Ecosystem Health and Sustainable Agriculture

Sustainable Agriculture

Editor: Christine Jakobsson
Sustainable agriculture is dependent on many different factors and intervening systems. It is dependent on environmental, social and economic decisions as well as on individuals and on society in general. During later years it has become more obvious that it is important to implement the ecosystem approach to be able to reach good results. What is the ecosystem approach and how can it be implemented? To find a good definition of the ecosystem approach, the report “Ocean-time for a new strategy”, SOU 2003:72 was consulted.

**Definition of the Ecosystem Approach**

Ecosystems consist of different components, flora, fauna, other organisms and of the surrounding environment. These various organisms in an ecosystem are all part of a food chain, with interconnections and with the different levels influencing each other as the result of complex and dynamic relationships. If a critical species decreases in number or disappears, these relationships can break down. The ecosystem can then take on a completely different state after the breakdown. Sustainable management must be based on this perspective and consider the impact of proposed measures in a holistic manner.

The ecosystem approach places more far-reaching demands on protection measures than is the case with the current ‘sectorised’ method. Management must be more adaptive and instructive with clear links between implemented measures, environmental monitoring and research. Management must be based more on the obligations of the sectors and less on their rights. The environmental requirements placed on the sectors must be founded on the limitation of the ecosystems. The aim is to preserve the structure and function of ecosystems and hence maintain their capacity to provide us with goods and services (“Ocean – time for a new strategy”, SOU 2003:72).

**Definition of Ecosystem Health**

In Ecosystem Health two concepts are joined together. First we have the Ecosystem concept which is described above and secondly we add the concept of health. In today’s world the effects of ecosystem decline are becoming more and more evident. At the same time, health is an important indicator of the systems function. Ecosystem health is a comprehensive and integrated approach, which reflects the health of the living and non-living components of the land and marine world. It expands the traditional definitions of health, and implies the links between human activity, ecological change and health. Ecosystem health is transdisciplinary by nature, as it brings together the natural, social and health sciences and incorporates ecological, social, and economic perspectives with hu-
man health. Health ultimately depends upon ecosystem services e.g. availability of fresh water, food, fuel, pollination etc.

**Definition of Sustainable Agriculture**

Sustainable agriculture has been defined in several different contexts. The FAO definition can be found in the preface. It was defined for the Baltic Sea Region in 1997-1998 in connection with Baltic 21 – An Agenda 21 for the Baltic Sea Region. Baltic 21 was initiated by the Prime Ministers of the Baltic Sea Region in 1996 and is a regional Agenda 21 working towards regional sustainable development. Baltic 21 consists of stakeholders, government ministries and agencies from the Baltic Sea states, the European Commission, numerous intergovernmental and non-governmental organisations, academic and financial institutions, as well as local, city and business networks. The Baltic 21 Agriculture Sector was requested to give a definition and goal for sustainable agriculture. This was discussed during an international process of approximately one year and all ten participating countries (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, NW Russia, and Sweden) were active in the process.

**The Baltic 21 Definition of Sustainable Agriculture**

“Agriculture contributes significantly to the society of the future. Sustainable agriculture is the production of high quality food and other agricultural products/services in the long run with consideration taken to economy and social structure, in such a way that the resource base of non-renewable and renewable resources is maintained. Important sub-goals are:

1. Farmers’ income should be sufficient to provide a fair standard of living in the agricultural community.
2. Farmers should practise production methods which do not threaten human or animal health or degrade the environment, including biodiversity, and at the same time minimise our environmental problems for which future generations must assume responsibility.
3. Non-renewable resources have to gradually be replaced by renewable resources and recirculation of non-renewable resources maximised.
4. Sustainable agriculture will meet society’s needs of food and recreation and preserve the landscape, cultural values and the historical heritage of rural areas and contribute to create stable, well-developed and secure rural communities.
5. The ethical aspects of agricultural production are secured.” (Helsinki Commission, 1998)

**Problems or Non-sustainable Issues for the Agricultural Sector**

There are many different types of farms and agriculture throughout the Baltic Sea Region, all with various sustainability impacts. Regions and farms with a high livestock density and/or high inputs of fertilisers, as well as inappropriate agricultural management, can often be a serious environmental threat. This varies within the Baltic Sea Region. The main challenges are to reduce the negative effects of agriculture on the Baltic Sea by reducing the pollution by nutrients, which to a large extent originates from animal production and improper use of fertilisers, and through reducing the risks associated with the use of plant protection products, as well as developing and maintaining bio-diversity. Great differences exist between EU15 member countries (the 15 countries that were members in 1994) and the new members of EU27 (EU member countries in 2004 e.g. Estonia, Latvia, Lithuania, Poland, Slovakia) and Russia. In the EU15 countries, point sources in connection with manure handling have been the focus for environmental action programmes for more than a couple of decades, with diffuse sources also considered more recently. On the other hand, in the new EU27 member countries and Russia, an immediate problem today is nutrient point sources, due to insufficient or non-existent manure storage and often large animal holdings. Diffuse pollution is also a problem here. The development within this area is in some countries still too slow.

Nitrogen losses are basically correlated to the total turnover of nitrogen in the system and different corrective measures in crop production practices have so far not proven sufficient to reduce the nitrate losses to acceptable levels for the water environment. Efficient tools to effect such a reduction are important. EU legislation such as the Nitrate directive and the Water framework directive are such tools among many others (see the chapter on Nitrogen losses from Agricultural Soils in the Baltic Sea Area page 78-81).

Modern agriculture also relies on imported feed and non-renewable fossil fuel and finite phosphorus resources. The specialisation of agriculture has greatly increased the transportation of commodities and agricultural products. In addition, large differences exist between countries and regions in economic conditions and infrastructure in rural areas. This means that measures necessary for sustainable development are not always the same within the entire Baltic Sea Region. As there is a great lack of education and knowledge on sustainable agriculture, education, advisory services and training are needed in the whole region, but particularly for the new family farms in the new EU27 member countries. Throughout the whole Baltic Sea Region, there is a need for development and demonstration of more sustainable agricultural systems. A well functioning agricultural extension service has an important role to play and demonstrate to the farmers the best ways to implement changes towards sustainable development. Appropriate monitoring systems and the proposed indicators of sustainable development are indispensable tools to evaluate the progress towards the established goals of sustainable agriculture.

In the context of the Baltic 21 Agricultural Sector in 1998 the task on identifying what sustainable agriculture was started when the sector defined the non-sustainable issues in agriculture. This list was used as a starting point also for the planning of this project and only a few issues were added in 2006 by the group of researchers involved in producing these three books in the Ecosystem Health and Sustainable Agriculture series. The updated version is provided in this book.
References

Chapter 1


Chapter 2


Chapter 3


