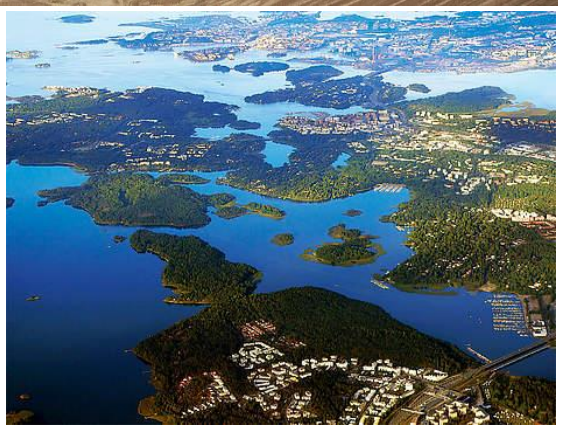
COOPERATIVE FOOD PRODUCTION SYSTEM IN FINLAND BASED ON ENERGY AND NUTRIENT SELF-SUFFICIENCY

By Kim Assaël

Knehtilä Farm won the 2015 WWF Baltic Sea Farmer of the Year Award for its environmentally friendly practices. Located in the village of Palopuro in Hyvinkää, 60 km from Helsinki, it is at the center of the cooperative Palopuro agroecological symbiosis, a food production system based on energy and nutrient self-sufficiency.

The WWF competition intended to inspire farmers in the entire Baltic Sea region to take an active part in combating eutrophication. It was launched in 2009 in cooperation with farmers' organisations from around the Baltic Sea which is still one of the most threatened seas in the world. Over-fertilization, has been identified as the most important threat to its health because of the agricultural runoff.



The Award recognized among best practices in "Baltic-friendly" farming those farmers who were taking innovative measures to reduce nutrient runoff from their farms.

The Knehtilä Farm aim is in fact to produce local, organic food using bioenergy and recycled nutrients. The idea driving this co-operative is to locally recycle the nutrient flows generated in the production, and fully utilize the bioenergy potential in the biomass flows. The production of organic food considers all aspects of the process and strives for maximum sustainability at every step of the production by reducing the greenhouse gas emissions per unit of product.

The Farm has done a remarkable job for the environment on 340 hectares of arable land since the 1990s. They have been interested in Baltic friendly farming for a long time and paid attention to soil structure and tilling methods long before shifting to organic farming in 2010. At any given season, on a third of the total area the Farm grows green fertilizers, i.e. vegetation to be ploughed into the soil as a source of nutrients. Nutrients run-off to waterways from the fields is prevented with protective zones that have been established along all ditches and creeks.

In the integrated system at Knehtilä, the grain from the fields is milled in place, and baked to bread by an organic bakery which has established its operations on the farm. Energy from gas charred using local, low-value wood as feedstock is used for both the drying and milling of the grain, as well as for the ovens of the bakery. The losses from milling and baking are used as feed for hens in the neighbouring henhouse which is producing organic eggs for the bakery. Biomass from green manuring leys in Knehtilä's organic crop rotation combined with the hens'

manure and manure from local horse stables is processed by anaerobic digestion.

The biogas produced is used for running the farm machinery and for local sale to passenger cars. The effluent, the nutrient-rich product from digester, as well as the biochar produced as by-product in making gas by charring, is used as organic fertilizer and soil conditioner in the farm fields. Knehtilä is an excellent example where the environmental issues are integrated into the everyday activities of food production at the farm.

By recycling the organic materials, minus the energy used for farming operations and for food processing, there is an inherent increase in soil productivity and health. This system conserves natural resources and reduces nutrient loading in the Baltic Sea which will help to take the stress off of the ecosystem. The whole local community benefits of a transparent and understandable production process which reconnects the consumers with the source of their food. The customers greatly value the fact that the menus are based on an organic production without any chemical fertilizers and pesticides.

Precision agriculture methods, as those used at the modern Knehtilä farm, include using integrated advanced technology to analyze the soils, reduce pollution, generate on farm energy from waste, and adapting use of equipment to fit different conditions. This integration minimizes the need to purchase inputs of energy, feeds, and fertilizers. These efforts have resulted not only in optimal soil structure and a reduced nutrient runoff, but also in optimal yields and increased economic returns for their farm due to circular activities.

At European level this cooperative is today a model of Agro ecological Symbiosis for farmers, producers and consumers within an organic food production and processing which is truly energy and nutrient self-sufficient.

It is part of the first Internacional Network in Finland, assembling several organic producers and processors, but also R&D, companies, universities, farmers, and regulators, who met at the Forim for Action of Helsinki, on 20 April 2016 to share experience, support Finland's "Clear Waters" nutrient recycling programme. The network finds synergies also within the Phosphorus Platform which promotes ecological biodiversity of water and economic efficiency through closing the biomass loop.

Many were the opportunities presented at the Nutrient Recycling into practice Programme lunched by the Government of Finland with EUR 12.4 million for the experimentation programme *Nutrient recycling into practice*: opportunities to recycle nutrients, from field margins to pipelines of wastewater purification plants, in the framework of Circular economy and nutrient recycling.

The Knehtilä Farm has substantially reduced their use of fertilizers through nutrient recycling methods of buffer zones and grasslands to produce green manure. Farmers are part of the solution and are the best in teaching each other about new practices to change the future for the Baltic Sea.

Recyclable materials from the community, such as horse manure, food waste, crops residues, other suitable biomasses, lead to consumption in the community, in households and public

caterers. With this long-term agri-environmental measures the cooperative is able to operate in a sustainable manner and the countryside is kept alive and diverse. The aim is that this model will be reproduced by other farms around Finland. This kind of cooperation could be the answer to a sustainable organic sector in Finland.

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Knehtila website

Phosphorus Platform Projects

Knehtila in Facebook

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Palopurons blog

Article in wwf panda website

Article in beras.eu website

Article in hippolis website

Article in baltic deal website

Article in EU circular economy

Article in Carbontosoil.com