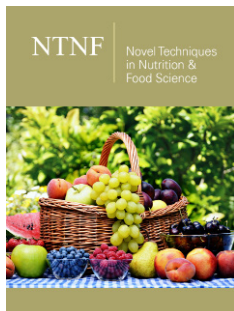


# Opportunities with Wild Food in Managed Ecosystems-A Swedish Perspective

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## Abstract

Wild animals, plants and fungi harvested in a sustainable manner from managed ecosystems offers opportunities as a complementary resource as well as an emergency national food security measure. A prerequisite is availability and access. In Sweden, both apply. Sweden is a vast country with rich populations of terrestrial game species, opportunities for semi-domestic husbandry, a long coast and many inland waters and plentiful production of plant and fungal resource. In addition, the Swedish regulation 'right of public access' to land and vegetative resources such as berries and mushrooms make parts of the resources accessible to all. Finally, in addition to being a resource, wild and semi-domestic animals along with plants and fungi are vital components in the landscape and a basic fundament for biological diversity and functional ecosystems. Thus, a balanced and sustainable utilization offers multiple opportunities.

**Keywords:** Wildlife; Plants; Fungi; Food; Sustainability; Food security; Biodiversity

## Introduction

Sweden has unique conditions to base food production on sustainable utilization of natural resources in wild, semi-managed and/or regulated ecosystems [1,2]. The large land area provides opportunities for extensive animal husbandry (for example reindeer husbandry), sustainable hunting of rich and viable populations of ungulates and other wildlife, fishing along a long coast and in many lakes, as well as large quantities of wild plants, fruits, nuts, berries and mushrooms. Some basic prerequisites that set Sweden apart from many other countries is the large geographical areas of land and water, often sparsely populated and little visited by people [3]. There are also viable populations of many wild animal-and plant species which provide excellent food resources and are mainly sustainably managed. Finally, the 'right of public access' makes it possible for people to move freely in natural areas and for example, pick wild berries and mushrooms [4]. The Swedish game populations in Sweden deliver approximately 20,000 tons of meat annually through hunting (preliminary 21 840 tonnes during 2022) [5,6] which is approximately two kilograms per person per year (Sweden have around 10 million citizens), or 2.5% of the annual consumption of animal proteins (which was estimated at 78.6 kilograms per person in 2020 [5]. This is more than the 1 120 and 16 870 tonnes respectively that the Swedish reindeer husbandry and sheep farming deliver altogether [5]. Around 70 percent of the population eats game at least once a year [7,8]. Reindeer farming is the only form of animal production that is currently carried out extensively in the form of free-range semi-domestic animals, similar to the largely abandoned shack farming or forest grazing that was common practice in Sweden a century ago [9]. This form of extensive husbandry used to be an important part of the landscape utilization throughout Sweden, which created open pastures and fields of importance for many other species. Today, however, more than 70% of the open, grazed landscape in southern Sweden has been lost, in some places close to 100% [10,11] and thus many of its species and the important ecosystem functions supported by the grazing animals are threatened.

Fish and other seafood is a suitable and healthy food recourse. Today's fishing, however, generates mostly animal feed and is in that way less sustainable. The salt sea fishery in Sweden lands 130-140,000 tonnes of wild fish annually [12], of which more than 70% are used as

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forage fish [6]. The sales value is estimated at approximately half a billion SEK (about 500 million USD). In September 2022, during one single month, the sales value for the fishery was 70 million SEK [6]. In addition to this comes freshwater fishing and recreational fishing in the many lakes and streams. Wild plants in Sweden produce enormous quantities of berries of which only a fraction is consumed as human or animal food. Annual berry production is estimated at more than 500 000 tonnes, of which blueberries are the most common followed by lingonberries and cloudberry [13,14]. Of an estimated maximum of five percent is picked by the public and commercial actors, including, for example, invited pickers from other countries (Ola Langvall, pers. com.). Many wild plants can also be eaten, for example daisies, milkweed, sorrel, chives and spruce shoots. Broadly speaking, this is an overlooked and underutilized resource that has so far only been exploited by parts of the restaurant industry. Nuts are also produced in large quantities, although the extent is unclear. In addition to being human food (e.g. hazelnuts), nuts can also be suitable as animal feed (e.g. acorns, chestnuts).

Fungal mycelium makes up approximately 50 percent of the humus layer in Sweden and binds approximately 15 tonnes of carbon per hectare [15]. There are approximately 10,000 species of mushrooms in Sweden [16] which makes them one of the most species-rich groups of organisms. How much that is used for food is unclear, but just as with the plant resource, there is probably great potential (Kerstin Varenius pers. com., Anders Dahlberg pers. com.) [17]. In Sweden, we have viable populations of many wild animals and plants that provide excellent food resources and that are mainly sustainably managed. Thus, wild food should be considered in the strategic work with our food supply and food security. A wilder Sweden with larger ungulate populations yields more venison and today's reindeer husbandry can function

as a model for more extensive animal husbandry in the whole of Sweden. The rich opportunities for fishing should be redirected towards human food rather than domestic animal feed and finally we should explore possibilities for an extended use of wild plants (including fruits and nuts) and mushrooms. Overexploitation is a major challenge involved for utilization of wild animals, plants and fungi [18]. To balance exploitation with sustainability with ecosystem function an organized management organization along with continuous monitoring of species and resource status is needed. For hunting wild animals such a system is fairly in place in Sweden, with assessed quotas of major ungulates and large carnivores and voluntary gamebag report of other harvested species [19]. Fishery industry is more complicated and under influence from international negotiations and agreements. The utilization of wild berries and mushrooms is currently uncontrolled, but with a potential increased exploitation a monitoring system may be necessary. Another challenge is food safety, food quality and xenobiotics in relation to wild food [20]. Also, in this context a monitoring system is desirable and in Sweden partially in place through a wildlife disease monitoring program [21].

Fish, algae and lingonberries are not just trendy food for Nobel dinners, but a shared resource available for all. In addition to the resource perspective, the wild and semi-wild animals and plants are important for the environment and rich, living landscapes. There is also a very important preparedness aspect and a self-sustaining perspective in the wild food. Although Sweden has unique prerequisites for a sustainable utilization of wilderness, these opportunities should be explored better in other areas as well. In addition to food availability and food security, the wild food raise issues of general concern for all societies (Figure 1) and offers a path to sustainable coexistence with man and nature.

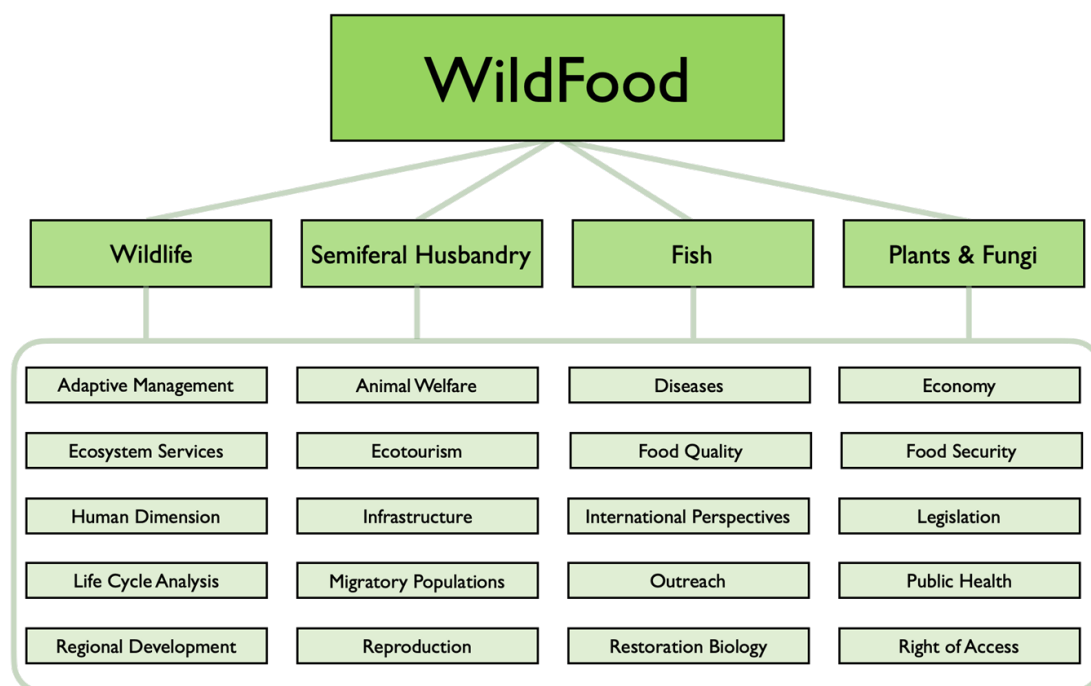


Figure 1: Examples of questions and opportunities that arise in relation to utilization of wild food.

## Conclusion

A balanced and sustainable utilization of wild resources in a modern form of 'hunting and gathering' society offers multiple opportunities for food availability and food security, but also for biological diversity and functional ecosystems in coexistence with humans. Public access to wild berries and mushrooms on all land, as in Sweden, offers a wide societal applicability. To be achieved on a larger scale it is necessary to monitor the impact and balance the interests of humans and wild species.

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