

Science of Fiction - Challenges for Sustainable Development in the Coastal Zone Area

Albert-Jan Abma, Ministry of Agriculture, Nature Management and Fisheries, Groningen, NL

The Stade Declaration 1997 adopted sustainable development as a guiding principle of Wadden Sea policy in the next millennium. This means that economic activities remain possible, but only within the constraints of a suitable protection and a natural development of the Wadden Sea. There is need for a harmonious relationship between the needs of society and ecological integrity. Can these beautiful words be realized?

The Dutch Ministry of Agriculture, Nature and Fishery has explored the possibilities of a sustainable development of ecology and economy in the coastal zone of the northern part of the Netherlands. This means that economic growth and ecological improvement require a simultaneous realization, in spite of their apparent discrepancy. Ecological objectives need economic support, while economic activities rely on properly functioning ecosystems. Therefore, programs for economic development must have good prospects for the ecology. The outlook is designed by 'backcasting' the technological development in 2015 from ecological objectives for a sustainable system in 2040. In 2040, advanced technologies will be in practice; renewable resources will replace fossil energy and materials. Crops will meet the need for food and materials; solar energy is the main power source. Production of waste and emissions to the environment will be considered as inefficient, so the efficiency of production and application of materials will be optimized and any emission will fit in the ecological cycles.

The Wadden Sea region offers some advantages to meet these objectives. Agriculture and farming/processing industries are well developed, chemical industries and power stations are available; the Wadden Sea and the open landscape of the region are of high ecological value.

In the outlook on 2015, the utilization of crops will be optimized: 'the plant is the *plant* of the future'. High-quality applications are reserved for various constituents of crops, available by fractionating not only the usual crops like sugar beets and potatoes, but also new crops and various former waste products like branches and leaves. The cultivation of new crops is favorable, as the entire crop is usable in integrated processes. Components of both plant fibers and juices are separated and converted into bulk materials and specialties. The main processes in the farming and chemical industries

are based on advanced biotechnology. Specialties are used in the production of e.g. medicines and fine chemicals; bulk materials are converted into basic chemicals. The revaluation of former vegetable waste succeeds in improvement of the competitive position of both agriculture and industry, as well as in new employment and new economic clusters. The outlook also offers ecological advantages. The cultivation of new and alternate crops in agriculture reduces the use of pesticides. Inorganic compounds, separated from the plant juices, replace manure and artificial fertilizer, thus closing nutrient cycles. Biotechnological separation and conversion are low temperature processes, thus saving energy. Solar energy and energy from biomass replace fossil fuels, thus reducing the greenhouse effect. Full crop conversion optimizes the use of materials and minimizes emissions to the environment; emissions are biodegradable, thus preventing bioaccumulation.

A range of actors, indicating the social basis supports the outlook. The outlook matches the objectives of governmental organizations and environmental NGOs as well as the interest and chances of industries. As yet, the actors expect no bottlenecks in the technology or in the price of crops. The phased introduction of the new processes can utilize the actual infrastructures. However, intensive research and development is needed, e.g. in the field of plant conversion. Industrial investments and cooperation and the integration of production processes need governmental stimulation, coordination and support.

Sustainable development in the Wadden Sea region is a challenge and offers many chances; however, it needs proper planning, commitment and investments from a wide range of organizations. But anticipating on future perspectives on sustainable development is unmistakably of great value to improve the quality of the Wadden Sea ecosystems in the long run.

For more information about the study "Science of Fiction. Vision for sustainable development of the northern Netherlands to the year 2015" please contact the author.

Albert-Jan Abma
Ministerie van Landbouw, Natuurbeheer en Visserij
Directie Noord
Postbus 30032
NL 9700 RM Groningen
a.j.abma@Invn.agro.nl