthetical, touristic, or any other mode. This relationship has four important and interdependent ingredients: information, education, research and advocacy, to which we can add care and love for nature.

EDUCATION AND NATURAL HISTORY

The modern concept of environmental education invites to recognize and treat aquatic and coastal environment as a resource that belongs to the entire nation. When we refer to teaching natural history of the coastal waters of Chile, it is not so much to pass on information –which is also important– but to impart knowledge that offers theoretical and practical understanding and enriches mind and heart. To learn about nature well is to care for it; this is equally appropriate for the patriotic, poetic, economical, political, artistic and religious groups of the land. It is useful to distinguish between environmental education and environmental information as two important aspects of dealing with nature, as outlined by the North Carolina Office of Environmental Education:

ENVIRONMENTAL EDUCATION

- Increases public awareness and knowledge about environmental issues.
- Provides skills to make informed decision and take responsible actions.
- Does not advocate a particular viewpoint or course of action.
- Teaches individuals how to weigh various sides of an issue through critical thinking
- Enhances their own problem-solving skills.

ENVIRONMENTAL INFORMATION

- May provide facts or opinions about environmental issues or problems, but may not enhance critical thinking, problem solving or decision-making skills.

- Is an essential element of any educational effort.
- Is not, by itself, environmental education.

Environmental education does not encompass such issues as environmental advocacy, provide technical assistance to groups and interested third parties, nor does it advance, nor defend biased appreciation or interpretation. These are offered by other professions or socioeconomic interest groups.

Multifaceted education about the natural history of the area has to be delivered by educators, natural and social scientists and conservationists, with active participation of politicians, economists, religious and community leaders, businessmen and corporations, navy personnel, fishermen, farmers, as well as cultural and artistic personalities. All are simultaneously educators and apprentices of the natural history of Chile, its generosity, its richness, its beauty, and also its endangerment. While metals, minerals, forests, fruits and wine are the main bounty of the land that provide the bulk of Chile's external and internal revenues, coastal zone contributes a significant part to it. Aquaculture and fisheries comprise about 12% of country's export plus their great importance in local economy. The appreciation and rational use of the natural history of these resources has to be correctly understood and treated.

The most important group that can teach about natural history of the land and waters well is the educators on all levels of schooling. Chile as one of the most educated nations of Latin America has a cadre of educators, from universities down that must and have in part assumed a leading role in teaching about natural history of the land. To demonstrate the exceptional ecology of the coastal zone a comprehensive education and communication should incorporate teaching-exploration on all levels of the educational system, formal as well as informal. Education must cover all aspects of natural history of Chile, including conspicuously animals, plants and ecology of the coastal zone, as well as the rest of the land. To learn about the Atacama desert ecosystems and its dwellers, the Chilean palm forests and the remarkable *Sclerophyllum* associations of somewhat more xerophytic areas, the Andean mountain ecosystems, the araucaria forests and the alerce regions is important. The aquatic world of lakes and rivers, for their freshwater life lines of the country, estuaries, for their importance in aquatic food chains and ecological productivity, and the clean coastal waters that offer so much beauty and usefulness for aquaculture and fisheries are to be appreciate for their unusual natural history. Most Chileans do not realize that their forests

are extraordinary and completely unique in the world. Many travelers and tourists enjoy and value this Chilean natural history uniqueness. No less intriguing are the lakes, estuaries and marine world.

The most effective levels of teaching about nature are the preschool and primary school levels, perhaps up to the first years of secondary school. Children and young adults can learn best about trees, and animals, and fish, and butterflies because they still have the ability to wonder about life and nature, a sense that most adults have lost. Care and love for nature can not be taught but can be invoked by sharing a deeper sense of the beauty and richness of the surrounding natural environment of Chile with its magnificent forests, mountains and the long stretch of changing shoreline and its flora and fauna. This does not exempt anybody from teaching and learning about natural history, anybody who has understanding, expertise and experience in dealing with nature and human relationships to it.

Recognizing the importance of the coastal zone and the ocean, several Chilean educational institutions on university level offer a variety of courses or programs in oceanography, marine sciences, fisheries and related subjects. The Maritime University of Viña del Mar is dedicated exclusively to the issues of the sea. It offers a comprehensive program covering theoretical and practical aspects of the sea and the coastal zones. Postgraduate advanced courses with international cooperation are offered by the Universidad de Concepción, sponsored by UNESCO, Ministry of Education of Chile, Department of Fisheries of Canada, US Office of Naval Research, German Academic Exchange Program, and several other entities. In 2003-2004 the university offers courses that cover a variety of themes, including remote sensing, ecology of microorganisms, ocean dynamics, fisheries and climate. This university has an active Facultad de Ciencias Naturales y Oceanográficas, while Universidad Austral de Chile has an Escuela de Biología Marina and other programs. One important task of the universities is to provide well trained natural scientists, ecologists, marine biologists, environmentalists and other professionals that would advance understanding, research and teaching of the dynamics of nature history, natural resources and their rational use. As stated by Hellman and Morales (2003).

“Given the multiplication of ecological issues in the last decade in Chile as a result of economic development and industrialization, increased urbanization, and infrastructure development (energy and roads), there is an urgent need to augment the number of ecologists. Ecological education must be emphasized from the very beginning and not only at

college and graduate levels; also there must be an integral approach to education in which not only are the disciplines integrated into research teams, but also other professionals (e.g. lawyers, economists) from both public and private sectors educated and sensitized to ecological issues”.

APPROACHES TO TEACHING NATURAL HISTORY

In light of the critical moment of history in terms of human relationships to environment, the teaching-learning process about natural history and its impact on human affairs has not been adequate. When the clear, cool waters of coastal Chile will be irreversibly contaminated by excessive industrial fisheries, the shellfish beds exhausted, and most forests transformed into wood chips it will be too late for learning about ecological resiliency and its delicate balance. When Bío-Bío River and its surroundings will not be able to self-purify from the industrial-agricultural stress the sea-estuary-fresh water interface will begin to collapse. The challenge for the nation is to recognize that as much as the marine resources are needed for economic development the natural environment is subjected to a stress that can not go on for a long time. Most likely a large percentage of the population has a love for their country and its nature but do not have a clear understanding and do not know what are the issues, problems and opportunities to be considered. They have not been able to voice their perceptions and express their concerns in concrete actions.

This invites to think radically, even heretically about education of natural history, its contemporary power, its limitations and its future opportunities.

We would ask who cares for nature and appreciates its uniqueness in Chile, beyond its exploitation and use in socioeconomic development of the nation? Who is concerned about the cleanness of the coastal waters, the riches of its natural resources and has a clarity that they should benefit not only this generation but the generations to come? Who are the wise leaders and heads of large and small corporations and institutions who can promote plans and schemes that would optimize the revenues while respecting the natural history of the land?

An important social group that is emerging as champions for nature history are the young people. Their challenge to the nation is to find ways to protect and better appreciate Chilean patrimony of the nature and its coastal regions. This poses an opportunity for an intergenera-

tional dialogue based on well informed thinking and action pro-natura. Several million people living and earning their livelihood in the coast of Chile from Arica to Punta Arenas would benefit from learning more about their world. This projects education of natural history as one of the important steps that would educate people and also dignify them.

Three different somewhat interdependent approaches to education of natural history offer an overview of the possibilities of meeting the current and future needs of dealing constructively with nature (Roze, 1999).

Education of Maintenance. It is basically today's education geared to transmit information and knowledge of what is presently known and possible. Its emphasis is on information and "learning by heart". Part of the intent is to learn about the natural history of the land or coastal waters. It is also a system that maintains and transmits the existing political, social and economic systems and cultural values that deal with nature and natural resources. It can also be called "education of homeostasis" (education to maintain steady states, or reinforce the existing system) as it educates within existing thinking and knowledge using values of the predominant sociocultural system of the land. To learn about the structure and function of nature is part of this approach. Maintenance education teaches, for example that sharks might be dangerous, salmon are edible, that macro-algae (*Macrocystis*) are important for fish communities in southern Chile (Moreno and Jarra, 1984), or temperate region forests of Chile have to be protected (Armesto, et al, 1998).

Education of Innovation, is an education open to creativity and innovation, to solve unknown problems and to confront unexpected situations. It teaches ways how to meet situations that require new learning. It incorporates anticipation and participation (Botkin et al, 1986). This education can also be called "education of heterostasis", (out-of-balance education, appreciating the new and confronting the unexpected or unknown alternatives). Heterostasis is newness in the system, like mutations in genetics. Education of innovation can deal, for example, what might happen to the waters and to the people when the Chacao bridge in southern Chile is constructed to connect Chiloé to the mainland. How to cope and what to do when an earth quake destroys the bridge. If the education of maintenance teaches how to cross the street when the green light is on, the education of anticipation allows to learn what to do when the street light does not function.

Education of being that integrates the external learning with the internal individual consciousness. Actually, education of being is a call

from the future that incorporates the whole individual, not only information and knowledge, but also emotional intelligence, deeper understanding and, yes, love for nature. Thus, it is a self-education or it can be also considered “education of synthesis” because it is education of the whole person. The education of being is to be activated for learning about the ways of the nature and its resources and anything else, invoking care and love for nature, respect and compassion for animals and plants and wonder about the living world.

A central element of the education-learning about natural history is the individual consciousness and recognition of the nature’s value as a national patrimony, as well as the patrimony of humankind. Education of being promotes the awareness that we all are guardians of nature for future generations.

SOME POSSIBLE ACTIONS

Some possible steps to advance the education-learning of natural history of Chile, including the coastal region and its natural history.

design and develop comprehensive educational programs coordinated for all levels of education dealing with natural history that would gradually achieve a higher level of understanding the nature of Chile, train and sensitize teachers on all educational levels to issues of natural history of Chile, especially the multiple issues, problems and opportunities of its coastal zone produce and distribute for formal and informal education audiovisual material, computer programs and printed information, such as a handbook of natural history for Chilean Coastal Zone, or activities books (Center for Marine Conservation, 1989) about the beauty, uniqueness and usefulness of nature and the potential of natural resources mobilize and support the efforts of Non Governmental Organization to focus and defend natural environment and natural resources develop popularizing university extension programs of lectures, workshops, special events (cf. Earth Day celebrations, Day of the Chilean Coastal Beauty, others).

Recent trends in teaching and managing natural history are revealing that information and knowledge about its structure and function is necessary but not enough. Education around natural history must invoke the human spirit that finds itself embedded in the natural world and recognizes humans as co-inhabitants of the earth, together with plants and animals. The need for an education program of the natural

history of the coastal zone of Chile invites to reevaluate the current educational systems and expand their approach to imparting knowledge, as well as awakening care and compassion for nature.

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