ARE INSTITUTIONAL CHANGE AND THE IMPLEMENTATION OF THE ECOSYSTEM APPROACH SUCH STRANGE BEDFELLOWS? A CASE STUDY OF HELCOM AND THE BALTIC SEA ACTION PLAN

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The Helsinki Commission (HELCOM), the governing body of the 1974 Convention for the protection of the Marine Environment of the Baltic Sea Area has expanded to include membership of the EU, Russia as a successor of the USSR and the newly independent Baltic States in 1992. HELCOM changed its structure and instruments to aid implementation efforts. The Baltic Sea Action Plan (BSAP) was adopted in 2007, with the aim of implementing the ecosystem approach (EA) to achieve good ecological status. BSAP acknowledges that the ecosystem approach is based on integrated management of human activities and the ecosystem.

Whilst HELCOM previously focused on sectoral governance, a clear shift was needed for this integrated approach. The structuring of BSAP around four strategic goals reflected the major environmental problems of the Baltic Sea but was this change accompanied by institutional changes within HELCOM? This question is pertinent as a review of the BSAP indicates that national implementation actions are lagging. This paper examines the institutional demands of ecosystem based management. It uses the Institutional analysis and development framework (IAD) to analyse the institutional changes of HELCOM to implement this new governance approach.

FOREST ECOSYSTEMS' IMPACT ON THE CARBON BALANCE

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The ability to deposit and store the atmospheric carbon in the organic matter determines the important role of the forest ecosystems in the carbon balance of the biosphere. Boreal forests, that occupies about 33 % of the land surface, contain 25 % of plant carbon and 60 % of soil carbon, which is about 50 % of the global carbon stocks contained in biomass and soil. Investigation the role of wood residues in the carbon cycle is a relatively new direction. Recently, they are considered not only as a source of atmospheric CO_2 formation, but also due to a long period of destruction in natural conditions, as a pool of long-term carbon storage, especially in boreal forests [1].

Keywords: forest, carbon stock, greenhouse gas absorption, dead organic matter, soils, biomass.

Plant biomass, including above-ground and below-ground parts, is the main conduit for CO_2 removal from the atmosphere. Large amounts of CO_2 are transferred between the atmosphere and terrestrial ecosystems, primarily through photosynthesis and respiration [2].

Greenhouse gas absorption is influenced by land use and management through a variety of anthropogenic actions such as deforestation, afforestation, fertilization, irrigation, harvest, and species choice. For example, tree harvesting reduces biomass stocks on the land [2]. Thus, some of the carbon removed from the ecosystem is rapidly emitted to the atmosphere while some carbon is transferred to other stocks in which the emissions are delayed. In non-forest ecosystems (i.e., Cropland, Grassland), biomass is predominantly nonwoody perennial and annual vegetation, which makes up a much smaller part of total ecosystem carbon stocks than in forest lands. The non-woody biomass turns over annually or within a few years and hence net biomass carbon stocks may remain roughly constant, although stocks may diminish over time if land degradation is occurring. Land managers may use fire as a management tool in grasslands and forests or wild fires may inadvertently burn through managed lands, particularly forest lands, leading to significant losses of biomass carbon. Fires not only return CO_2 to the atmosphere through combustion of biomass, but also emit other greenhouse gases, directly or indirectly, including CH_4, N_2O, NMVOC, NOx and CO [2].

The bulk of biomass production (NPP) contained in living plant material is eventually transferred to dead organic matter (DOM) pools (i.e., dead wood and litter). Some DOM decomposes quickly, returning carbon to