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# **Sustainable Foraging of Wild Edible Plants in Norway A Biocultural Approach**

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# SUSTAINABLE FORAGING OF WILD EDIBLE PLANTS IN NORWAY

A Biocultural Approach

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# **Sustainable Foraging of Wild Edible Plants in Norway A Biocultural Approach**

by

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## Abstract

Globally, the role of wild edible plants (WEPs) in providing culturally appropriate nutrition and food security, added economic value, and ecological benefits, is now well recognized. In Europe, the use of WEPs appears both as an ancient and on-going subsistence activity, but also as an emerging trend in high-end gastronomy and luxury foods. Yet, WEPs remain underutilized and mostly neglected, and the conservation of knowledge systems and practices associated to them is threatened. It is also unknown if there are any threats on the plant populations through harvesting. In Norway, overharvesting of some wild edible species has been observed recently around urban centres. Although research has been conducted on the documentation of traditional knowledge associated to WEPs, little is known about how new foraging practices affect biological diversity. The purpose of this study was to investigate if and when foraging activities in Norway can be unsustainable and what foraging practices may threaten plant communities. Different socio-cultural constructs around WEP harvesting were analysed, notably comparing chefs and professional foragers with amateurs. In collaboration with the Norwegian Association for Mycology and Foraging, ethnographic methods were used and 19 key stakeholders were interviewed within the Norwegian foraging community including foragers, chefs, association leaders, and conservation experts. Ethnobotanical data was collected through an online questionnaire (219 responses mainly from amateur foragers), and combined with available information on species' ecology and their conservation status to assess foraging impact on WEPs. Results show that foraging WEPs in Norway poses no immediate threat to plant conservation, yet risks exist. These are discussed in the context of developing local guidelines for the sustainable use of WEPs in Norway in a participatory manner.

*Keywords: Biocultural Diversity | Foraging | Sustainability | New Nordic Food Movements | Wild Edible Plants*

## Résumé (Abstrakt – Appendix 1)

Le rôle des plantes sauvages comestibles est reconnu pour les nombreux services écosystémiques rendus à l'humain. En Europe, l'utilisation du sauvage comestible semble être une pratique ancestrale, liée à la pauvreté et aux situations de famines. Néanmoins, l'émergence de nouvelles cuisines gastronomiques remet le sauvage comestible au goût du jour et permettrait de promouvoir une plus grande biodiversité au sein des agroécosystèmes et dans les assiettes des consommateurs. Toutefois, cette ressource reste négligée et les systèmes de connaissances en lien avec une gestion durable subissent de nombreuses mutations. En Norvège, des situations de surexploitation ont été récemment observées. Dans ce contexte d'engouement croissant pour les produits naturels qui pousse au développement d'une économie du sauvage, il convient de se demander dans quelles mesures les activités de cueillette sont-elles durables. Ce mémoire étudie en quoi les différents construits sociologiques et culturels influencent les comportements des cueilleurs et tente d'évaluer les impacts écologiques associés. Dix-neuf entretiens d'acteurs du domaine des cueillettes ont été réalisés pour identifier les rapports aux plantes et à la durabilité de l'activité. À l'aide d'un questionnaire en ligne (219 retours), des données ethnobotaniques ont été collectées puis combinées aux informations issues de la biologie de la conservation. La cueillette de plantes sauvages comestibles ne posent actuellement aucun problème réel. Toutefois, certaines pressions peuvent s'exercer localement sur des espèces dites populaires. Les acteurs éprouvent un besoin de se réunir afin d'élaborer par une approche participative un guide de bonnes pratiques qui permettrait d'approcher une promotion responsable de la ressource.

*Mots-clés : Biodiversité culturelle | Cueillette | Durabilité | Norvège | Plantes sauvages comestibles*

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## **Abbreviations and Acronyms**

CBD Convention on Biological Diversity

COPs Conference of the Parties

EU European Union

FAO Food and Agriculture Organization

FPIC Free Prior Informed Consent

FWF FairWild Foundation

ISE International Society of Ethnobiology

IUCN International Union for Conservation of Nature

LEK Local Ecological Knowledge

MEAs Multilateral environmental agreements

NHM Natural History Museum of Oslo

NMBU *Norges Miljø- og Biovitenskapelige Universitet* (Norwegian University of Life Sciences)

NPP Nordic People and Plants

NSD *Norsk Senter for forsknings Data* (Norwegian Centre for Research Data)

NSNF *Norges Sopp- og Nyttevekst Forbund* (Norwegian Association for Mycology and Foraging)

SDGs Sustainable Development Goals

TAEK Traditional Agro-Ecological Knowledge

UiO *Universitet i Oslo* (University of Oslo)

WEPs Wild edible plants

## Introduction

According to the FAO (2020), more than a billion of people are undernourished and another 500 million suffering from diseases related to a poor nutritional diet. However, academic literature usually emphasizes only cultivated foods when it comes to food security (Bharucha & Pretty, 2010). Some studies reveal the importance of wild foods in global diets and the potential danger of underestimating the importance of wild edible species underpinning provisioning ecosystem services, such as food (Bacchetta et al., 2016; Ulian et al., 2020). Such underestimation may hinder the emergence of policies and programmes needed to recognise local knowledge systems and support these alternative food chains (Bharucha & Pretty, 2010).

Wild edible plants (WEPs) are defined as plant species collected in the wild to be consumed as food or drink (Reyes-García et al., 2015). WEPs have always been an integral part of the human diet throughout history and around the world (Behre, 2008; Hummer, 2013; Leonti et al., 2006; Reyes-García et al., 2015; Schulp et al., 2014) and foraging WEPs seems to be at the basis of human civilizations before the Neolithic, when the first settlements appeared and agriculture began (Bharucha & Pretty, 2010; Schippmann et al., 2006). However, the way humans use plants has changed, and continues to change through time, and recent ethnobotanical evidence shows a worrying trend of loss of traditional knowledge of WEPs and associated foraging practices (Łuczaj et al., 2012). Trends in foraging are highly dependent on sociological situations and interactions between communities in time and space. For example, during times of food scarcity and shortage, foraging activities often increase (Łuczaj et al., 2012). In addition, foraging in urban settings is an emerging practice among city dwellers independent of their age, race, gender, and standard of living, both in the Global North and the Global South (McLain et al., 2014; Schlesinger et al., 2015; Shackleton et al., 2017; Waygood, 2019).

The revalorization of WEPs in gastronomic cuisines is another trend that has appeared since the 90s (Łuczaj et al., 2012; Reyes-García et al., 2015). The recent gastronomic revival that focuses on the significance and use of wild plants has been increasing especially in the Nordic countries, where it was triggered by an interest for natural living, alternative medicine, and eco-friendly products. Specifically, a new focus on WEPs emerged from the New Nordic Cuisine led by pioneering restaurants such as Noma in Copenhagen or Maaemo in Oslo (Hermansen, 2012; Münke et al., 2015). These modern trends rely on new foraging pressures on specific plant species, potentially raising sustainable harvesting and conservation issues (Hamilton, 2005). Current foraging activities and their impact on people and plant communities are yet to be studied in the Nordic region. Very little is known about how nature-users backgrounds and experience (constructs) influence behaviours that shape the sustainability of their practices (Albuquerque et al., 2019). To fill this gap, this study aims to determine to what extent foraging of WEPs in Norway is a sustainable activity, and to elucidate the socio-cultural and economic factors that influence foragers' motivations, attitudes, and impact on foraged plant biodiversity.

Prior to collecting data, a thorough literature review was conducted on the available evidence on the roles and contributions of wild plants to sustainable foodways at the global and European scales, and on the socio-ecological context of foraging in the study area (Norway). This literature review is summarized in Part 1. Background Context. The research strategy for data collection and analysis is described in Part 2. Methodology of this thesis, followed by a presentation of main results in Part 3. Results. In the final Part 4. Discussion, findings are discussed, and potential solutions are suggested for the participatory establishment of local guidelines for sustainable foraging in Norway.



## **PART 1 | Background Context**

# **1 Part 1. Background Context**

## **1.1 Wild Edible Plants: The Potential of a Sustainable Contribution to Food Security**

### **1.1.1 Global Challenges: Food (In-) Security, Biocultural Diversity Loss, and Plants**

Feeding the world's growing population while simultaneously preserving biodiversity constitutes one of the utmost challenges of the twenty-first century (Chappell & Lavalley, 2009; Bjarklev et al., 2019). Policy has emphasized efforts for reaching higher yields through rural agricultural development and reducing production losses along the food system (Bharucha & Pretty, 2010; Lake et al., 2012), and long disregarded biological and cultural diversity (Ciftcioglu, 2015; Sunderland, 2011). However, the conservation of biocultural diversity for meeting long-term and increasing dietary demands under rapid climate change appears at the basis of a globally sustainable food system (FAO, 2018). There is now consensus about the interdependency of both nutritional security and environment sustainable management (Heywood, 2011; Berry et al., 2014; Capone et al., 2014). Coping strategies to tackling food insecurity while reversing biodiversity erosion resulted so far in the consideration of 'appropriate alternative agricultural practices' (Chappell & Lavalley, 2009), focussing primarily on cultivated foods (Bharucha & Pretty, 2010) and a focus on 'ancient underutilized agricultural crops' (Bjarklev et al., 2019).

### **1.1.2 Integrating Wild Edible Plants: A Promising Approach to Food Security and Biocultural Diversity Conservation**

Agroecology is defined as the "integrative study of the ecology of the entire food system" (Francis et al., 2003:1) and is a "science, a movement and a practice" (Wezel et al., 2009:p1) that bridges the gaps between food insecurity and the human use of ecosystem services provided by a rich biological diversity (Lamichhane et al., 2015; Ratnadass et al., 2012; Wezel et al., 2014). Agricultural biodiversity (Heywood, 2013) or 'agrobiodiversity' (Hardon-Baars, 2000) refer to cultivated plants and raised animal species, but also undomesticated ones, called 'wild species' (Powell et al., 2015). The study of wild plants is an increasing topic of interest because they offer a wide range of local societal benefits at local and global levels (Bharucha & Pretty, 2010; Bacchetta et al., 2016; Pardo-de-Santayana et al., 2010). That wild edible plants (WEPs) provide culturally appropriate foods and medicines is well studied (Galhena et al., 2013; Grivetti & Ogle, 2000; Hardon-Baars, 2000; Penafiel et al., 2011). Literature on WEPs demonstrates their great multifunctionality, as detailed in the subsequent section: from their nutritional value to additional positive contributions such as empowering women (Colfer, 2013; Schumsky et al., 2014; Perrey, 2017), fostering traditional and local knowledge (Turner et al., 2011; Leal et al., 2018), diversifying and generating income (Delang, 2006; Ahmed, 2019), and delivering valuable ecosystem services (Powell et al., 2015).

Unsurprisingly, WEPs are most well studied in developing countries where subsistence lifestyles remain common and wild goods are still prominent in people's daily lives. While these socio-ecological systems are experiencing a shift towards market-oriented visions, wild products are often being promoted (Beltrame et al., 2019). Inversely, in western societies the role of wild food plants in sustainable development is being overlooked and ethnobiologists call for more efforts in the promotion and revitalisation of these resources (Pardo-de-Santayana et al., 2010; Bacchetta et al., 2016).

Foraging practices in 21<sup>st</sup> century Europe are grounded in long-standing local traditions but also in rising innovative culinary approaches (Turner et al., 2011; Łuczaj et al., 2012; Łuczaj & Pieroni, 2016; Reyes-García et al., 2015). These new interactions between traditions and innovations in the foraging domain may entail the use of non-traditional plants and new

harvesting techniques. Hence, an emergent theme in promoting and valorizing WEPs is the need for new socio-ecological, inter-disciplinary, and cross-sectorial conservation approaches (Pardo-de-Santayana et al., 2010) that ensure revitalisation is indeed sustainable. Nothing has yet been done on that fundamental issue, though it is often claimed implicitly as the overall purpose of ethnobotanical studies on such plants (*ibid*). Here a review on the diversity and trends of WEP collection in Europe is made and their potential to contribute to the sustainable development of the European society outlined. Through this, key Knowledge Gaps (KGs) in the study of WEPs are identified to approach their promotion in a responsible manner.

## **1.2 Wild Edible Plants in Europe: Well-documented Trends of Loss and Innovation**

### **1.2.1 Declining Biodiversity, Uses and Knowledge Systems**

While exotic species abound in global markets, wild plants are getting undervalued and underused (Bacchetta et al., 2016; Borelli et al., 2020; Ulian et al., 2020). People rely increasingly on globalized cultivated foods, still they are not replacing and balancing nutrients provision from forgotten wild and native biodiversity (Bharucha & Pretty, 2010) and nutritional security and sovereignty of local communities is getting lost (Alonso, 2015). Along with the decline of traditional (agro-) ecological knowledge and culture, biodiversity erodes (Pretty et al., 2009; Ciftcioglu, 2015; Rotherham, 2015), as traditional foods “retain our human legacy and contribution to diversity so as long as we maintain our relationship to the landscapes where we live” (Salmon, 2016:2). If wild food products have been consumed traditionally and played a major role within most European landscapes (Pardo-de-Santayana et al., 2010), from the Mediterranean (e.g. Tardío et al., 2006; Ghirardini et al., 2007; Turner et al., 2011; Pinela et al., 2017) to Scandinavia (Alm, 2004; Alm & Iversen, 2010; Alm, 2015; Svanberg & Egişson, 2012; Stryamets et al., 2015), policy programmes for food and health security still operate by prevailing measures discounting traditional and ancient local practices owned by autochthonous communities (Bharucha & Pretty, 2010).

### **1.2.2 Modernization of Human Societies: The Two Sides of The Same Coin**

‘Sustainable diets’ contribute to culturally and economically acceptable food and nutrition security while being protective and respectful of biodiversity in all its dimension (Burlingame & Dernini, 2010:8). They are urgently required to lower the effects of human food consumption on the biosphere (Burlingame & Dernini, 2010; Capone et al., 2014). The search of a better nutrition for both healthier humans and Nature, increased migration and multiculturalism, and emerging modes in knowledge transfer are factors underlying shifts in people-food relationships worldwide (Stepp et al., 2002; Łuczaj et al., 2012; Łuczaj & Pieroni, 2016; Reyes-García et al., 2015). In Europe, people’s perception and consumption of wild food plants have evolved through time, and until the 1960s wild foods were associated with subsistence lifestyles, poverty, and famine (Turner et al., 2011; Łuczaj et al., 2012). Valorization of wild food stuffs also suffered from intense modernization and standardization of our society (Łuczaj et al., 2012; Vandebroek & Balick, 2012). Family and community-oriented foraging, or traditional gathering, has been constantly disappearing (Kalle & Sõukand, 2013; Łuczaj et al., 2012; Reyes-García et al., 2015).

Yet, locally sourced WEPs are now ‘delicatessen’ goods at the core of culinary vogues mostly accessible to elites (Łuczaj et al., 2012; Reyes-García et al., 2015). The Slow Food and the New Nordic Cuisine movements are examples of these new trends. Integrating traditional practices and products in their gastronomy, chefs are shaping new, often transnational food identities (Andrews, 2008; Mithril et al., 2012; Stano, 2018), a process labelled as ‘tradinnovation’ (Clemente-Villalba et al., 2020). These new trends can be understood in a ‘glocal’ framework – where local and global goods and practices mix –

directly affecting food cultures and plant traditions (Bellia & Pieroni, 2015; Sloan et al., 2015; Stano, 2018). As part of this shift and counteracting conventional agricultural and health systems, foraging typologies have also been remodelled (Albert-Llorca & Garreta, 2016; Pinton et al., 2015). Currently, three kinds of wild-gathering include traditional (family and community-based knowledge and attitudes), amateur (neophytes that learned from media and courses), and professionals (which may include a personal practice that was either based on traditional or amateur contexts; Julliand et al., 2019; Serrasolses et al., 2016; Söukand & Kalle, 2015; Vorstenbosch et al., 2017). While the contribution of wild plants to diets in terms of added nutritive content exist (e.g., de Cortes Sanchez-Mata & Tardío, 2016), no study has estimated quantitatively the role of WEPs to European diets today (KG1).

### **1.3 Wild Edible Plants for Sustainable Foodways in Europe: Opportunities and Challenges**

#### **1.3.1 The Many Benefits of Using Wild Edible Plants**

The study of European WEPs is at stakes across the Old-Continent, and for many good reasons (Bacchetta et al., 2016; Pardo-de-Santayana et al., 2010). WEPs can contribute directly to improve health, foster local economies, maintain co-evolutionary relationships with the natural environment while enhancing landscapes multifunctionality (Gaba et al., 2020), and facilitate the integration of migrant communities and diverse socio-cultural influences (Bharucha & Pretty, 2010; Bacchetta et al., 2016; Poe et al., 2014; Lovrić et al., 2020). However, concerns on biodiversity conservation are central to the sustainable use of WEPs (Table 1). WEPs revitalization could drive European societal and agroecological transitions, yet hindering forces occur. Opportunities rely on WEPs being culturally appropriate local foods, with high economic potential for autochthonous people. But WEPs remain underutilized and mostly neglected, and their conservation in relation to biocultural diversity, encompassing knowledge systems (e.g. traditional ecological knowledge, TEK) and associated practices, is threatened. Although research has been conducted on the documentation of TEK associated to WEPs use, little is known about the foraging practices of wild-gatherers and how these affects biological diversity (Albuquerque et al., 2019).

##### **1.3.1.1 Nutritional Importance and Health Benefits**

First of all, WEPs increase the availability and accessibility of food products (Tardío et al., 2006; Berti & Jones, 2013; Cruz-Garcia & Price, 2014; Powell et al., 2015). Due to their rich antioxidant properties (Romojaro et al., 2013), WEPs consumption may improve diets (Grivetti & Ogle, 2000; Sánchez-Mata et al., 2011; Pinela et al., 2017) and thus health (Grivetti, 2006; Marrelli et al., 2020). Wild plants contain valuable compounds with beneficial nutraceutical assets (Grande et al., 2004; Ranfa et al., 2014; Naik et al., 2018) that serve as useful medicine for both human and animals (Pieroni & Price, 2006; Pieroni & Quave, 2006; Benítez et al., 2017). WEPs contributions to health have been mostly studied in the Global South, where vitamins and minerals are primary compounds missing in poor dietary situations (Galhena et al., 2013). In South Africa, “wild foods may offer unique benefits to households affected by AIDS, providing a nutritious and freely available food source at minimal labour and financial costs” (Kaschula, 2008). However, the millions of people worldwide that still lack secure access to food and fit nutrition include people living in high-income countries (Gorton et al., 2010; Heywood et al., 2013). In this context, it is especially relevant that wild plants’ nutrient content has great potential for tackling ‘western societies illnesses’ such as chronic diseases including obesity and type 2 diabetes (Bere, 2007; De Cortes Sánchez-Mata & Tardío, 2016; Local Food-Nutraceuticals Consortium, 2005; Marrelli et al., 2020). In line with growing trends of urban foraging (Waygood, 2019), nutritional safety of wild food plants needs to be investigated locally in the light of potential urban pollutants affecting WEPs quality (Amato-Lourenco et al., 2020).

### 1.3.1.2 Economic Benefits

Economically, wild sourcing constitutes a way to provide the household of free resources (Hickey et al., 2016), thus lowering its expenses in the food domain and optimizing land-use unsuitable to agriculture (Powell et al., 2015). In Europe, evidence show that foraging activities can also contribute to boosting income, improving subsequently livelihoods and economic welfare in rural areas through enhanced local markets (Rigat et al., 2016) and tourism (Wiggen & Lexhagen, 2015). Similarly in developing countries, wild foods can be sold to generate additional income (Ahmed, 2019; Suwardi et al., 2020), and the savings from consuming them can provide more finances for different expenses within households (Delang, 2006). As previously highlighted, the role of economic adversity in affecting proper access to nutritive and healthy foods (Galhena et al., 2013), poorly studied positive feedback loops from economic valorization of wild resources may offer wider societal benefits in lowering health care costs, or increase valuable ecosystem services for example (Schulp et al., 2014; Tebkew et al., 2018; Gaba et al., 2020). The impact of economic incentives on increased harvest is also yet to be evaluated (KG2).

### 1.3.1.3 Environmental Benefits

Communities worldwide manage (agro-) ecosystems to guarantee wild production of goods and services (Anderson, 2006; Turner et al., 2011; Bharucha & Pretty, 2010; Powell et al., 2015; Levis et al., 2018). Wild edible plants can be harvested in various spaces (e.g. agricultural field margins, forests, parks) and are prone to co-evolve within changing socio-environments (Bharucha & Pretty, 2010). WEPs are also found in a breeding spectrum within a wide range of habitats (Powell et al., 2015). These eco-cultural landscapes appear as a valuable *in situ* repository, where reciprocal influences of biological and cultural diversities occur, support biodiversity evolution and 'natural' conservation in all its dimension (e.g. genetic, species, ecosystems; Rotherham, 2015). WEPs natural genetic pool served as the basis element when initiating domestication processes (Cinar et al., 2017) and, while much research for policy development focuses on wild crop relatives (Kell et al., 2011; Bjarklev et al., 2019), little attention has been paid to WEPs as sources of future crops (KG3; Bacchetta et al., 2016).

### 1.3.1.4 Socio-Cultural Benefits

Besides changes in traditional WEP collection trends, there are new phenomena associated with plant use appearing in Europe. Who collects WEPs in 21<sup>st</sup> century Europe is poorly studied. In Europe, the use of WEPs appears both as an ancient and on-going subsistence activity mainly practiced by elders, but also as an growing trend in high-end gastronomy and luxury foods (Łuczaj et al., 2012; Łuczaj & Pieroni, 2016; Reyes-García et al., 2015). Migration and new ethnic minorities bring new traditions to their host countries and their adaptation to new floras is a topic of interest in ethnobotany (Medeiros et al., 2012). Yet, immigrating diaspora are little studied regarding their evolving relation with wild food plants in Europe (KG4; Pieroni & Vandebroek, 2007; Pardo-de-Santayana et al., 2010). As “a source of cultural identity, reflecting a deep and important body of knowledge about the environment, survival, and sustainable living known widely as traditional ecological knowledge” (Turner et al., 2011: p3), the use of WEPs may strengthen cultural roots for indigenous people (Kaltenborn et al., 2017). Thus, they can be an important expression of cultural identity and foster a sense of place and belonging for migrants, especially in urban environments (Poe, 2013; McLain et al., 2014; Poe et al, 2014), as well as contributing to enrich European foodways.

### 1.3.2 Promoting WEPs Use Responsibly

#### 1.3.2.1 Questioning the Shift from a Subsistence to Market-Oriented Economy

Given this myriad of benefits provided by WEPs, the promotion of 'sustainable diets' argues for the importance to getting more food produce from the wild (Mithril et al., 2012). While the trends of WEPs use in Europe mostly indicate a reduction of harvesting over the last century, new culinary trends and the use of different wild ingredients, as well as the incorporation of WEPs in the current market-oriented economy, raise sustainable harvesting and conservation issues (KG5; Hamilton, 2005). The economic rationale for valorizing WEPs in markets constitutes another challenge, as the shift from traditional to commercial foraging may alter plant populations (Bharucha & Pretty, 2010). How sustainable and ethical harvesting and consumption of WEPs should happen is yet to be defined (Cambecèdes & Garreta, 2018; Thévenin, 2017) as foragers' behaviours, local knowledge and cultural expertise are essential variables in wild-gathering practices, but rarely included in conservation research (KG5; Albuquerque et al., 2019).

#### 1.3.2.2 Growing Interests, Increased Pressures, and Lack of Data on Sustainability

Finally, in Europe, there is an increased public awareness of wild plant availability and growing harvesting pressures (Łuczaj et al., 2012; Łuczaj & Pieroni, 2016). If examples of overharvesting of WEPs in Europe are not common, some worrying observations have been made on the field (*ibid*; Cambecèdes & Garreta, 2018; Pinton et al., 2018). Most studies on the collection of wild plant resources focussed on aspects inferring selection processes, such as the knowledge, and the final use of collected plants (Albuquerque et al., 2019).

However, some stages of the collection process are often neglected, and few studies have documented processes of semidomestication or paradomestication, what Turner and colleagues (2011) define as "caring for and promoting *in situ*" wild plants. Hence, there is a need for more information "from the selection of the resource to the time when the resource regenerates in nature and is available for collection again" (Albuquerque et al., 2019). Because the inherent notion behind sustainable foraging refers to that wild natural resources should be gathered within the limits of its ability for self-regeneration, one should not overlook the importance of the way harvesting is conducted, as such that the environment or habitat should not be damaged in other ways (Hamilton, 2005). Yet, very little scientific investigation has been conducted on the "levels of damage that species are able to withstand after collection, or the time required for species to regenerate" (KG5; Albuquerque et al., 2019).

Furthermore, the implementation of sustainable harvesting systems suffer from scarcity of comprehensive data on species used and sustainable yields; management regimes and institutions regulating ownership, access and harvesting rights; and legislation and policy for sustainable harvesting (KG5; Schippmann et al., 2006; Mac Monagail et al., 2017; Lovrić et al., 2020; Sardeshpande & Shackleton, 2020).

Table 1. Identified knowledge gaps (KGs) during the literature review, sorted in themes with examples of scientific questions

Theme	Knowledge Gaps (KGs)	Example of questions	Reference
1. Nutrition	Quantitative contribution of WEPs to current European diets Food safety and toxicity of WEPs, especially in (polluted) urban centres	To what extent WEPs contribute to European diets? Is it safe to consume WEPs gathered from urban areas?	Schulp et al., 2014 Powell et al., 2015 Amato-Lourenco et al., 2020
2. Economy	Potential economic incentives to increased WEPs harvest	How to increase economic interest to promote WEPs in a responsible way? How much would WEPs use increase if economic incentives trigger a market-oriented production?	van Kleunen et al., 2020
3. Agronomy	Domestication of WEPs for diversification of food system Ecosystem services and impact on yields	To what extent can WEPs be domesticated and conserved on-farm? What are WEPs impact on cultivation system?	Joshi et al., 2015 Saini et al., 2020 Gaba et al., 2020
4. Socio-Cultural	Sociodemographics about wild-gatherers  Processes of cultural hybridization and social integration of migrating communities	Who are we calling wild-gatherers in Europe?  What are reciprocal influences between evolving biocultural diversities under immigration?	de Albuquerque et al., 2019 de Santayana, Pieroni, and Puri, 2010 Pieroni & Vandebroek, 2007
5. Conservation	Potential impact of foraging on biodiversity  Influences of market integration on the resources, on ownership, access, and harvesting rights, and development of relevant management regimes	To what extent foraging WEPs is a sustainable activity? What are the impacts of management practices (e.g. parodomestication)?  What are impacts, i.e. on ownership, access, harvesting rights, of integrating wild resources into a market-oriented economy?	Delang, 2006 Schipmann, 2006 Mac Monagail et al., 2017 Gallois et al., 2020  Schipmann, 2006 Lovrić et al., 2020 Sardeshpande & Shackleton, 2020

## **1.4 Assessing the Sustainability of Foraging Wild Edible Plants: A Case Study in Norway**

### **1.4.1 From Global Conventions to National Policies and Regulations**

The Convention on Biological Diversity (SCBD, 1992; 2020; Glowka et al., 1994) led by the COPs is the global supporting foundation for every biodiversity conservation endeavours undertaken around the world. It frames all efforts implemented in addressing the Multilateral Environmental Agreements (MEAs) that directly contribute to meeting some of the Sustainable Development Goals (SDGs). As a 'framework convention', the CBD is binding international treaties (e.g. MEAs) and contributes to the establishment of a set of general guidelines and principles for the international governance on biodiversity related issues. Yet international, the CBD must be seen as a global consensus on the world's necessity to preserve biodiversity. It places responsibility at national level to reach the objectives of biodiversity conservation, and the sustainable use of all its components (e.g. genetic, species, ecosystem) (SCBD, 1992). The Nagoya package also known as 'Nagoya protocol' discussed during the COP10 (SCBD, 2020; Buck & Hamilton, 2011) was adopted to increase legal transparency on the 'access to genetic resources and the fair and equitable sharing of benefits arising from their utilization' for both providers and users ('ABS', Nagoya protocol). Traditional knowledge associated to genetic resources that is held by indigenous and local communities is further recognized and directly aim at strengthening the ability of these communities to benefit from the use of their knowledge (e.g. concept of 'right holders'). This add-up to the CBD create a framework for the conservation and empowerment of 'biocultural diversity' that is directly associated to the SDGs of the UN (Buck & Hamilton, 2011; Pimbert, 2017).

#### **1.4.1.1 Biodiversity Conservation from Europe to Norway**

In 1995, following the Rio Summit the Paneuropean strategy on biological and landscape diversity was discussed as the direct lever of the CBD at the European scale. More recently, the European Green Deal was presented in December 2019 and was followed with several plans, pacts, and strategies. The 'Farm to fork strategy' followed these reflections and focussed on sustainable resource management and agri-food systems sustainability. The IUCN's European Regional Office has been increasingly active over the last years, specifically supporting and promoting action plans and measures in the framework of the EU policy work previously done. They usually take the role of convening stakeholders and facilitate discussions on many topics relevant to the new Green Deal. In 2021, the IUCN World Conservation Congress in Marseille will be held and the new IUCN Programme will be approved while charting the pathway for the next four years. Focus areas are sustainable agriculture, food systems and landscapes conservation. Their main outcomes serve as reference and deliver key 'knowledge products' allowing the monitoring of the state of nature. An example is the IUCN Red List of Threatened Species™ examining the extinction risk of species and which will be used for the determination of priority edible species in Norway (Caruso et al., 2015).

Norway is part of the Schengen zone but is not an EU member. Following the CBD, Norway states that all sectors must take responsibility for integrating biodiversity considerations into their administrative orientations. Non-governmental organizations contribute directly to the follow-up of the CBD and Norwegian strategies to sustainably manage biodiversity. Through their expertise and active commitment and participation in the public debate, they play a major role in local planning processes. The Norwegian Association for Foraging and Mycology (NSNF), direct collaborators in this research, is linked to an umbrella association named SABIMA (Norwegian Biodiversity Conservation Council). The latter directly takes part in political discussions on biodiversity. Nowadays, the Norwegian Biodiversity Information Centre holds an online citizen platform which maps species across the country and serve as a reference in monitoring biodiversity evolution (Kålås, 2010).



### 1.4.2 The study of People-Plants Ecologies to Foster Conservation

Studies focussing on the intersection between food security and biodiversity conservation are needed while rural spaces should be seen as socio-ecological systems “embedded within intersecting multi-scalar processes” (Wittman et al., 2017). System properties should be investigated holistically, addressing highly complex research questions requiring interdisciplinary and more integrated approaches and methodologies (Pomade, 2018). The intersecting study of biological and cultural diversity (‘biocultural diversity’; e.g. Pretty et al., 2009) “involves disciplines of natural sciences, such as conservation management, biology and ecology” and “disciplines of cultural sciences, such as archaeology and anthropology” (Solberg et al., 2013). Biocultural heritage conservation management offers the opportunity to merge both natural and cultural disciplines, enabling a more holistic and integrated approach in considering the People-Environment socio-ecological continuum (Figure 1; Solberg et al., 2013; Pomade, 2018; Hanspach et al., 2019).

To understand current socio-ecological interactions, studying local historical cultural practices and comparing them to emerging trends, and associated knowledge systems (e.g. contents and transmission modes) seem essential (Barron, 2015). In Norway, associations and food movements within *haute* cuisines are showing more attention to biological heritage as part of their local culture and identity (Hermansen, 2012; Munk, 2019). This may increase pressure on WEPs, thus providing a good case for ethnobotanical research on People-Plants ecologies.

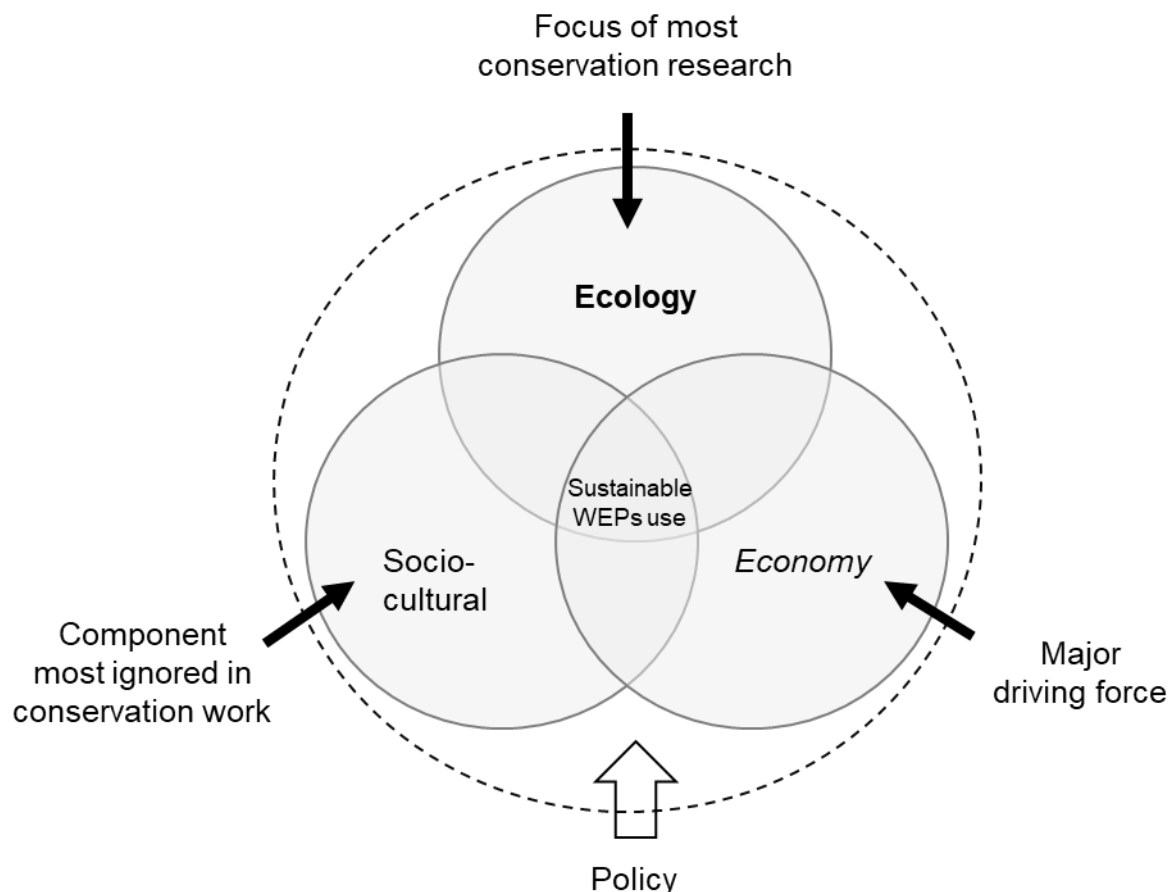


Figure 1. Sustainable use of plants, adapted from Martin (1994) and Cunningham (2001).

### 1.4.3 Sustainable Foraging of Wild Edible Plants and New Nordic Food Movements

#### 1.4.3.1 New Nordic Food Movements: Cuisine, Diets, and Growing Interest in Wild Foods

In Nordic countries, the interest for natural living, complementary medicine, and eco-friendly plant production in society is subsequently increasing. In this context, following trends of the Slow Food and Mediterranean diets movements, the New Nordic Cuisine is triggered by a gastronomic revival (Hermansen, 2012; Münke et al., 2015). Defined as “a contemporary food discourse based only on produce grown and ways of cooking “native” to the Nordic region”, the New Nordic Cuisine movement gained popularity in the first decade of the 21st century and puts emphasis on local foods (Hermansen, 2012; Munk, 2019). While the New Nordic Kitchen Manifesto pushes on promoting Nordic producers and produce “to spread the word about their underlying cultures” and contribute to food innovations within a traditional framework (Norden, 2004), ‘guidelines for the new Nordic diet’ focus on the nutritional aspects of integrating wild foods in Nordic plates (Mithril et al., 2012). Led by pioneering chefs at restaurants such as Noma in Copenhagen and Maaemo in Oslo, this has increased the significance and use of wild plants in the Scandinavian food culture. These modern trends rely on new foraging practices of specific plant species, raising sustainable harvesting and conservation issues (Hamilton, 2005). Based on the review search, ethnobotanical research has not yet been done in Norway regarding foraging activities and its impacts on plant communities. More specifically, a growing interest likely to increase the use of available resources, putting more pressure on the environment. Increasing foraging practices promoted by amateur associations and an emerging high-end gastronomic trend based on local produce (i.e., the New Nordic Cuisine) is likely to raise people’s awareness and willingness to harvest natural resources. Recently, newspapers articles have highlighted potential harvesting issues, especially around major urban centres (Mathismoen, 2020). Altogether, this makes Norway’s People and Plants an interesting case for studying the effects of foraging activities on WEPs conservation.

#### 1.4.3.2 Study Site(s): Natural and Cultural Aspects

Norway has 5.4 million inhabitants, with 82% of its population concentrated in urban settlements. Around 20% of the Norwegian population lives in Oslo. Other major cities are Bergen, Stavanger, Trondheim, Tromsø and Kristiansand. Norway is a sparsely populated country, with a surface of 323 808 km<sup>2</sup>. 37% of the land surface is covered by forests, and another 38% by open firm ground, or areas with low vegetation including mountain and moorland areas. From the remaining 25%, 3.5% is devoted to agricultural production and almost 2% is build-up (Statistics Norway, 2020).

Protected areas, including see zones, account 61 144 km<sup>2</sup> (19% of total land surface). Table 2 below presents the different protection schemes and associated surfaces. Given Norway’s geography, one can find a diversity of landscapes and around 55 000 species inhabiting them (Norwegian Environment Agency, 2015). Norwegian landscapes stretch from southern temperate to alpine mountains and Arctic islands, with a long coastline characterized by numerous fjords. Norwegian biodiversity has a remarkable varied country with diverse geology and topography, and combined with centuries of human history, Norway’s appear with diversified and marked landscapes. Ancient glacial times have shaped landscapes that are under current climate features such as the Gulf Stream well suited to human cultural activities. A third of Norway’s mainland is covered by forests where around 60% of plants have been recorded. The remaining 40% is associated with open landscapes, that are mostly influence in some way by the country’s cultural history. Today’s vegetation has been shaped by locals that have through times foraged, hunted, fished, and farmed, to name a few activities.

Table 2. Protected areas in 2019 Norway (adapted from Statistics Norway, 2020)

Protected areas (2019)	Total (km <sup>2</sup> )	Land (km <sup>2</sup> )	Land (%)	Sea (km <sup>2</sup> )	Sea (%)	Number of protected areas
All protection purpose	61144	56574	17.5	4570	3.1	3117
National parks	32980	31524	9.7	1456	1.0	40
Nature reserves	9007	7401	2.3	1606	1.1	2414
Landscape protection area:	18335	17262	5.3	1073	0.7	195
Marine protected area	242	0	0.0	242	0.2	6
Other protections	657	394	0.1	263	0.2	462

Norwegian biodiversity is estimated to reach about 55 000 species, and so far, up to 44 000 have been identified. Even though biodiversity is relatively well monitored, and the fact that human density remains low, many species and habitat types are under threat in Norway. The Environmental Ministry recognize that there are remaining major knowledge gaps about ecosystems, and consequences of change need to be explored. As it is happening at a global scale, land-use change is the most important factor in spaces and species erosion. Although climate change will likely enhance agricultural production in Nordic areas (EEA, 2019) it puts severe pressure on its natural ecosystems and impacts temperatures and precipitations. Anthropogenic pollution, invasive exotic species, and over-exploitation follow in the threat list of Norwegian biodiversity (Statistics Norway, 2020).

The intrinsic value of natural spaces and species in Norway is well recognized, but their practical value emerges also when diving into Norwegian culture. Norway is famous for having a population that are often characterized as ‘outdoor people’. The concept of *friluftsliv* can be defined as lifestyle of “open-air living” and is deeply rooted in Norwegian culture (Smith, 2020). Official statistics shows that almost 80% of the population goes on trips for hikes, more than 40% goes on fishing trip, and more than a third goes out in the wild to forage berries or mushroom (Statistics Norway, 2020). Oslo, the country’s capital city, is surrounded by three forests which are directly accessible by public transport. In addition, there is ‘freedom to roam’ in Norway (*Allemannsretten*). ‘Freedom to roam’ states that every citizen can roam freely as a fundamental right, and this applies even to private land. You can circulate and pick wild foods if you take care of the environment, people, and life-long residents or landowners (Regjeringen, 2019). However, this right is nuanced by the following two concepts: *innmark* (mainly considered as agricultural fields) and *utmark* (mainly forests and other ‘natural’ areas). The freedom to roam applies with few rules in the *utmark*, while stricter limitations exist in the *innmark*. For example, you should avoid walking on agricultural fields, including pastoral meadows, from May to October (i.e. the growing season).

Wild edible plants Ethnobotany in Norway has been documented in two major texts: the “Norwegian Flora” by Gunnerus (*Flora Norvegica*; 18<sup>th</sup> century) and “Plants and Tradition” by Høeg (*Planter og Tradisjon*; 1974). Even though Norway has a rich historical development of plant uses from the Viking Age until today, it seems that plant knowledge may have been under-documented (Teixidor-Toneu et al., 2020) and few ethnobotanical studies exist on foragers and WEPs in Norway (Alm, 2015). Only specific examples of plant uses exist in Norway, such as *Rhododendron tomentosum* (Stokes) Harmaja develop from North Sami material (Alm & Iversen, 2010) or *Rhodiola rosea* L. (Alm, 2004), yet these often do not record nor focus on human food uses and foraging techniques. Robinson (2007) explores the shift from gathering to agricultural communities in Denmark and southern Sweden, but nothing is done in Norway. While current Nordic Human-Nature relationships are quite famous across the world, few ancient and folk traditions have been documented and very little is known about people, plants, and practices in the Norwegian foraging domain.

## 1.4.4 The 'Nordic People and Plants' Project

### 1.4.4.1 Funding, Time-Table, and Outcomes-Deliverables

The 'Nordic People and Plants' (NPP) project has been funded by the Research Council of Norway through their SAMKUL program (Project Number: 283364 "People and Plants – Rediscovering and safeguarding Nordic ethnobotanical heritage"). The project includes two postdoctoral positions (a one-year linguist position and a three-year ethnobotanist position), one research assistant position (three years, part-time) and the involvement of two senior researchers. It started in November 2018 and will run at least until April 2022 (Norges Forskningsråd, 2018).

In total for the project, academic deliverables include: Six academic publications, two books, one interdisciplinary online database, participation in five international conferences, and an improved living collection of Nordic botanical heritage plants at the Botanic Garden of Oslo.

### 1.4.4.2 Interdisciplinarity as a Mean to Study Biological and Cultural Influences

This masters' thesis research took part in the context of the NPP research project, which aims at rediscovering and safeguarding Nordic botanical heritage. This interdisciplinary project addresses essential questions in cultural history and evolution, ethnobiology and botany, and simultaneously tackles a pressing societal concern - the loss of traditional knowledge about biodiversity and its ecological services. Plants are a prerequisite to human life in all aspects; NPP studies the role of plants in Scandinavian culture from the Viking Age until today, drawing from historical, archaeological, botanical, and ethnobotanical sources (Norges Forskningsråd, 2018).

### 1.4.4.3 Transdisciplinarity: Involving Non-Academic Stakeholders to Scale-Up Impacts

Used as food, medicines and building materials, plants allow a new look into old cultural practices that shaped biodiversity through time and space. Wild plants in particular have been overlooked. To do so, Karoline Kjesrud from the Museum of Cultural History and Anneleen Kool and Irene Teixidor-Toneu from the Natural History Museum of Oslo, started a joint collaboration and aimed at involving different disciplines, but also make connections beyond academia and engage with different stakeholders in Norway.

NPP has thereby established a citizen science project for the transcription of historical handwritten texts (Nordic People and Plants, 2020) and collaborates with Norway's Folk Museum to document memories of plant use in the context of their *minner* (lit. "memories") online platform (Minner, 2020).

One of the key aims of the NPP project is to safeguard traditional ethnobotanical heritage in the Nordic region. To do so, researchers partner with non-governmental associations whose aims are aligned, notably, the Norwegian Association for Mycology and Foraging (*Norges Sopp- og Nyttvekest Forbund*, NSNF).

Hence, the research team engages in constant and diverse outreach activities, mostly in collaboration with the NSNF and other associations to maximise the transmission of research results to those interested members of the public (history, gastronomy, foragers and plant enthusiasts).

#### 1.4.4.4 Collaborating Research Partners: The Norwegian Association for Mycology and Foraging or *Norges sopp- og nyttevekstforbund* (NSNF)

The Convention on Biological Diversity's Biodiversity Targets (SCBD, 1992) suggest that management strategies should make use of incentives to 'nature-users in conservation (Hutton & Leader-Williams, 2003; Waygood, 2019). Indeed, before the Nagoya protocol (2010), discussions on the safeguard of biodiversity have mainly focussed on scientific expertise to assess conservation status and act on protective measures targeting 'ecologists' such as National Parks managers (Cunningham, 2001:7). Recently, the FairWild Standard emerged to bridge this gap by addressing the sustainable use of wild plants combining both scientific and local expertise (FWF, 2010).

The 'Norwegian Association for Mycology and Foraging' or *Norges sopp- og nyttevekstforbund* (NSNF) contributed to this research. NSNF consists of almost 5700 members, of which 500 are active within the organization and engage in running local societies or running courses. These members may include traditional, amateur, and professional foragers. This partnership is mutually beneficial at multiple levels. First and foremost, the objectives of this study was discussed with the association leader, Pål Karlsen, whose primary aim was to design guidelines for sustainable foraging in Norway (Figure 2).

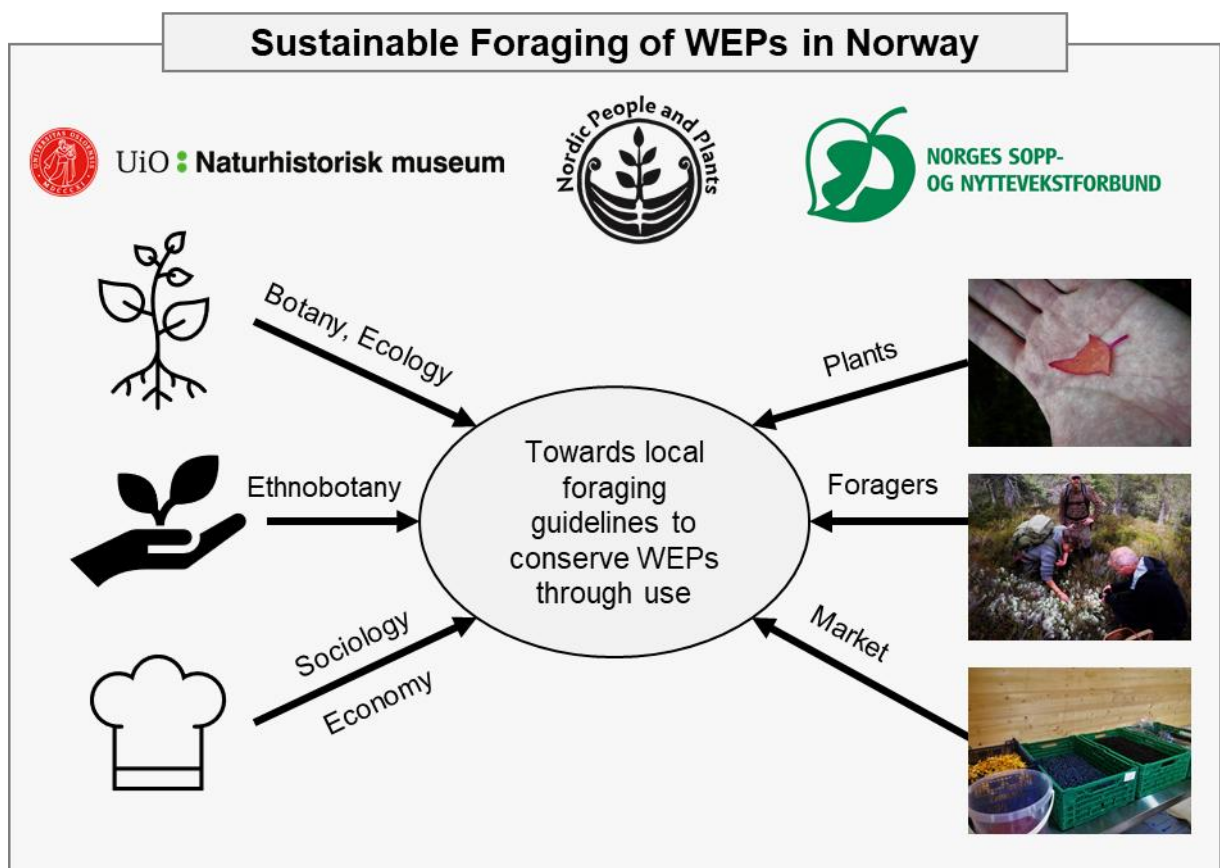


Figure 2. Overview of the study purpose, stakeholders and disciplines involved

## 1.5 Theoretical framework

Sustainability is a contested term and any attempt to defining it demands considerations of “what is being sustained, for how long, for whose benefit and at whose cost, over what area and measured by what criteria” (Pretty, 1995:2). An interdisciplinary and participatory action-oriented approach was used to ensure adequate consideration of the sociocultural implications of the answers to these questions, as defined by Pretty (1995) and the FairWild Standard (2010). Participatory ethnographic tools are suitable to bring forth important motivation features for the use of WEPs by locals (Cruz-Garcia, 2017). They are a valuable source of information and contribute to the contextualization and visualization of stakeholders’ personal perceptions and experiences of sustainability (Pretty, 1995). Successful examples of researchers’ participation also show that it further amplifies incentives for the design of sustainable foraging activities in practice and in policy (O’Neill et al., 2017; Pío-León et al., 2017). Hence, the sustainability of WEPs foraging was assessed by integrating both scientific and local expertise (FWF, 2010).

Participatory approaches to development are often equally ill-defined and can range from passive stakeholder manipulation to genuine transformative empowerment (Pretty, 1995). Therefore, the approach taken for this research was explicitly designed to achieve the highest levels of participation, namely “interactive participation” and “self-mobilization” in which “people take initiatives largely independent of external institutions” (Pretty, 1995: 7). That concrete actions can be undertaken for long-term benefits is at the core of such levels of participation, and key is the involvement of participants in setting priorities and checking the research process (Pretty, 1995; Caruso et al., 2015). The research was therefore designed and implemented together with representatives from *Norges sopp- og nyttevekstforbund* (NSNF), which aim at designing a set of sustainable guidelines for foragers.

Assessing the sustainability of current WEP foraging activity in Norway requires an investigation of both humans and plants involved in these practices. Not only is this subject a matter of botanical and ecological concern, but it also reflects issues of cultural heritage. Such an assessment is inherently complex given the high diversity of actors involved (Pretty, 1995) as well as the stakes perceived concerning the conservation of wild flora for long-term benefits (Schulp et al., 2014). Considering this complexity an ethnobotanical approach was adopted as this discipline integrates local ecological worldviews with environmental management concerns (Prance, 2007). Ethnobotany is however an inherently interdisciplinary pursuit involving many disciplines related to the study of people and plant relationships (Martin, 2014: p. 3) (e.g. ecology, anthropology, and sociology). This was important for the research as socio-cultural components are often ignored in classic conservation research, while ecology and economics constitute respectively the “main focus” and “major driving force” of research (Cunningham, 2001: p. 6). Given the action-led design of the research it was of paramount importance how any proposed interventions would be received by stakeholders.

The definition of sustainable harvesting provided by Hamilton (2005) frames the present study, considering that the “resource should be harvested within the limits of its capacity for self-renewal [... and] the manner of its harvest should be such as not to degrade the environment in other ways” (p.1). Therefore, volume and gathering proceedings in relation to foraging activity are important elements to consider and should not be used without the context of place in regard to sustainability. However, this study does not constitute a “resource assessment” (Hamilton, 2005:3) but hopes to provide baseline data that is meaningful to the community and that may contribute to local development of management plans in Norway, if ever necessary. Hence, the assessment is contextualized with a qualitative evaluation of the risk of foraging in Norway.

## **1.5.1 Thesis Scientific Problem: To What Extent is Wild Edible Plants Foraging a Sustainable Activity in Norway?**

### 1.5.1.1 Study Objectives

Key objectives and research questions to the investigation of the topic were identified and developed in close collaboration with NSNF. The background literature review presented above identified a series of Knowledge Gaps in regard to wild edible plant foraging in Europe (Table 1, p.8). Of these, the present study focusses on gaining new knowledge of KG4 and KG5, respectively addressing sociodemographic and conservation gaps. More concretely, social and cultural constructions driving attitudes on the field are explored and related to their potential impact on WEPs biodiversity.

Hence, this master's thesis has four main study objectives : (1) characterizing the socio-ecological context of WEPs foraging in Norway (2), exploring socio-cultural and economic motivations as well as perceptions of foraging and (3) investigating socio-ecological interactions established through the foraging process (e.g. how the market influences foragers' attitudes, and then biodiversity?). Overall, (4) an attempt to assessing the impact of foraging and discussing the definition of what could be a 'sustainable foraging activity' in Norway is made, identifying potential risks and misuses of WEPs (e.g. are there any species of concern deserving prioritized actions?) towards the design of best harvesting practices.

### 1.5.1.2 Research Questions and Hypothesis

To characterize the socio-ecological context of WEPs foraging in Norway, identify potential detrimental practices and species of concern, and investigate socio-cultural and economic influences on foraging attitudes, this thesis addresses the following research questions:

- (1) Who is harvesting wild edible plants in Norway? (i.e. who are foragers in Norway - i.e. professionals, amateurs?) What is the knowledge of foragers about sustainability and practices?
- (2) What and why plants are being harvested? (i.e. what are their ecological traits and conservation status? What are the motivations for foraging them?)
- (3) How are plants being harvested? (i.e. quantitatively/volume harvested and qualitatively speaking/ways of harvesting; What are important ecological plant traits in foraging WEPs and what are 'best practices' limiting potential negative impacts?)
- (4) What are interactions between providers and processors, and how those affect WEPs biodiversity? Are there any vulnerable culinary species emerging from Field-Market interactions?

Foraging and harvesting modes are assumed to have an impact on biodiversity. For instance, that plants for which underground organs or bark are harvested may be more vulnerable than others if not propagated vegetative.

Second, depending on foragers' characteristics, as for instance amateurs or professionals, a hypothesis is that these have different socio-cultural and economic constructs, thus different perceptions and expertise, and thereby different attitudes and impacts.

Finally, the New Nordic Food movements is expected to spark off the interest for wild edible plants thereby potentially increasing pressure on the latter.

The following section describes the biocultural approach taken to answer the research questions presented above, fulfil the study objectives, and discuss the overall thesis problem statement.

## **PART 2 | Methodology**



## 2 Part 2. Methodology

This research was conducted from April to October 2020 within the context of the Nordic People and Plants project (NPP). The objective was to collect relevant data to establish context-specific guidelines for 'sustainable foraging' activity in Norway. NPP further desired for this process to be grounded in participatory and community-based ethnobotanical research to ensure ownership of these guidelines by the foraging community.

The appropriate characterization of 'sustainable foraging' required to relate people's worldviews (i.e. perceptions) and constructs (i.e. background, experience) driving WEPs collection to attitudes on the field (i.e. practices) in Norway. A mixed-methods approach was therefore taken to combine qualitative information about these social considerations with quantitative data about the flora involved with WEP foraging activity. Doing so enabled the research to provide a more complete picture of reality (Denscombe, 2008) which allowed for constructivist exploration and holistic analysis of trends in foraging activities in Norway.

As mentioned previously, this research builds on the pre-existing interest of the foraging community in Norway. That concrete actions can be undertaken for long-term benefits is at the core of high levels of participation, and key is the involvement of participants in setting priorities and checking the research process (Pretty, 1995; Caruso et al., 2015). The research was co-designed with NSNF representatives and conducted in four phases (Figure 3) which are described henceforth.

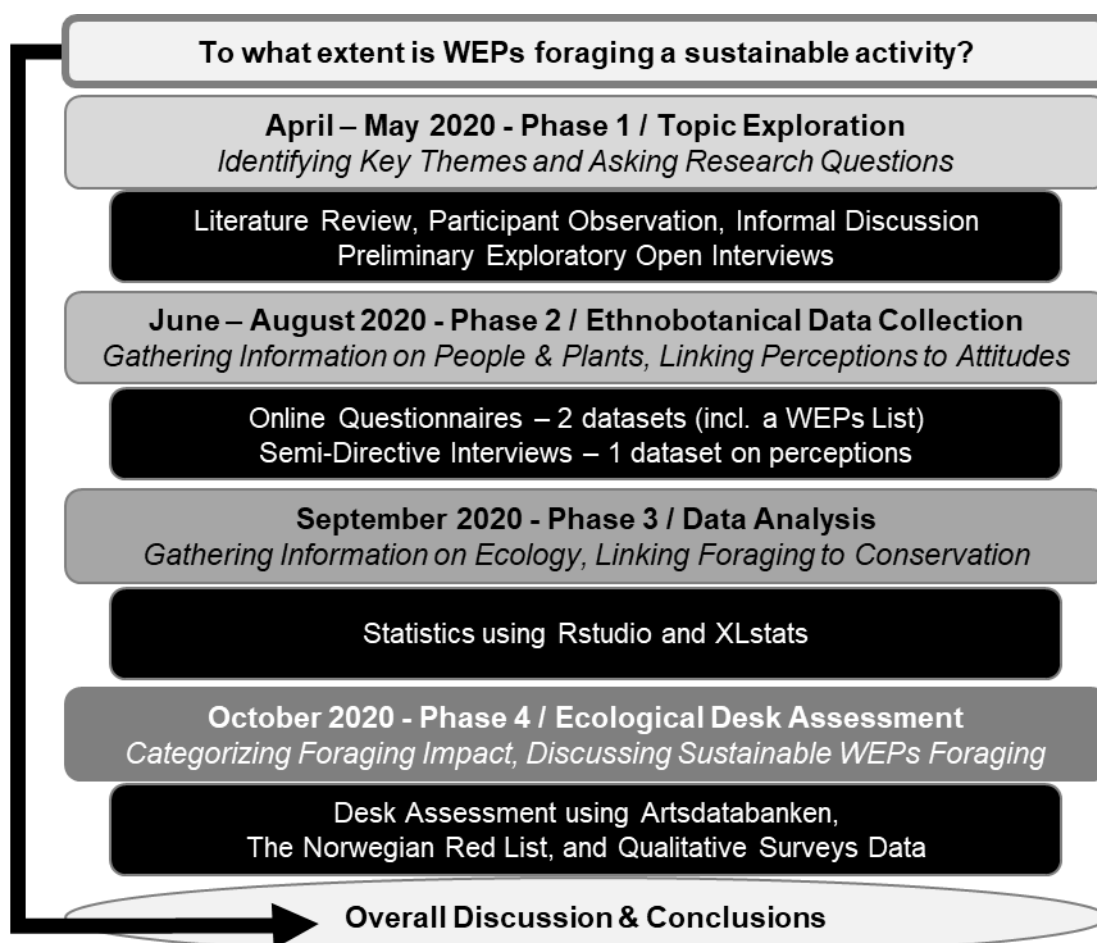


Figure 3. Thesis phases with methods used

## **2.1 Phase 1 - Topic Exploration**

### **2.1.1 Literature Review**

A systematic literature review was conducted from April to July 2020 in relation to the ethnobotany of WEPs, conservation and strategies applied at field, market, and policy levels. Initially this review was conducted at the global level before focusing specifically on the European and Norwegian contexts (see Appendix 2 for literature workflow).

### **2.1.2 Preliminary Interviews, Participant Observation, and Informal Discussions**

Five preliminary unstructured interviews were conducted with key informants in May and June 2020 to explore and clarify relevant themes for the Norwegian context (see Appendix 3 for interview guide). The research context was presented to each informant prior to commencing the interview. Foragers were then asked about their experience and perspectives on sustainability. This method was chosen to allow the informants to bring their own thoughts and opinions to further identify relevant and recurring themes (Albuquerque et al., 2019). These interviews were conducted over phone or video calls due to travel restrictions imposed by the COVID19 pandemic. Audio recordings were stored on an external storage.

In August 2020, participant observation during WEP forays and informal discussions with professional and non-professional foragers was used at the beginning of the study to explore perceptions and values associated to WEPs and to the practice of foraging them (Cunningham, 2001). This helped identify the knowledge of local experts and also to build trusting relationships. This line of work was fundamental for the holistic comprehension of wild plant collection in Norway and aimed at supporting future stakeholders' mobilization and the development of relevant knowledge systems needed to enhance sustainable foraging practices (Hamilton, 2005).

## **2.2 Phase 2 - Ethnobotanical Data Collection**

Primary ethnobotanical data was collected via interviews with stakeholders in the Norwegian foraging community and Nordic food movement, as well as an online questionnaire.

### **2.2.1 Semi-Structured Interviews**

Building on the initial five interviews, snowball and convenience sampling methods were used to identify informants within the Norwegian foraging community. These methods were appropriate given the small size and difficulty of accessing this dispersed social group (Bernard & Bernard, 2013). Interviews were facilitated through collaboration with the NPP research team and NSNF. NSNF project leader was accompanied on field trips to meet foragers and attend workshops and workdays in order to conduct interviews.

The Code of Ethics of the International Society of Ethnobiology (2006; Caruso et al., 2015: p. 9, 10) were followed. The ethical guidelines of the University of Oslo (2013) and the Norwegian University of Life Sciences (NMBU, 2016) were followed as well. Approval from the Norwegian Center for Research Data, *Norsk Senter For Forskningsdata* (NSD), was granted (Reference number 157596) and allowing data collection from face-to-face interviews (Appendix 4 and Appendix 5). Free prior informed consent (FPIC) was obtained verbally or in writing before each interview (see consent form in Appendix 6).

Fourteen semi-structured interviews were conducted between August and September 2020. A map of Norway detailing the number of informants interviewed at each locality is provided in Appendix 7. Interviews were concentrated in five localities in Norway, namely

Oslo, Arendal, Stavanger, Trondheim, and Inderøy. Each locality provided in-situ observation of different landscapes and WEPs as well as a diversity of local perceptions on WEPs distribution and availability that would have been impossible to obtain from an online questionnaire alone.

### 2.2.2 Online Questionnaires

No previous ethnobotanical surveys had been conducted on the foraging of WEPs in Norway prior to this research, and a combination of methods increased the representativeness of the study (Denscombe, 2008). Hence an online questionnaire was used to develop an ethnobotanical dataset to complement the detailed qualitative data provided by the interviews.

The complete questionnaire consisted of three sections based on key themes on WEP foraging identified during the initial five interviews. After a brief introduction to the research the first section asked questions related to the practices used by foragers to harvest plants as well as the knowledge of WEPs held by foragers. Listing and multiple-choice questions were used for these questions and respondents also had the opportunity to add comments. Listing tasks are easy to run and effortless for respondents as they do not require forced responses. No minimum nor maximum were imposed to fill these lists. The second section asked questions about individual perceptions and values associated with foraging WEPs using Likert scale statements (e.g. “foraging contributes to my sense of community”). In the final section respondents were asked to provide sociodemographic data.

The questionnaire was made purposely long to gather primary data on a wide range of different aspects relating to foraging WEPs in Norway (see Appendix 8 and Appendix 9 for questionnaires template in both language). In line with the ethical considerations given to interviews, consent for using survey data was also requested at the beginning of the online questionnaire.

The questionnaire was written in English and translated into Norwegian (*Norsk*) by research colleagues at the Natural History Museum (NHM). English and Norwegian questionnaire templates were transcribed on *Nettskjema*, the Norwegian research tool for creating and handling online surveys and data. The questionnaire was distributed through various social media platforms (see list in Appendix 10) as well as via the social media networks of the primary informants. It was also published on the NHM's website, as well as the NSNF's June's newsletter and mailing list. As a result, the sampling method used for respondents was targeted to foragers who had an online presence.

Respondents were able to complete the questionnaire from June 4<sup>th</sup> to July 5<sup>th</sup>, 2020. It was anonymous and had no time limit for completion. The aim was to reach over 100 foragers in Norway to enable reliable statistical analysis of a range of variables that could help relate foragers typologies and worldviews to foraging attitudes. A forager was defined broadly as a person who spends time outdoors to gather wild food plants. As mentioned in the review manuscript, different foragers' typologies were targeted, such as traditional-amateurs, neophytes-amateurs, or professionals, while staying aware of potential other foragers' typologies that could emerge from the study (e.g. semi-professionals).

In total, 221 foragers responded. However, two individuals did not provide consent and hence 219 questionnaire results were included in the final analysis.

## 2.3 Phase 3 - Data Analysis

Three databases were created as means to analyse responses gathered from interviews and online questionnaire. The first database consisted of a list of WEPs mentioned in the online questionnaire. The second database consisted of categorical variables coded from the online questionnaire and used for qualitative and quantitative statistical analysis. The third database referred to a matrix of qualitative data collected during face-to-face interviews.

### 2.3.1 First Dataset – Foraged Plants, Ecological Traits, and Conservation Status

Lists of plants mentioned in the questionnaire were entered into Excel to develop a plant dataset following Caruso et al. (2015). Informants were listed in rows, with elicited items (i.e. plant species) which they could then expand upon (i.e. “if you ever forage berries, please list all plant species in this category”) in subsequent columns. Plant species were kept in the same order as they were mentioned in the questionnaire.

Many of the plants listed were mentioned with folk or local names, while some were mentioned with their scientific names. The names provided were hence cross-referenced with three scientific botanicals to accurately count the number of reports of each plant species identified (Høeg, 1974; Kålås, 2010; NSNF, 2020). Species that were not identifiable via these sources were discussed within the research team and identified at species level if ever possible. If impossible, taxa identification was kept at genus level. The resulting scientific nomenclature and plant families were checked using The Catalogue of Life (Roskov et al., 2019). XLSTAT (Addinsoft, 2020) was used to count the total number of different plant species listed by respondents (PR for plant reports per respondent), as well as the number of times plant species were cited (NR for number of reports for plant species).

Further variables were subsequently added to the WEP list, including: the most commonly used folk names (retrieved from artsdatabanken), scientific names, botanical family, number of reports per plant part, total number of reports (NRs) per plant, Norwegian Red List of Species status (IUCN classification of plant species in Norway), invasiveness, perennation, life form, woodiness, clonality, comments on ecology, and - if any - comments from respondents of the online questionnaire on conservation issues for specific species.

This generated an initial dataset detailing the identified WEPs, parts foraged, and their associated variables (Appendix 11, Appendix 12, Appendix 13). This data was used as a proxy to assess the cultural status of a foraged WEP in this study. Cultural importance of WEPs has been evaluated through their gathering frequency, i.e. amounts of products harvested or consumed and provided a first overview of the importance of certain species for the foraging community as a whole, and for subsets such as professional or amateur foragers.

#### 2.3.1.1 Cultural Domain Analysis: Lists and Saliency per Plant Parts

Foraged plants provided in online questionnaires were processed as free-lists, which were analysed with tools commonly used in cultural domain analysis, an anthropological method useful to define the boundaries of what is being studied (i.e. a “domain”; Caruso et al., 2015). During free-listing, objects are listed in a given domain such as parts of plants gathered for food, and specific items may be identified by their ubiquity and their saliency to explore the content and structure of the related domain (Purzycki & Jamieson-Lane, 2017; Vuillot et al., 2020).

Saliency can be characterized by the frequency (F) and the rank order (r) by which an item is listed. This is defined as “cognitive saliency” or the “accessibility of specific items” where “items listed earlier are typically more salient and often more ubiquitous within a sample”

(Purzycki & Jamieson-Lane, 2017). Item salience is calculated as follows (Caruso et al., 2015; Purzycki & Jamieson-Lane, 2017) where  $n$  is the total number of items listed by an individual and  $k$  is the order in which an item was listed:

$$\text{Item salience} = \frac{n + 1 - k}{n}$$

In this free-listing exercise, the objects listed were WEPs in the foraging domain. It is important to note that these 'free-lists' were collected from the online questionnaire. This meant that respondents had more time to reflect and answer than they would during oral free-listing. Also, in order to interpret collection practices in light of the plants ecology, lists were compiled for each botanical plant part (e.g. berries, flowers, leaves) which is an unconventional way to run free-listing tasks in ethnography (see Caruso et al., 2015 for the conventional way).

From each botanical part list, salience per species was calculated with the R package AnthroTools (Purzycki & Jamieson-Lane, 2017) in RStudio (Rstudio Team, 2020). Salience calculations per plant part were used to explore the importance of WEPs and to what extent they might be vulnerable in relation to the plant parts being foraged. These datapoints were valuable for the ecological assessment of the impact of foraging practices (i.e. collected plant parts) on plant species and the identification of potential species of conservation concern. For instance, during impact assessment (Phase 4) the most salient species in the root list would be considered potential WEPs of conservation concern. Indeed, as collecting root systems would likely affect the reproduction of individual WEPs, it could possibly alter the plant community (Hamilton, 2005).

### 2.3.2 Second Dataset - Questionnaire Analysis

Other than the WEPs list, a second dataset based on online questionnaires was built. This time, the units of analysis were questionnaire respondents. The dataset consisted of a mix of qualitative (QL) and quantitative (QT) variables. On one side, QL variables could refer to sociodemographics such as the foraging type (professional and/or amateur) or the membership of an association such as NSNF. Other QL variables were relating to respondents' subjective experience (e.g. perception of foraging impact) and self-assessed knowledge (i.e. perceived 'cultural expertise'). On the other side, QT variables, such as the number of plant reports respondents mentioned (PR), reflect the diversity of plant species they forage. In ethnobotanical analysis, PR is taken as a proxy to evaluate the knowledge and 'cultural expertise' of informants in a domain, here foraging of wild edible plants. Each variable was coded to ease the analysis on XLSTAT (Addinsoft, 2020).

#### 2.3.2.1 Statistics

First, descriptive statistics were used to summarise the data gathered from the questionnaire. Second, exploratory statistics were used to find potential associations between variables. For instance, the mean and standard deviation of the number of plants listed by respondents in the questionnaire were calculated across types of foragers such as professionals or amateurs. Third, further statistics were generated to describe the relationships between types of foragers, and their knowledge, perceptions and attitudes towards foraging and practices in the field. For instance, perceptions on the sustainability of WEP foraging were also explored in the online questionnaire. Using a Likert scale, respondents had to indicate their level of agreement (1= 'I completely disagree' to 5= 'I completely agree') with the following statements: (1) Some plants are more vulnerable than others and should be harvested in a specific way; (2) Foraging WEPs can be unsustainable; and (3) Foraging WEPs is a sustainable activity.

Factorial analysis was added to investigate associations between people's perceptions and socio-cultural constructs (i.e. background, experience). Based on a Fisher test, the design included an analysis of the consensus of the perceived impact of foraging on biodiversity and between types of foragers. Variables included in the analysis were: foragers' professionalization (amateurs or professionals), age classes, membership (non-members, willing to become members, or members), frequency of foraging (from being a regular to an occasional forager), foragers' self-assessed level (from being a novice to an expert), and foragers' knowledge and awareness of specific foraging regulations (e.g. on land access, plant collection rights).

Other statistical tests were conducted to explore linkages between socio-cultural constructs, knowledge and attitudes on the field. For example, expertise levels were compared between professionals ( $n < 30$ ) and amateurs, and between members and non-members, through the Mann-Whitney test, using the difference in the total number of plant reports elicited by these foraging categories. The Pearson correlation coefficient was also calculated between quantitative variables to elaborate on relationships between age, foraging and consumption frequency, self-assessed level, and total number of plant reports per respondents (PR).

Parametric tests are more powerful than non-parametric tests and were therefore preferred whenever the conditions (e.g.  $n > 30$ , conditions of independence, normality, and homoscedasticity) allowed to use them. In case of unfulfilled conditions, non-parametric tests were conducted because they would be more robust, and residuals always checked. For all statistical tests, a significance threshold of  $\alpha = 0.05$  was used.

### **2.3.3 Third Dataset - Interview Analysis**

Twelve interviews were recorded and transcribed using the open software OTTER (Otter.ai, 2020) freely available on the internet. Audio and transcripts were deleted from the online software to ensure data protection. Personal data were anonymised by using codes instead of names in any written paper or electronic document. A key linking names with codes was written on paper and kept locked in a cabinet at the Natural History Museum (University of Oslo). All transcripts were revised, and non-accuracies adjusted by hand while listening to the audio tape. Seven other interviews could not be transcribed, because they were not recorded. This is because these interviews were conducted either on the phone or in the field, with little opportunity to obtain a good quality audio recording. Instead, notes were taken and transcribed on a word document. Transcriptions were analysed with colour-coding and emergent themes related to the perceived impact of foraging were extracted from transcripts as variables in an Excel file. Relevant and interesting quotes illustrating these themes were noted down to support the qualitative analysis (Caruso et al., 2015).

## **2.4 Phase 4 - Ecological Desk Assessment**

An impact assessment was conducted to identify potentially vulnerable WEPs and risks in relation to foraging activities in Norway. This was done by merging ecological data and conservation information available online, with the data collected from the online questionnaire. Again, the total number of plant reports per species (NRs) was used as a proxy to evaluate the cultural importance of WEPs in the foraging domain in Norway. Elicited WEPs were ranked from the highest to the lowest according to their NR. Together with salience calculations on botanical plant parts, this enabled to identify potential conservation concern and the risk of overharvesting native species or dispersing invasive species targeted by foraging activities. In other words, high-ranked WEPs were checked upon the botanical parts harvested from them in combination with ecological plant traits (i.e. life cycle and reproduction traits: perennation, life form, woodiness, clonality), IUCN conservation status in Norway (Kålås, 2010), and local observations given in the online questionnaires.

This data was used to categorize each species with regards to potential ecological impact under the current foraging pressure (Figure 4). Impact was defined and assessed differently depending whether a plant was native (risk of extinction/overexploitation) or alien (risk of invasion/spread). Following separating listed plants into native and alien, WEPs were scored ranging from G for green (no or little risk; with a nuanced assessment G\*, indicating that exceptions to the main category may exist), O for orange (potential risk), to R for red (high risk). To summarize the assessment, descriptive statistics on the calculations of proportions of each score were performed. Preliminary advice was suggested as general guidelines to be discussed later on (Hamilton, 2005).

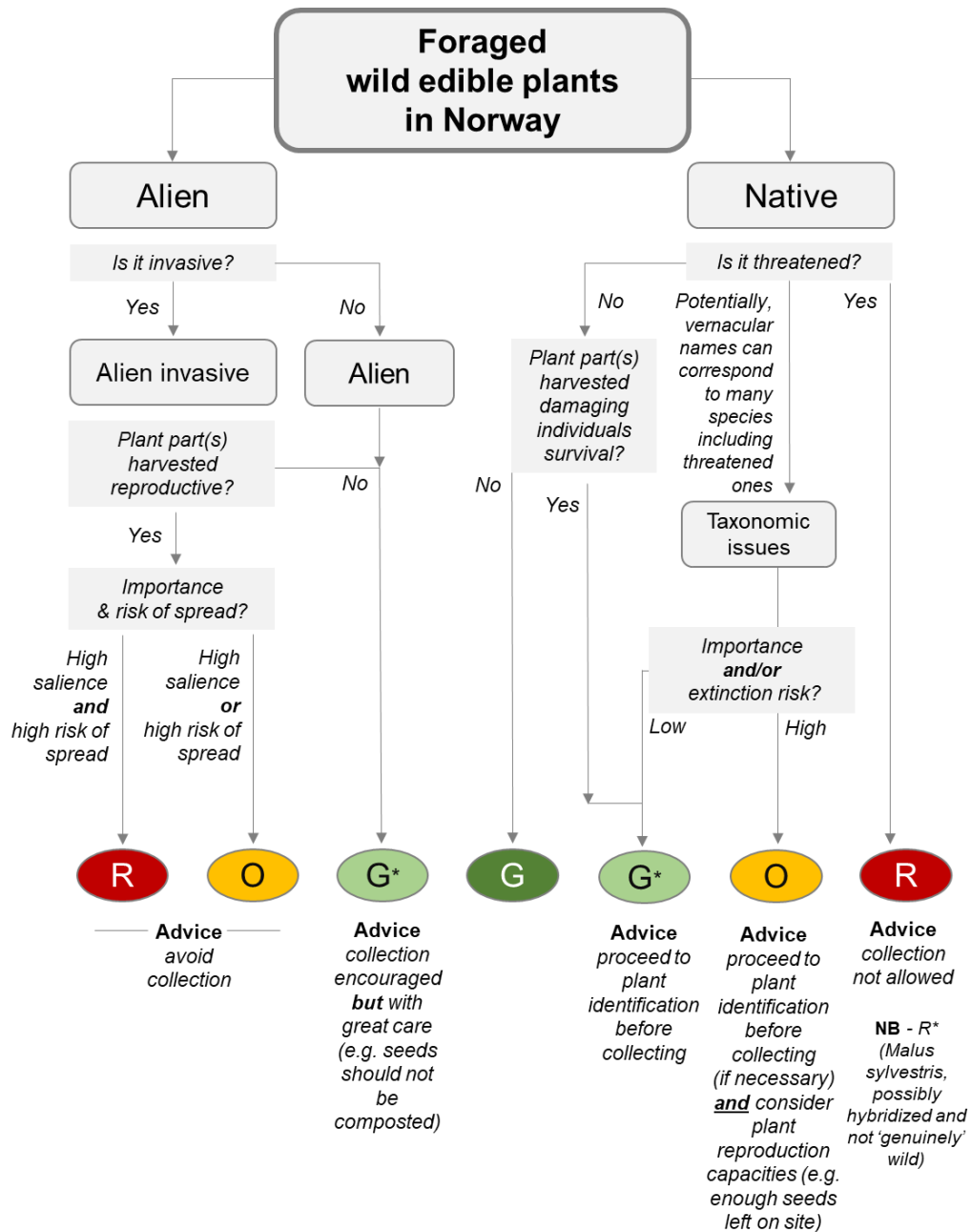


Figure 4. Decision flow-chart to categorize WEPs according to foraging activity

## **PART 3 | Results**



### 3 Part 3. Results

#### 3.1 Foraging Knowledge and Practices

##### 3.1.1 Foragers' Socio-demographics

The online questionnaire collected responses from 219 foragers. Of them, 207 foragers (94,5%) considered themselves as amateurs while 11 respondents (5%) forage professionally. As also stated by several informants during interviews, there is a continuum from being an amateur to a professional forager as most of those who forage professionally are likely to have another job on the side. According to the online survey, most amateur foragers are older than 50 years old, very few people under 30 forage, while most professionals are over 30 years old (Figure 5a). More than half of the amateur and 95% of professional foragers are members of an association such as the NSNF (Figure 5b).

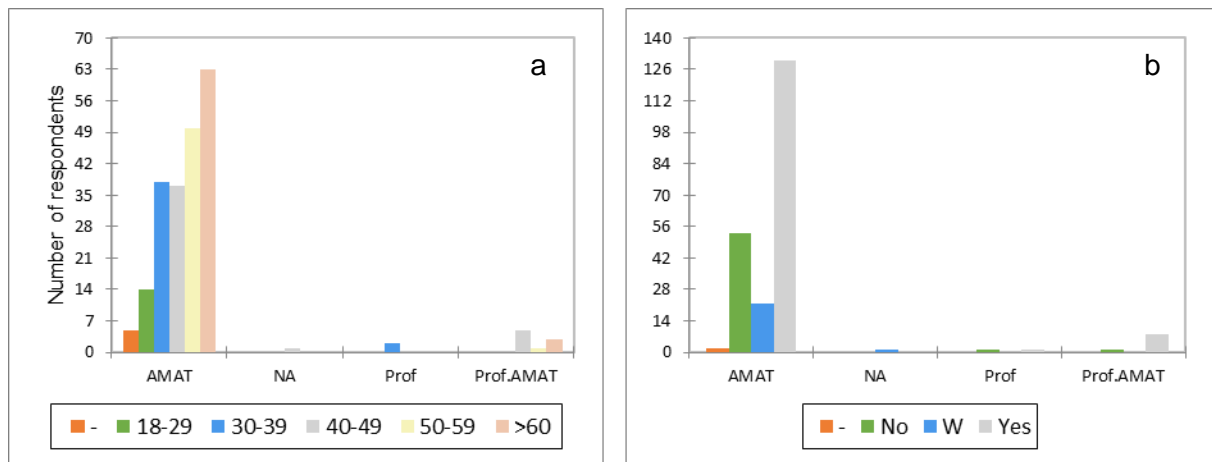


Figure 5. (a) Age of foragers belonging to different types of foragers, i.e. professionals (Prof.), amateurs (AMAT), or both (Prof.AMAT); (b) Memberships of different types of foragers, i.e. having membership (Yes), willing to get one (W), or not interested (No)

##### 3.1.2 Knowledge

Most foragers both gather, process and consume wild plants (online questionnaire, >96%). Other than food, WEPs are being foraged for their ornamental value (68%) and their medicinal properties (31%). Respondents also referred to the educational aspects of foraging: 11% of them like to teach about WEPs to other people, while 39% like to learn about WEPs while they forage. Less than 3% go foraging every day, whereas almost 40% forage regularly one to three times a week (Figure 6a). Most foragers (>91%) consume WEPs at least once a month (Figure 6b). Around 25% of foragers gather WEPs between one and three times every two weeks and another 25% every month. While most foragers only harvest WEPs from the wild, almost 40% of respondents mentioned either transplanting WEPs from the wild to their own garden (31%; Gardening of Wild Plants) and/or tending WEPs directly *in situ* (8%; Tending of Wild Plant populations) (Figure 6c).

The number of elicited items per informant is often used as a proxy to determine respondents' knowledge within a domain. Professionals reported more plants on average than amateurs (40 plants vs. 15 plants on average for professionals and amateurs, respectively), which suggests that they have more knowledge in the domain of foraging (Mann-Whitney test,  $p$ -value<0.001). While professional foragers forage often (varying from every day during high season to 1-3 times every two weeks in low season), so do many amateurs.

Members of foraging associations reported significantly more plants on average than people who forage but are not members of such associations (Mann-Whitney test,  $p$ -value<0.05). Table 3 shows Pearson's correlation coefficients between foraging frequency and other quantitative variables (Pearson's test  $p$ -value<0.05). The number of plant reports per respondent increases with the self-assessed knowledge level. The self-assessed knowledge level also increases with age, foraging frequency, and consumption frequency. Unsurprisingly, foraging frequency increases greatly with consumption frequency (Pearson's correlation coefficient 0.612;  $p$ -value<0.05).

Most respondents reported getting their knowledge by themselves (78.5%), through literature and a personal practice of foraging. While 69% learn from family and 36.5% friends, more formal education such as courses and workshops are also an important source of knowledge for 16% of respondents. No significant relationship was found between types of foragers (i.e. amateurs or professionals) and the learning modes (i.e. personal, family, or education-based sources of knowledge).

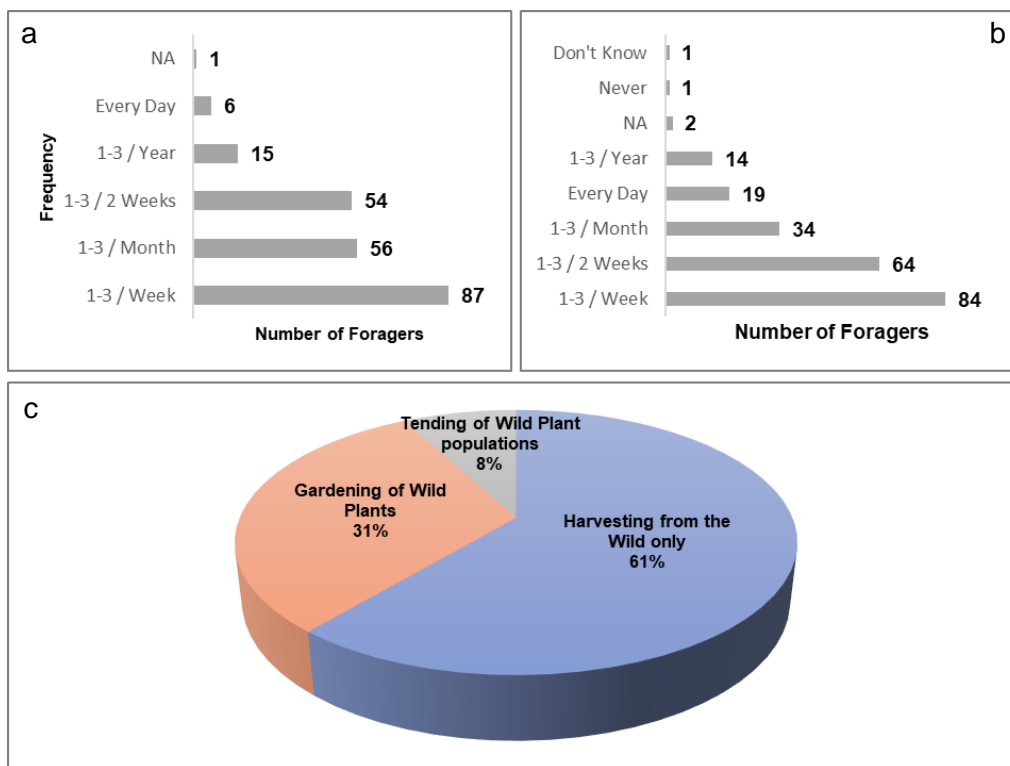


Figure 6. (a) WEPS consumption and (b) gathering frequencies; (c) Attitudes related to WEPS gathering, such as transplanting from the wild to the garden (red) or tending WEPS in-situ (grey)

Table 3. Pearson's correlation matrix between quantitative variables

Variables	Age	Foraging frequency	Consumption frequency	Self-assessed level	Total of PR
Age	<b>1*</b>	0.0658	0.0449	<b>0.158*</b>	-0.0248
Foraging frequency	0.0658	<b>1*</b>	<b>0.612*</b>	<b>0.192*</b>	<b>0.327*</b>
Consumption frequency	0.0449	<b>0.612*</b>	<b>1*</b>	<b>0.217*</b>	<b>0.181*</b>
Self-assessed level	<b>0.158*</b>	<b>0.192*</b>	<b>0.217*</b>	<b>1*</b>	<b>0.424*</b>
Total of PR	-0.0248	<b>0.327*</b>	<b>0.181*</b>	<b>0.424*</b>	<b>1*</b>

Note. In **bold\***, significant relationships ( $p$ -value<0.05)

### 3.1.3 Ethnobotanical Description of Wild Edible Plants Foraged in Norway

A total of 273 WEPs belonging to 67 botanical families were identified at species or genus level from 3647 reports (NR). Seven families had high NRs and constituted 65% of the total NRs. The families with the highest number of reported species are Rosaceae with 29 taxa (10.5%) and Asteraceae with 27 taxa (<10%). Apiaceae and Brassicaceae were represented by 18 plants each (6.5%), followed by Lamiaceae (5.8%; 16 taxa), Fabaceae (4.7%; 13 taxa), and Ericaceae (4%; 11 taxa). The remaining 60 families are represented by less than 8 species each (<3%).

According to the number of reports, the most popular WEPs foraged in Norway are *Vaccinium myrtillus* L. (208 reports), *Rubus idaeus* L. (165 reports), *Chamaenerion angustifolium* (L.) Schur (157 reports), *Taraxacum officinale* Weber ex Wigg. (155 reports), *Vaccinium vitis-idaea* L. (150 reports), *Allium ursinum* L. (145 reports), *Urtica dioica* L. (144 reports), *Rubus chamaemorus* L. (122 reports), *Fragaria vesca* L. (104 reports), *Sorbus aucuparia* L. (101 reports), and *Filipendula ulmaria* (L.) Maxim. (100 reports). The remaining 263 taxa have less than 90 citations each and 124 taxa are only cited by one or two respondents. Fruits and berries, leaves, and flowers are the most important plant parts that are foraged amongst respondents. While berries were collected by 216 respondents, 188 respondents reported collecting leaves, and 160 respondents reported collecting flowers.

### 3.1.4 Foraging Practices

#### 3.1.4.1 Species Salience per Collected Plant Parts

Considering what plant parts are foraged is important because it stems from specific cultural practices (i.e., specific uses) and the foraging impact varies depending on the plant part that is foraged. The most salient fruits and berries foraged are *Vaccinium myrtillus* (Salience index 0.76), *Rubus idaeus* (0.46), *Vaccinium vitis-idaea* (0.45), *Rubus chamaemorus* (0.31), and *Fragaria vesca* (0.26). *Urtica dioica* (0.43), *Allium ursinum* (0.36), *Aegopodium podagraria* L. (0.25), and *Taraxacum officinale* (0.20) are the most salient items for which the leaves are foraged. The most salient flowers foraged are those of *Chamaenerion angustifolium* (0.33), *Filipendula ulmaria* (0.32), and *Taraxacum officinale* (0.31). Regarding plants of which stems are foraged, *Chamaenerion angustifolium* is more salient (0.38) than *Matteuccia struthiopteris* (L.) Tod. (0.17) and *Angelica archangelica* L. (0.14) followed by *Reum rhabarbarum* L. (0.10), *Allium ursinum* (0.08), and *Reynoutria japonica* Houtt. (0.08).

#### 3.1.4.2 Important Plants and Collected Parts

Figure 7 shows the most foraged WEPs in Norway, which can be considered the most important species in the foraging domain in Norway. Most these species are also salient: nine have high salience index in the berries' list, nine also in the leaves' list, seven in the flowers' list, and six in the stems' list. These are 'key' species in the foraging domain and refer to WEPs that are most likely to be listed (and collected) by a member of the overall foraging community, all groups considered (e.g. professionals, amateurs). Only two species, *Picea abies* (L.) H. Karst. and *Rosa canina* L., found in the list of the 23 most reported species, have a null salience in lists of important plant parts.

A similar analysis was conducted, separating WEPs' importance for professionals and amateurs. A comparison of salience indices shows that these groups have most species in common, with only slight differences in rankings.

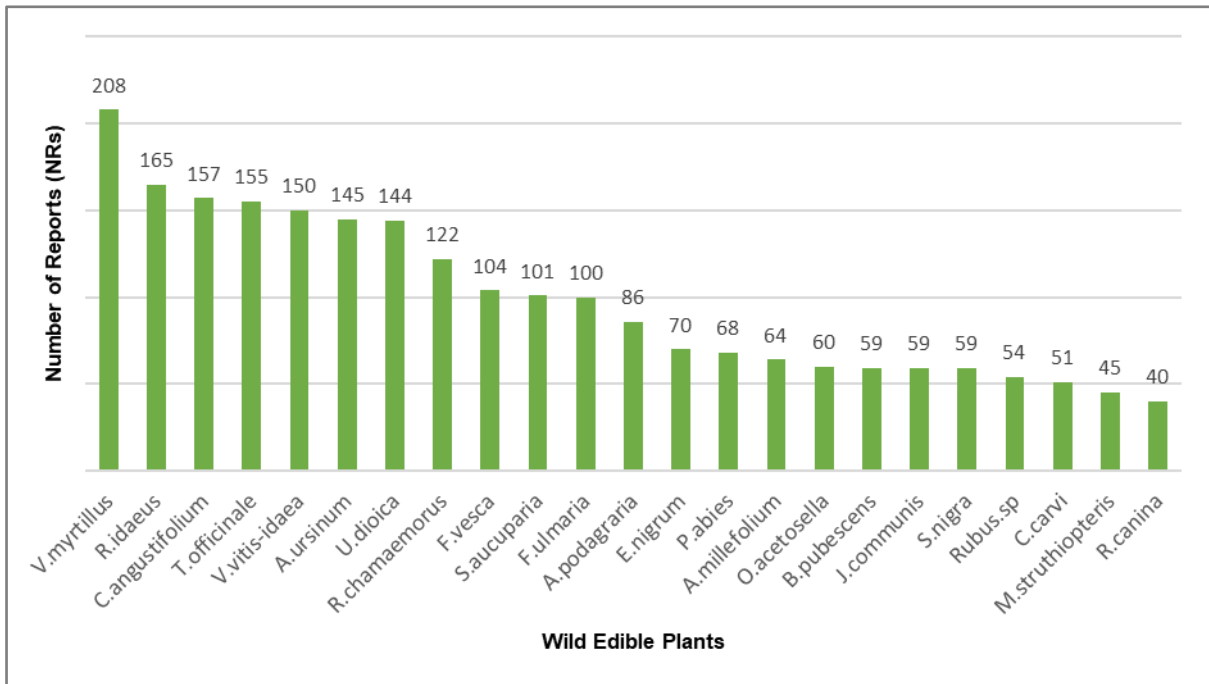


Figure 7. Most reported WEPs in this study

## 3.2 Foraging Motivations and Trends

### 3.2.1 Motivations: A Life-long Learning Lifestyle towards a Sense of Freedom

#### 3.2.1.1 Evolving Reasons: From *Matauk* to *Friluftsliv* or From Necessity to Recreation

Traditionally, foraging was “driven by necessity” and done in combination with farming, hunting, or fishing. The concept of *matauk* literally means ‘food increase’ (from Norwegian *mat* = food and *auk* = increase). It refers to a traditional practice of subsistence lifestyles, which was apparently common within Norwegian households in the past before the major industrial and green revolutions. People would complement their food sources from small-scale farming, through *matauk* activities that were mostly done in the wild but not exclusively. According to one amateur informant, *matauk* mostly refers to hunting and fishing activities that are famously embedded within the Norwegian culture. However, it also refers to growing vegetables in the garden, or going out in the forest for a ‘mushroom hunt’ or ‘berry picking’. Foraging WEPs though, apart from berries and very common plants such as *brennesle* (*Urtica dioica*), is not so ‘traditional’ as such. As a subsistence activity, *matauk* also fulfils certain economic and nutritional goals of foraging, especially because the idea of *matauk* was to collect and store as many vitamins as possible to spend the long and dark up-coming winter.

According to the same informant, this is a concept in decline. As the need to store wild foods decreased and was subsequently removed following the industrial and Green revolutions, foraging became much more a means to have fun and enjoy the *friluftsliv* (*fri* = free, *luft* = air-outdoors, and *liv* = lifestyle) or the famous Nordic outdoors lifestyle. Similarly, based on interviews, from gathering to processing, cooking, and eating WEPs; having a ‘goal’ with foraging activities, seems to motivate the use of WEPs by foragers. On one hand, foragers enjoy the ‘hunt’ and the sense of freedom, as well as the nutritional and gastronomic rewards. On the other hand, chefs use WEPs within their cuisines as a way to express their Nordic identity while telling a story of Scandinavian culture.

Recreational, learning, and nutritional aspects are the most popular reasons for foragers to go out foraging. Environmental and other reasons, such as food and taste aspects, and the idea of sharing valuable knowledge of foraging are also quite popular among Norwegian foragers (Figure 8).

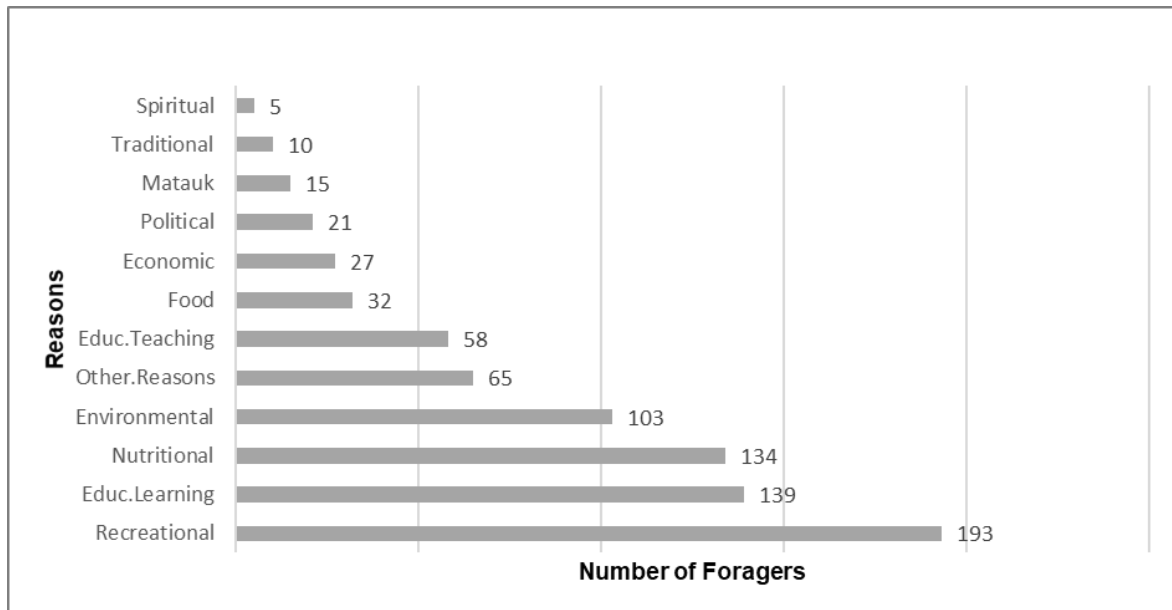


Figure 8. Reasons for foraging in Norway. Other reasons include Spiritual, Traditional, Matauk, and Food (i.e. gastronomic identity, taste experiences)

### 3.2.1.2 Values Associated with Foraging of Wild Edible Plants

According to most foragers and chefs, integrating wild food plants in their cooking is a way to express their 'freedom' as part of their 'lifestyles' and their identity. They feel free in developing a strong connection with the natural environment in which they act, and they are looking for something 'different' than what the societal norm has to offer. Even though they make money from using WEPs, it is not so much about making a living out of it as it is about 'doing' a living with it. For most of them, this is a way to 'relocalize' their spirit and put all their energy into something 'meaningful' that makes sense not only at a local level, but also at a global scale. 'Knowledge sharing' about these 'lifestyles' is as important as being able to live a 'free life', thereby showing the world that another way is possible.

There's a consensus on the many benefits that foraging and consuming WEPs provide, ranging from enabling a 'healthy' daily live (e.g. through being able to exercise while eating nutritious foods) to having 'fun' and enjoying new 'tastes' and 'experiences', and even 'learning and sharing wild ideas'. Aligning with what interviewees mentioned, Figure 9 illustrates the values associated with WEP foraging in Norway by questionnaire respondents. Most people agree with foraging having interesting educational features (online questionnaire responses, 92%). The practice is also associated with a strong recreational value for most respondents of the online questionnaire (95%). This is followed by a consensus on the gastronomic values of using WEPs (84%), and the cultural and traditional values of the foraging 'lifestyle' (78%).

The relationships between these values were explored with a factorial analysis (Table 4). A positive correlation exists between foraging as a 'cultural' and a 'family' tradition (Pearson's coefficients 0.563, p-value<0.05). WEP foraging as part of a 'healthy lifestyle' is also strongly correlated with foraging and using WEPs to enhance local cuisine and develop new culinary traditions (0.629; p-value<0.05). This gastronomic aspect of WEPs is also correlated significantly with foraging as a 'recreational' activity (0.420; p-value<0.05).

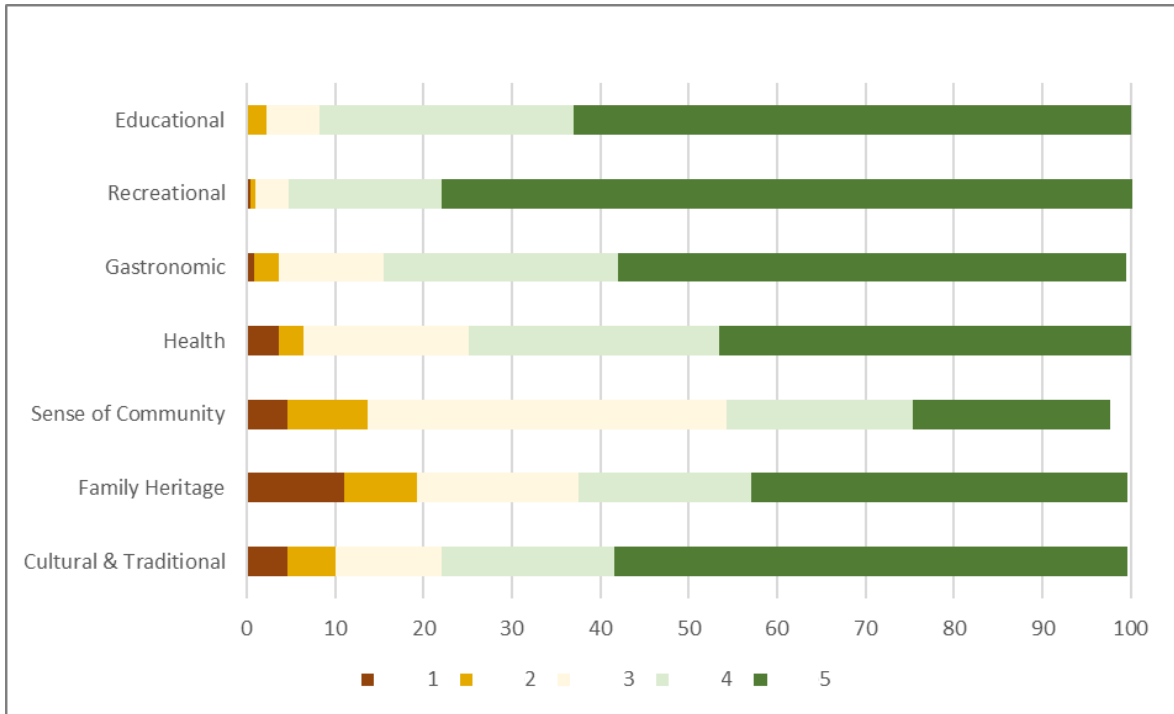


Figure 9. Values associated with foraging Wild Edible Plants in Norway; from 1 (red) completely disagree to 5 (green) completely agree

Table 4. Pearson's correlation matrix between identified values of foraging

Variables	cultural	family	community	health	cuisine	recreation	educ	sustainable	unsustainable	plant vulnerability
cultural	1*	<b>0.563*</b>	<b>0.216*</b>	<b>0.336*</b>	<b>0.347*</b>	<b>0.239*</b>	0.034	<b>0.218*</b>	-0.121	0.015
family	<b>0.563*</b>	1*	<b>0.269*</b>	<b>0.231*</b>	<b>0.253*</b>	0.099	-0.060	<b>0.150*</b>	-0.129	-0.061
community	<b>0.216*</b>	<b>0.269*</b>	1*	<b>0.319*</b>	<b>0.332*</b>	0.076	<b>0.186*</b>	<b>0.262*</b>	-0.079	-0.060
health	<b>0.336*</b>	<b>0.231*</b>	<b>0.319*</b>	1*	<b>0.629*</b>	<b>0.292*</b>	<b>0.224*</b>	<b>0.315*</b>	-0.103	0.007
cuisine	<b>0.348*</b>	<b>0.253*</b>	<b>0.332*</b>	<b>0.629*</b>	1*	<b>0.419*</b>	<b>0.181*</b>	<b>0.331*</b>	-0.049	0.109
recreation	<b>0.239*</b>	0.099	0.0765	<b>0.292*</b>	<b>0.420*</b>	1*	<b>0.311*</b>	<b>0.284*</b>	0.052	<b>0.180*</b>
educ	0.035	-0.061	<b>0.186*</b>	<b>0.224*</b>	<b>0.181*</b>	<b>0.311*</b>	1*	<b>0.199*</b>	0.122	<b>0.214*</b>
sustainable	<b>0.218*</b>	<b>0.150*</b>	<b>0.262*</b>	<b>0.315*</b>	<b>0.331*</b>	<b>0.284*</b>	<b>0.199*</b>	1*	-0.103	0.072
unsustainable	-0.121	-0.129	-0.079	-0.103	-0.049	0.052	0.122	-0.103	1*	<b>0.262*</b>
plant vulnerability	0.0152	-0.061	-0.060	0.007	0.109	<b>0.180*</b>	<b>0.214*</b>	0.072	<b>0.262*</b>	1*

Note: In **bold\*** significant relationship at level  $\alpha=0.05$

### 3.2.1.3 Foraging Lifestyle: Knowledge for Freedom

Based on interviews, foraging is experienced as an eco-friendly lifestyle that is not tied to consumerism. As a way to escape our globalized society towards a real sense of 'freedom', foraging may be a sustainable alternative to the conventional societal lifestyles.

Discussing about freedom and how to define it, one informant said the following:

*"I think it's in human nature to have [a need] of control, on your environment... And we can solve that in two different ways: we can remove the things we don't know about [...] or we can learn what the things we don't know about are, and then we have control over the environment, get relaxed about it, and enjoy the anarchy."*

Most foragers pointed out that WEPs should not be seen only as great ingredients that mostly elites can enjoy in tasting experiences. While they recognize that delivering to gastronomic restaurants is a way to promote the practice, they claim it should not only stay enclosed within the *haute cuisine* spheres that only a handful of people may be able to access. Analysis from interviews and from the questionnaires resulted in a clear idea: Nordic gastronomic cuisine promotes WEPs directly as ingredients but does not promote the foraging 'lifestyle' as such. For most foragers, it is important to fill that gap, to create stronger connections between foragers and chefs and also to talk about the biological and cultural diversity that underlies the wild foods production system. It's not only about promoting sustainable ingredients, but also about promoting a 'sustainable lifestyle' that has great value for global societal transitions.

### 3.2.2 Perceptions: A Sustainable Lifestyle Yet Unsustainable Practices Exist

#### 3.2.2.1 Perceived Impact of Foraging

Respondents have different interpretations of what sustainability means. Some participants seem to be thinking about the direct impact foraging has on plant communities, other participants seem to be thinking about the larger effect the foraging lifestyle has on society. Despite these different interpretations, most people believe that foraging can be sustainable, although the perceptions on whether foraging practices can be sustainable, vary. The majority of respondents of the online questionnaire (90.5%; Figure 10) agree that some edibles may be more vulnerable than others, and therefore deserve specific foraging treatments. Even though most people (75%) agree that foraging WEPs is a sustainable activity, there was less agreement as to whether foraging WEPs might be unsustainable in some cases. While 50% agree to some extent, 21% have no opinion and almost 24% disagree. Respondents who believe that foraging is potentially 'unsustainable' also mentioned that some 'plants are more vulnerable than others' (Factorial analysis, correlation coefficient 0.262; p-value<0.05).

Younger people are more likely than older people to think that foraging might be unsustainable (Factorial analysis, correlation coefficient -0.134; p-value<0.05). Regular foragers believe that foraging is a sustainable activity (0.203; p-value<0.05). While members and regular foragers (i.e. people foraging one to three times a week) have no opinion on the impact of the activity, self-assessed experts think that the activity can either be positive or negative (p-value<0.05).

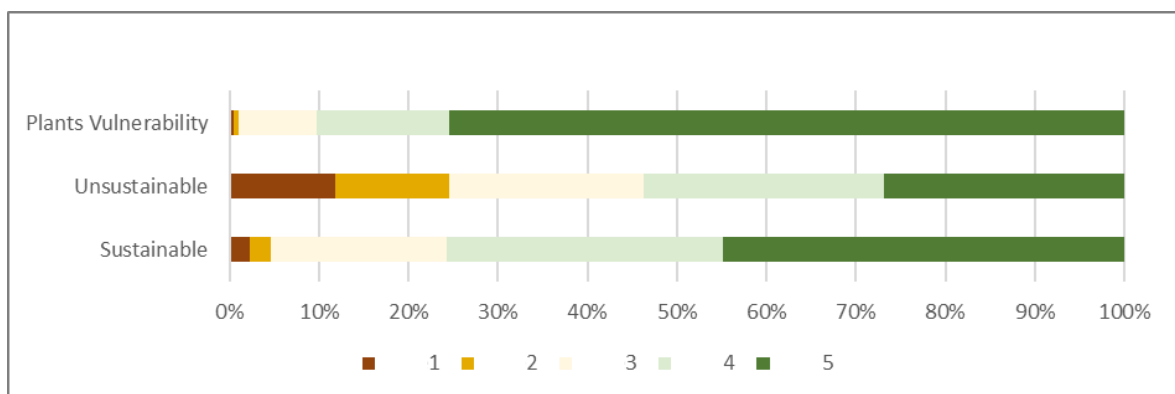


Figure 10. Consensus analysis on the sustainability of WEP foraging using Likert scale from 1. Completely disagree (red) to 5. Completely agree (green)

### 3.2.2.2 Localized Pressures on ‘Popular’ WEPs: Navigating the ‘Trendy’ but ‘Secret’ Foraging Activity

Informants interviewed face-to-face (n=19) were adamant that foraging is not a major threat to biodiversity, yet they also mentioned that some plant conservation issues may arise at a local scale. The decline of WEPs in Norway has also been reported in the online questionnaire (Figure 11), and overharvesting may happen locally for some species (e.g. *Allium ursinum*) in densely populated areas.

*“Overharvesting of ramsløk in certain areas [may occur] close to the city, where it is harvested for commercial use. [...] Ramsløk is in no way threatened [...] but there may be a decline in suburban areas if the harvesting continues as it is now.”*

Localized negative impacts thus seem to happen on specific species, such as *ramsløk* (*Allium ursinum*). Thirty-nine observations on the local decline of this species were reported in the online questionnaire and the *ramsløk* case was mentioned in each and every interview. *Strutseving* (*Matteuccia struthiopteris*; 24 mentions in online questionnaires), and *strandkål* (*Crambe maritima* L.; eight mentions in online questionnaires), also seem to be ‘fashionable’ plants on which an increased foraging pressure may occur locally.

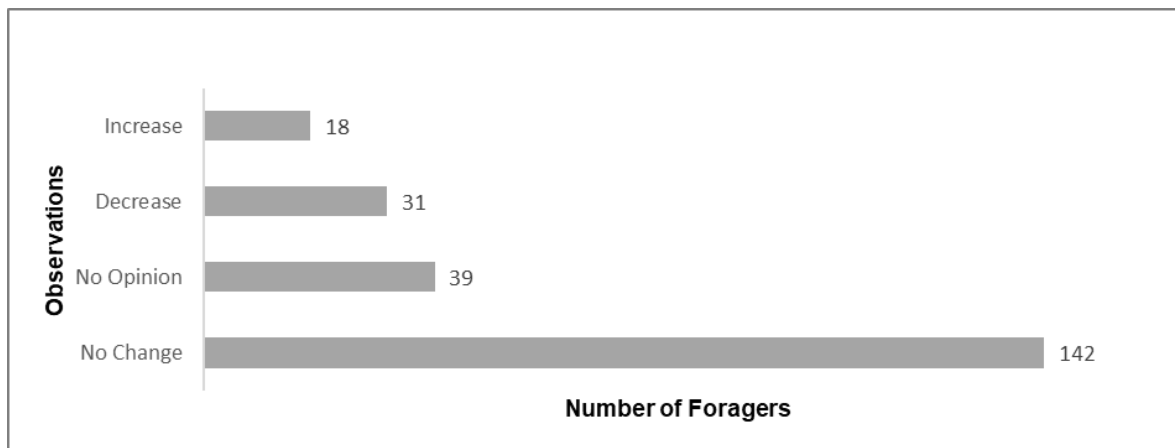


Figure 11. Number of observations for which a change in availability has been observed

### 3.2.2.3 The Use of Wild Edible Plants triggered by Nordic Food Movements

This idea of ‘fashionable’ or ‘popular’ plants surfaced regularly within the results. One online questionnaire respondent wrote:

*"It's important to spread knowledge about sustainable harvesting. Some plants, such as ramsløk, have become fashionable plants. Celebrity chefs and food columns in the media need to be aware of their influence"*

The popularisation of WEPs seems to be influenced by New Nordic Cuisine chefs. One informant shared her story about how she started to forage for a restaurant in 2010. She had read a small notice in the *Aftenposten* (national newspaper) where journalists wrote about the opening of the ‘first whole ecological restaurant’ in Norwegian history. She suggested them to use locally sourced foods, such as WEPs and more specifically wild garlic (*Allium ursinum*). Apparently, this is how the ‘fashionalization’ of WEPs started in Norway. The restaurant was Maaemo. The informant explained to me how the use of WEPs by chefs at Maaemo may have contributed to its culinary development and put them on



'another level', being able to compete with the best restaurants not only in the Nordic region but all over the world. The popularity of WEPs thus seem to have increased during the last decade along with the creation and rise of Norway's most famous Nordic kitchen, which now counts three Michelin stars and was ranked 35th in the 2018 'World's 50 Best Restaurants'.

Even though WEPs seem to be promoted by *haute* and *avant-garde* cuisines, commercial foraging activity remains quite informal in Norway. Professionals have their own and different logistics for commercial foraging. Similarly, in the amateur foraging context, the activity remains quite secret and anonymous, something that is shared within small groups of close relatives. A concrete example is the story of *Molte* (*Rubus chamaemorus*). Respondents mentioned the famous '*molte* rule', an unwritten rule that lies somewhere in between paragraph five in the Outdoor Recreation Act and a sense of moral obligation. At one point in the Norwegian law and the Diversity Act, the famous berry was protected and specific rules applied to specific foraging times and volumes: one could not harvest an unripe berry and have more than a fixed amount per person. However, the *molte* rule has evolved to an empirical concept that frames the foraging activity in itself: "one should not pick more than a third of what is on site" and "one should not disclose their *molte* collection spots", they wrote in the questionnaire comments. An informant told me about how careful and sceptical she is with "spreading the knowledge" about harvesting sites. However, she would never miss an opportunity to share her expertise on WEPs botany and 'right' foraging techniques.

#### 3.2.2.4 Sustainability Guided by the Foragers' "Common Sense"

Half of the respondents reported knowing regulations about foraging WEPs, from which 85% always follow them, 10% follow them often, and less than 2% only sometimes do. Most professionals (70%) and most association members (60%) within the foraging community know the regulations regarding foraging. No significant relationship was found between foraging frequency and knowledge about regulations (Kruskal-Wallis test,  $p$ -value>0.05).

Based on information from face-to-face interviews, an important aspect of foraging when it comes to sustainability is the ability to recall volumes harvested. The difficulty or the ability to report the quantity of foraged goods varies from one forager to another. Based on questionnaires, 45 respondents (20.5%) indicated being able to report on the volumes of WEPs they collect, yet giving wide weight ranges unspecific to plants, i.e. they couldn't split their estimates by species. It seemed that without a good monitoring system it is impossible to assess the exact amount of plant harvested. The foraging process is very time consuming and because it is not profitable enough, volumes are kept down. According to professional informants, the financial rewards are quite low compared to the amount of work needed to deliver a 'sellable' and high-quality product.

According to them, the impact of foraging in a professional setting, but also of everyday foragers, relies on the forager's awareness of the surrounding environment. For instance, some plants might be vulnerable to trampling and suffer from soil compaction. Another example is the idea to 'leave wild food stuff to Nature', enabling other living beings to enjoy these resources and contribute to ecosystem functioning. Being a 'responsible' forager is dependent on being aware that this practice requires substantial ecological knowledge, not only about the plants themselves, but the whole ecosystem. One can harvest a plant for its roots (Figure 12), its seeds, or something else, but it is important to look around and consider the plant community structure and resilience. One should also be careful about not spreading invasive species when harvesting them. During interviews and within the questionnaire, the importance of 'common sense' was mentioned regularly and referred to a certain level of local ecological knowledge about foraging WEPs.



Figure 12. Sisselrot (*Polypodium vulgare*) is harvested for its taste-like liquorish roots

However, respondents experienced a lack of definitions and of information on what are the 'best practices' in foraging. Hence, they follow a personal ethic in the activity, guided by their 'common sense' and acknowledging that this 'common sense' may vary from one gatherer and one place to another. Most of them mentioned a pressing need for more research and literature to come out that focuses on potentially vulnerable WEPs under varying foraging pressures and practices.

### 3.3 Ecological Impact Assessment

#### 3.3.1.1 Foraging Impact Assessment – WEPs Categorization

WEPs were classified according to the conservation risks posed by foraging as high risk (R), potential risk (O) and no risk (G). Species with an increased localised risk were designated as G\* and species *Malus sylvestris* as R\*. This impact assessment shows that some important WEPs may be vulnerable in relation to the foraging activity (Figure 13). While no conservation risks were observed for the majority of foraged species (216 in G and 46 in G\*; >95%), high conservation risks exist for eleven plants (O, R, and R\*).

#### 3.3.1.2 Wild Edible Plants Prioritization

Conservation issues were identified at two levels: (1) the plant could be overharvested or (2) the plant is invasive, and foraging could contribute to its spread. There are no striking differences between amateurs and professionals regarding the conservation risks of the species they forage, and the pressure they could put on vulnerable species.

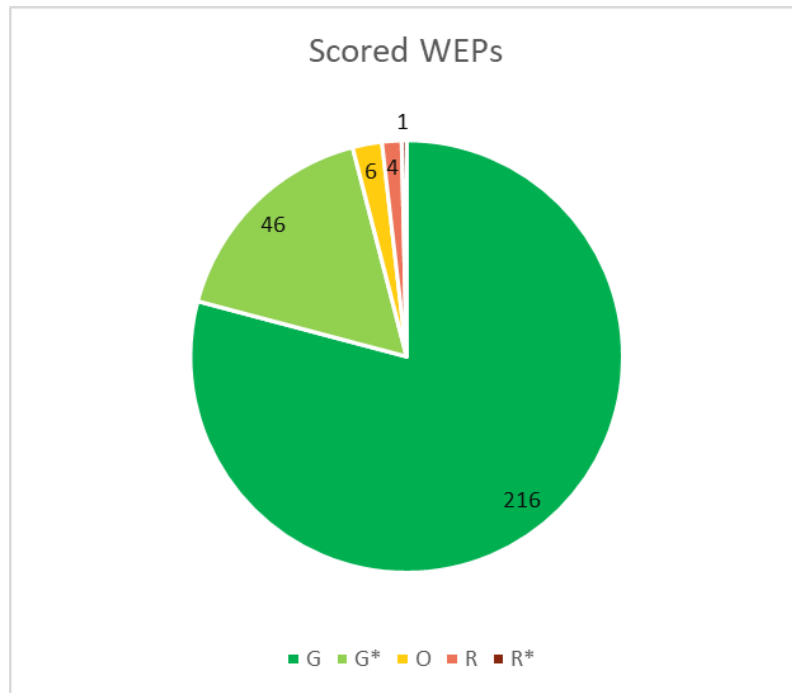


Figure 13. Overview of the categorization of 273 WEPs based on their importance for foragers and important ecological plant traits. The scoring ranges from no risk at all (G for Green), to potential risk (O), and high risk (R) with \* indicating exceptions to the category, emphasizing an observed localized pressure or a potential threat if incorrectly identified

Table 5 below presents an overview of these results: Twenty-two species were identified as potential priority WEPs to consider, from which eleven species are classified as O, R, or R\*, and the eleven G\* species are important for foragers and thereby likely to be overharvested or spread if classified as alien.

While these 22 WEPs are mostly native or naturalized plants for which overharvesting pressures might exist, four of them are considered non-native or alien and already are or might become invasive: *Anethum graveolens*, *Aronia melanocarpa*, *Barbarea vulgaris*, and *Sambucus nigra*. *Malus sylvestris* is the only taxon scored with an R\* and although it is not a salient item, it is classified as vulnerable in the Norwegian Red List Classification. Four other red scored (R) species with low salience and cultural importance scores are *Meum athamanticum*, *Peucedanum ostruthium*, *Ulmus glabra*, and *Valeriana officinalis*. However, the fact that they were mentioned in the questionnaire justifies attention as they are all classified in the Norwegian Red List, either as vulnerable (*M. athamanticum* and *U. glabra*), or near threatened (*P. ostruthium* and *V. officinalis*). Native plants that scored orange (O) in this priority plant list are *Matteuccia strupthiopteris*, *Polypodium vulgare*, and *Viola sp.*, and include mainly least concerns' species but also two vulnerable and one endangered species. The remaining eleven species are scored G\* and were included in the table for two main reasons: because they had with high salience scores and are thus considered interesting plants for foragers, and because foraging may be damaging to the plant's survival when roots, stems, or seeds are removed. *Allium ursinum* is one of those plants and even though it is classified as least concern in the Norwegian Red List, it is highly appreciated by foragers for its tasty flowers, leaves, and seeds. *Sisselrot* (*Polypodium vulgare*) is another appreciated species from which the roots are collected. Other examples include all species from which the sap or the bark, as well as the roots are collected.

Table 5. List of WEPs with potential conservation concern in Norway<sup>1</sup>

Potential WEPs of concern	Classification	Score	Overall	Prof	Amat	NRs	Parts foraged	Perennation	Life form	Woodiness	Clonality
<i>Alchemilla sp</i>	NA_LC_VU_EN_NT	G*	No	Yes	Yes	33	Fl, L	-	-	-	-
<i>Allium ursinum</i>	LC	G*	Yes	Yes	Yes	145	Fl, L, Se	Perennial	Bulbous geophyte	Herbaceous	Little or no vegetative spread
<i>Anethum graveolens</i>	<b>NR</b>	G*	No	Yes	No	1	Fl	Annual	Therophyte (annual land plant)	Herbaceous	-
<i>Angelica archangelica</i>	LC	G*	Yes	Yes	Yes	35	Fl, L, R, Se, St	Perennial	Hemicryptophyte	Herbaceous	-
<i>Arctium lappa</i>	LC	O	No	Yes	Yes	6	R, St	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
<i>Aronia melanocarpa</i>	<b>LO</b>	O	No	Yes	Yes	17	Be	-	Shrub	Woody	-
<i>Barbarea vulgaris</i>	<b>SE</b>	G*	No	Yes	Yes	20	Bu, Fl, L, St	Biennial, including monocarpic perennials; perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
<i>Betula pubescens</i>	LC	G*	Yes	Yes	Yes	59	Ba, Bu, Fl, L, Sa	Perennial	Phanerophyte	Woody	Little or no vegetative spread
<i>Carum carvi</i>	LC	G*	Yes	Yes	Yes	51	Fl, L, R, Se, W	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
<i>Malus sylvestris</i>	VU_A4e	R*	No	No	No	9	Fr, Fl, L, Sh	-	-	-	-
<i>Matteuccia struthiopteris</i>	LC	O	Yes	No	No	45	L, St	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
<i>Meum athamanticum</i>	VU_D2	R	No	No	No	1	L	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
<i>Peucedanum ostruthium</i>	NT_A4c_B2b_ii.ii.iv	R	No	No	No	2	L, R	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
<i>Picea abies</i>	LC	G*	Yes	No	Yes	68	Ba, C, Fl, Sh	Perennial	Phanerophyte	Woody	Little or no vegetative spread
<i>Pinus sylvestris</i>	LC	G*	Yes	Yes	No	17	Ba, Bu, C, Fl, Sh	Perennial	Phanerophyte	Woody	Little or no vegetative spread
<i>Polypodium vulgare</i>	LC	O	Yes	No	No	19	R	Perennial	Hemicryptophyte	Herbaceous	-
<i>Rhodiola rosea</i>	LC	O	Yes	No	No	7	L, R	-	-	-	-
<i>Rubus chamaemorus</i>	LC_EN_Sv	G*	Yes	No	No	122	Be	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
<i>Sambucus nigra</i>	<b>NR</b>	G*	Yes	No	No	59	Be, Fl, L	Perennial	Phanerophyte	Woody	Little or no vegetative spread
<i>Ulmus glabra</i>	VU_A4_e	R	Yes	No	No	11	F, Se	-	-	-	-
<i>Valeriana officinalis</i>	NT_A4_c_B2b.ii.ii.iv	R	No	No	No	2	R	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread; Rhizome shortly creeping
<i>Viola sp</i>	NA_LC_2VU_1EN	O	No	Yes	No	37	Fl, L	-	-	-	-

<sup>1</sup> Notes. Yes/No within Overall, Professionals (Prof), Amateurs (Amat) - refer to whether or not a WEPs appeared in salience or importance indices. Codes for collected botanical parts: berries (Be), fruits (F), flowers (Fl), leaves (L), seeds (Se), stems (St), and roots (R), or for their bark (Ba), cones (C), and shoots (Sh) respectively. In **bold** alien species.

## **PART 4 | Discussion**

## 4 Part 4. Discussion

This study aimed to determine whether foraging of WEPs is a sustainable activity in Norway, and to elucidate the influence of socio-cultural and economic constructs on foragers' motivations, attitudes, and overall impact on biodiversity.

The following section discusses the socio-ecology of foraging in Norway before presenting an analysis of the motivations and perceptions around the activity of gathering WEPs. In particular, interactions between the new Nordic food movements and the foraging activity in Norway are elaborated upon. Finally, following the acknowledgement of the limitations of this study, a concrete action plan to facilitate the development of sustainable foraging guidelines is provided alongside suggestions for further research.

### 4.1 Wild Edible Plants Use: An Example of Biocultural Diversity in Norway

#### 4.1.1 Socio-ecological Context of Foraging

##### 4.1.1.1 Foragers' in Norway

The results suggest that foraging in Norway is dominated by amateurs rather than professionals, including traditional and neophyte foragers that learn from family peers or through their personal practice. Nonetheless there are a number of professional foragers in Norway. Concomitant to the new Nordic food movements within Scandinavia (Munk, 2019), there has been a recent and increasing trend in the commercial use of wild edible plants in Norway. Many amateurs and professionals belong to foraging associations constituting of local societies that exist under the national association of *Norges sopp- og nyttevekstforbund*. Professional foragers and amateur members of foraging associations were found to have greater knowledge on average when compared to amateur foragers who were not members of associations. This result confirms the hypothesis that foraging knowledge differs between types of foragers and their varying socio-cultural backgrounds (Schulp et al., 2014; Albuquerque et al., 2019). Higher local ecological knowledge may enable foragers to harvest a wider variety of plants at different times of the year.

##### 4.1.1.2 Ethnobotany of Wild Edible Plants

Out of 273 reported WEPs, seven of them are classified in the Norwegian Red List but only few respondents collected them. Thus, overall there is very little concern for major negative impact of foraging on WEPs in Norway. Two of these red-listed WEPs - namely *Alchemilla sp.* and *Viola sp.* - were only identified at genus level and it is not possible to say if red-listed species were the foraged ones or if the foragers are able to identify the different botanical species (Berlin, 1973; Berlin, 1992). Nearly threatened WEPs were *Peucedanum ostruthium*, *Rubus chamaemorus* (endangered in Svalbard only), and *Valeriana officinalis*. Also, *Malus sylvestris* categorized as R\* (high foraging risk) may have been reported as 'wild apple' (*villepler*) yet not being 'genuinely' in its wild form and potentially hybridized (Coart et al., 2006; Larsen et al., 2006).

Second, most non-threatened native species categorized as G\* (low impact potential, yet with local exceptions), O (middle impact potential) or R (high impact potential) were species under some overharvesting pressure. Examples of locally over-exploited species are culturally important ones with high salience index such as *Allium ursinum*, or *Rubus chamaemorus*, but also species from which undergrounds organs or bark were collected such as *Polypodium vulgare* or *Angelica archangelica* (Hamilton, 2004; Mathismoen, 2020). Finally, while the use of invasive alien plant species may appear as a positive aspect of foraging WEPs (NSNF, 2020), as harvesting may contribute to eliminating the plant, great

care on harvesting procedures should be taken in order not to spread it across the landscape. Invasive aliens foraged for their berries or seeds should be transported properly in closed bags and leftovers not be composted. For those alien that can spread vegetatively, it is also important to not lose them on the way and not to compost them (Filippi & Aronson, 2011). More details of sustainability considerations in foraging WEPs in Norway can be seen in Appendix 13.

Some elicited WEPs (Appendix 11) are found in *Flora Norvegica* (Gunnerus, 18<sup>th</sup> century) and in *Planter og Tradisjon* (Høeg, 1974). In this study, 273 taxa were reported as being used as foods, almost two times more than what both works document overall for human consumption (Teixidor-Toneu et al., 2020). This result is more than three times (273 > 81 vascular plants) more than Schulp et al. (2014) found in their ecosystem services synthesis of vascular plants used as terrestrial wild foods in Europe. These results highlight the potential of WEPs and current foraging knowledge to develop locally-based foodways (Bacchetta et al., 2016).

The majority of WEPs reported in this study were harvested in for their berries, leaves and flowers. The limited harvesting of roots and bark appears to confirm Turner et al. (2011) who suggest that the physical (or visual) and cognitive (level of awareness) access to WEPs determines the likelihood of a plant being harvested. Pilgrim et al. (2008) argue that local and traditional knowledge is required for gathering and processing wild foods. Hence the results of this study suggest that berries, leaves and flowers may be more prominent within forager-WEP relationships and therefore may be more prone to overharvesting. Alternatively, that WEPs collected for their roots and bark are not culturally important could be that foragers perceive the use of roots and bark as being destructive. Closer analysis of foragers believes is required to shed light on these behaviours.

#### **4.1.2 Foraging as ‘A Lifestyle, A Practice, A Science’**

##### **4.1.2.1 Foraging Values and Motives**

Many values associated to the foraging activity remain grounded in Norwegian history and traditions, yet this practice is also subject to new socio-ecological context that is altering the motivations and attitudes behind foraging. The modernization of lifestyles, arising from the industrial and green revolutions, appears as the main driver for the declining necessity and use of wild foods in general (Łuczaj et al., 2012; Vandebroek & Balick, 2012; Łuczaj & Pieroni, 2016). Likewise, evolving nutritional needs and diets have changed societal motivations for going outdoors to gather foods from the ‘wild’ (Turner et al., 2011; Łuczaj et al., 2012; Kalle & Sõukand, 2013; Reyes-García et al., 2015). Echoing wider European trends of WEPs use (Łuczaj & Pieroni, 2016), foraging appears to be shifting from a survival to recreational activity. This shift is reflected in Norwegian culture as the transition from *matauk* to *friluftsliv*. A parallel trend can be seen in the movement from non-commercial to professional foraging in Norway.

Experienced as a ‘lifestyle’, foraging provides a sense of ‘freedom’ to Norwegian foragers that want to escape the modern society. Many values are associated to this lifestyle and that reflect a desire for freedom. This is particularly reflected in the value assigned to the knowledge required to forage for one’s own food. Knowledge is seen at the core of being able to feel free, being autonomous within the natural environment and able to survive by feeding yourself out there (Prance, 2007). Foraging is also viewed a skill which enables foragers to cope with various ‘natural’ constraints, but also as a way towards “taste sovereignty”, i.e. the ability to get tasteful experience for free and by yourself. As observed elsewhere in Europe (Reyes-García et al., 2015), this study found that Norwegian foragers

and chefs appreciate WEPs for their culinary value, and as a symbol of independence from a standardized and globalized food system. Foraging has hence become a cultural feature or means for achieving the goal of feeling free, and a way to foster local identities as reported in recent studies on Nordic food movements (Hermansen, 2012; Munk, 2019). In Norway, foraging is seen as a feature of a sustainable lifestyle (Turner et al., 2011), where the many benefits of WEPs are used and valued as symbols of freedom, alternative culture and eco-friendly lifestyles in opposition to modern lifestyles. Hence, foraging WEPs provides a sense of place and a true connexion to Nature within a 'glocal' landscape (Stano, 2018), potentially triggering foragers to act as local ecological stewards (Waygood, 2019).

#### 4.1.2.2 Management practices

At field level, foraging activity is characterised by various practices in different Norwegian landscapes. As in the Americas or Mediterranean Europe (Turner et al., 2011), processes of semi-domestication or para-domestication also occur in Norway. Although only 8% of online respondents tend wild edible plants *in situ*, most informants reported to care for plant communities in some areas. For example, *Crambe maritima* is tended to in its shoreline habitat through "seasonal weeding" and provides a good example of a cooperative relationship between gatherers and their environment. Semi-domestication also occurs across the Norwegian landscape as some WEPs are transplanted from the wild to garden ecosystems. This practice is true not just of pioneering foragers in Norway (Barstow, 2014) as almost a third of online respondents referred to transplanting WEPs to their households. At landscape scale, the gathering and use of WEPs is associated to a management continuum of (agro-) ecosystems (Bharucha & Pretty, 2010; Cruz-Garcia & Price, 2014; Powell et al., 2015). As elsewhere on the planet, Norwegian WEPs are closely linked to cultural practices such as pastoralism, an activity in decline in Norway and Europe (Liechti & Biber, 2016). More efforts should be directed on studying the relationships between WEPs availability and land use changes.

#### 4.1.2.3 Perceived impact of foraging

Foraging activity was seen as 'sustainable' by more than 75% of respondents of the online questionnaire. However, experts believe the foraging activity can have either a positive or a negative impact, while 90% of total respondents acknowledge that foraging can potentially be unsustainable with some plants being more vulnerable than others. This study highlights how some species have acquired a special status within the Norwegian foraging community and how a few WEPs have even become 'fashionable'. In line with other European examples (Łuczaj et al., 2012; Łuczaj & Pieroni, 2016; Cambecèdes & Garreta, 2018; Pinton et al., 2018) and local newspaper articles showcasing worrying situations (Mathismoen, 2020), edible plants have shift from neglect to popularity. 'Fashionable' edible plants are reported to endure overharvesting in some localities, primarily in and around densely populated areas in Norway, where they are cognitively available and socially acceptable for an increasing number of gatherers as explained by Turner et al. (2011).

#### 4.1.2.4 'Common Sense' as Local Ecological Knowledge

Based on the number of elicited items, the results of this study highlight that professionals and association members have more expertise in the foraging domain. An expression of local ecological knowledge of Norwegian foragers is 'common sense'. As in other places (Turner et al., 2011), foragers' attitudes are framed within cultural appreciation, societal regulations, and personal ethical considerations. Such 'common sense' primarily referred to the quantity of WEPs harvested, and the quality or care taken in foraging practices.



In terms of harvest quantity, most informants self-reported being guided by 'common sense' and referred to those that over-exploit resources as 'greedy'. However, the concept of sustainable harvesting remains vague and subjective, and illustrates the little available information on foraging best practices in Norway. Indeed, only half of respondents were aware of regulations written in law such as not being allowed to collect threatened red listed species. Interestingly, the *molte rule* that was written in law (Fylkesmannen, 2018) remains a powerful feature of the foragers' common sense and may now apply to other edible plants. However, aspects of this rule are interpreted subjectively by different foragers. For instance, one guideline states that "one should not collect more than a third of what is on site". Still, only 20% of online respondents could recall exact harvesting volumes, and those that did reported a wide range of weights unspecific to any listed WEPs. That foraging activity is mostly done for home-consumption makes such statistics further had to come by (Schulp et al., 2014).

With regards to the care taken by foragers when harvesting in wild environments Norway's foraging community is primarily compound by amateurs that refer again to subjective guidelines. For example, being careful to not trample soil, considering plant ecology and community structure, or 'leaving some foods for other living-beings' are general considerations amongst the foraging community (Hamilton, 2005). This suggests that more technical guidelines could be useful for improving the sustainability of foraging WEPs, as has been done in France (Chabert et al., 2013; Cambecèdes & Garreta, 2018).

Even though WEP products are being widely promoted (Bacchetta et al., 2016), the ethnobotany of WEPs in Norway may have been under documented (Teixidor-Toneu et al., 2020). Here, a lack of consistent information was found on sustainable foraging guidelines which is characterized by subjective comprehension of 'common sense' and a failed attempt to gather data on volumes. As across the European continent (Schulp et al., 2014), foraging is households driven and remains quite niche and informal in its commercial setting across Norway. Furthermore, yet being able to count a handful of professionals in Norway, they might be seen as individuals that pick too hard. In fact, professionals and members have overall more expertise and could be referred as key local experts. For one of them, promoting the use of WEPs in a sustainable manner goes together with raising public awareness of the diversity of available useful plants, thereby reducing local pressures on popular ones.

Interviewees called for more efforts in connecting people all along the wild food chain in order to share their knowledge about the land and wild edibles, about their 'sustainable' lifestyles, and the practices that underlie their activity. Show-casing this desire, some professionals already organized gathering workshops with chefs. Studying the interactions along this system seem essential in understanding foraging attitudes on the field while promoting a sustainable activity, as some risks may occur from those. Following the New Nordic Cuisine and New Nordic Diet food movements, discussing the responsible promotion of foraging and associated 'best practices' appears as the missing link towards a sustainable 'Wild Food System' here in Norway (Hermansen, 2012; Mithril et al., 2012; Münke et al., 2015; Mathismoen, 2020).

### 4.1.3 Towards the Sustainable Promotion of Wild Edible Plant Use

#### 4.1.3.1 Wild Edible Plants as Sustainable Ingredients

A major factor shaping foraging in Norway is that wild plants are being promoted by Nordic kitchen and dietary guidelines (Hermansen, 2012; Mithril et al., 2012; Byrkjeflot et al., 2013; Münke et al., 2015). Locally sourced and available, low-input, free, non-cultivated, fresh, and nutritious, WEPs are valuable natural resources considered and promoted as sustainable ingredients by high-end gastronomic restaurants that aim at doing “Nordic” with “multicultural influences”. Following trends of traditional and cultural loss of such activities, foraging was back in time considered as an activity for the deprived and WEPs as ‘famine foods’ (Barstow, 2014; Reyes-García et al., 2015). While referring to WEPs, different ethnobotanical relations now exist yet pleasure overcomes sustenance as wild edibles are seen as ‘delicatessen’ goods (Reyes-García et al., 2015). Sustainably promoting the use of WEPs is a challenge but the new Nordic food movements seem powerful in their capacity to promote ‘wild ideas’ (Münke et al., 2015). Even though a few WEPs were put at the forefront at the early stage of wild gastronomy, foragers and chefs are now starting to organize themselves in several places across Norway, mainly around major urban centres. Yet building on the traditional concept of *matauk*, wild food plants will be used by progressive restaurants (Norsk Matauk, 2020). How do identitarian gastronomic traditions help maintaining alive the gathering and consumption of some WEPs and how are these emergent organizations affecting WEPs availability deserves more attention. Results indicate that it may be considered as a form of cultural resistance embedded in present realities of the conservation of what makes their livelihoods.

#### 4.1.3.2 Towards a ‘Wild Food System’

The sustainable promotion of wild food plants faces not only the conservation dilemma from which botanical elements are natural heritage (Solberg et al., 2013) but also the ‘secrecy’ dilemma within the Norwegian foraging community. The example of the *molte* rule (*Rubus chamaemorus* ‘law’) in which “one should not share the precise whereabouts” lies both in the written law and imaginary constructs. It is now even generalized to other WEPs in Norway. On one side, protecting its collection spaces may prevent from overharvesting (in densely populated areas). On the other side, it could also lower the pressures on trendy spots if correctly managed. As part of the dynamic conversation between amateur and professional foragers, as well as chefs and scientists, everyone brings its piece of knowledge. The richness of the reflexion on responsible promotion of WEPs use from its collection to its processing and consumption stages refers to the combination of valuable shared knowledge from which a balance between conservation and valorization should be found (FWF, 2010; Ulian et al., 2020).

A number of relevant questions arose. At local site level, foragers are local field experts that observe and promote interesting strategies to the natural resource management of WEPs in Norway (Cambecèdes & Garreta, 2018). The sustainable resource management and foragers’ input is yet to be characterized at landscape and regional level, asking specifically what information, tools, and regimes could be implemented between key stakeholders within the foraging and conservation communities (Schulp et al., 2014; Cambecèdes & Garreta, 2018). Prior to taking further action though, acknowledging the study limitations is required.

## 4.2 Study Strengths and Limitations

### 4.2.1 Sampling biases

A first important limitation is on sampling biases. To select interviewees (n=19) and reach respondents to the online questionnaire (n=219), convenience and snow-ball sampling methods were used (Bernard & Bernard, 2013) and people close to the *Norges sopp- og nyttevekstforbund* (Norwegian Association for Mycology and Foraging) and known by the research team members were recruited. Online respondents' participation was solicited on social media and hence relied on individual willingness to contribute through voluntary responses. This may have attracted mostly connected people and findings might indeed underrepresent the reality of what the foraging community in Norway looks like. Hence, the representativeness of the sample may not be comprehensive (Babbie, 2009).

However, this approach to sampling was the most ethical and practical given the circumstances posed by the global pandemic situation in 2020. Where possible, face-to-face interviews contributed to contextualising responses in the online questionnaire. Moreover, by combining face-to-face interviews with mostly professionals and local experts, with an online questionnaire that reached mostly amateurs, this methodology provides valuable materials for the needs and objectives of this research (Bernard & Bernard, 2013), and provides a substantive overview of the socio-ecological features of the foraging activity in Norway. Given the range of respondents from the online questionnaire and the information gathered using ethnographic tools, a good overview of the diversity of foraging practices in Norway is provided.

### 4.2.2 Identification: Plants and Knowledge

A second limitation relates to the design of the online survey. Listing tasks were not conducted in a presential manner as usually prescribed in ethnobotanical manuals (Caruso et al., 2015). This may have generated three areas of concern in relation to the validity of the data.

First, self-reported plant identification could not be validated through the collection of botanical samples with informants. Reported taxa may not have always been accurate as some respondents may have referred to species using incorrect names.

Second, listing tasks were analysed as free-lists while they were not. Respondents may have searched online or on books plants they harvest sometimes, not necessarily writing only what was on top of their minds. Likewise the results may be affected by social desirability bias, in the sense that respondents may have overemphasised practices that are positively viewed and downplayed or neglected less socially accepted practices (e.g. harvesting vulnerable plants). Saliency measures may therefore not be accurate, however given the number of participants in the study results are assumed to be representative of the most commonly foraged plants.

Third, online sampling may have altered the analysis as the evaluation of respondents' knowledge was based solely on the number of plants they listed. For example, people could have listed plants from a book they have at home or directly through another website they use before engaging in foraging. However, as self-assessed knowledge level assessments and total number of plant reports were significantly positively correlated, it is inferred that such measures of expertise are a good proxy of foragers' knowledge about foraging WEPs in Norway (Caruso et al., 2015; Purzycki & Jamieson-Lane, 2017).

### **4.2.3 Data Collection Limitations: Socio-demographics and Gathering Procedures**

Some socio-demographic data and other socio-ecological features of harvesting procedures were not collected systematically due to travel restrictions related to the COVID19 pandemic, and hence were not included in the analysis. Gender, social class, ethnicity or sexuality, could be presumed as important aspects of human-environment relationships in the foraging domain (Pieroni & Vandebroek, 2007; Schulp et al., 2014; Albuquerque et al., 2019; Hanspach et al., 2020), but were not documented. Collecting such data in Norway requires long procedures of validation by the NSD, and hence would have been prohibitive in the context of the six-month timeline for this research. Similarly, harvested volumes are a crucial element for considering the impacts of foraging WEPs but were not collected during this study. Further research is hence required to provide a quantitative assessment of the impact of foraging on resource renewal and the overall sustainability of this practice.

### **4.3 Overall Discussion and Proposition**

The use of wild flora in Norway is a growing trend which constitutes both a threat to fragile habitats and species, and an economic opportunity for the development of territories. Triggered by new Nordic food movements, foragers taking part in the Norwegian Association for Mycology and Foraging and/or working as professionals in the sourcing of gastronomic restaurant in Norway have a raising awareness with regards to sustainability issues. Their responsibility as first pieces in the supply chain of wild plant resources and their willingness to engage in more professionalization makes them local key stakeholders for the recognition of their activity and the diffusion of good practices. Preserving the resource is crucial for them, and participative/collective thinking is essential for long-term benefits emanating from this network's dynamics. They are confronting perceptions, visions, values, and are seeking together for information and guidelines that will enhance the management of the wild flora. Still, many efforts are needed to sensitize the market and policy spheres, as well as foragers that are not engaged in a reflective practice and using and acting on wild plant resources. Moreover, this study creates an opportunity to develop a reflexion on the real stakes of foraging activities, and to think about the right tools and protocols enabling the objectivization of resource assessments and foraging impacts on biodiversity in general (e.g. How to elaborate a methodology to select good practices? What are relevant quality norms to warrant sustainable foraging activities? Should the resource management of wild food plants be scaled-up or stay mostly informal? How to frame and regulate commercial activities related to WEPs with regards to biodiversity monitoring?).

To further reflect on a sustainable management regime of wild plants in Norway and aiming at the elaboration of open-access guidelines of sustainable foraging, the design of a participatory workshop with key stakeholders is suggested.

An action plan that builds on the outputs of this thesis is developed and described henceforth. This plan hopes to carry on the mix of empirical and scientific knowledge to address technical foraging issues. In other words, the guidelines will be drawn upon foragers know-how and field experience, and this valuable information will be confronted to science-based data on ecology, conservation biology, or natural resource management. Indeed, as mentioned earlier in this document, professionals call for more efforts in mobilizing science to enhance their context-specific foraging practices.

### **4.3.1 Towards the Design of Local Guidelines of Sustainable Foraging in Norway**

#### 4.3.1.1 Purpose and Objectives

The purpose of this action plan is to communicate research results and design guidelines of sustainable foraging by gathering local key stakeholders of the foraging community in order to enhance sustainable foraging in Norway. In order to realize this purpose, there are a number of objectives that this workshop projects sets out to accomplish:

1. Communicate the results of this thesis, making them available and open to the Norwegian foraging community and relevant academic networks
2. Unify key stakeholders of the Norwegian foraging community
3. Find ways to address the remaining knowledge gaps of sustainable foraging in Norway
4. Deliver a reference document that suits the needs and visions of the foraging community in Norway

#### 4.3.1.2 Action Plan

Table 6 presents the action plan in detail. Nine action steps have been established in relation to the four objectives described above. Concrete tasks together with the responsible person to realize it are clearly displayed. To monitor the progress and achievement, a timeline is specified, and outcomes are set. Associated costs and sponsors are mentioned when necessary.

The first five steps are designed to meet the first objective, i.e. communicate the results of this thesis, and make them available to the Norwegian foraging community. These steps will be completed before the workshop project planned in April 2021. Steps six and seven are referring directly to the workshop, aiming at unifying key stakeholders, and finding ways to address the remaining gaps towards the participatory design of local guidelines of foraging. The last two steps are actions to be taken after the workshop and will contribute to the fourth objective which is to deliver a reference document as elaborated by the foraging community during the workshop. In line with the delivering of these guidelines, lectures and courses will be designed to communicate about them. In total, this action plan goes until Spring 2022 and requires a budget of 18180 EUR (maximum), all covered by NPP projects funds or NSNF running costs.

Table 6. Action plan to communicate thesis results and design a participatory workshop towards the elaboration of local guidelines of sustainable foraging in Norway

Action Step	Description	Relevance	Responsible(s)	Task	Start Date	Due Date	Progress	Outcome(s)	Resource(s)	Cost	Sponsor
1	Participation to the Society of Economic Botany (SEB) Fall Symposium	Objective 1	Nicolas Jan Giraud NJG Irene Teixidor Toneu ITT Anneleen Kool AK Pål Karlsen PK	Presenting Supervising Co-supervising Co-supervising	oct-20	23-oct-20	Completed	Academic international outreach, a video-audio conference	SEB Membership Zoom (NHM, UiO)	30,00 -	NPP project NHM-UiO
2	Writing of an outreach paper for NSNF journal	Objective 1	NJG PK ITT AK	Writing Supervising Co-supervising Co-supervising	nov-20	dec-20	Work in Progress	Public Norwegian foragers outreach, a short article	Not applicable	-	NSNF
3	Interview about NSNF paper	Objective 1	NJG PK	Interviewed Interviewing	dec-20	jan-21	Not started	Public Norwegian foragers outreach, an interview record	Not applicable	-	NSNF
4	Writing of an academic paper (prob. in Ecology and Society)	Objective 1	NJG ITT AK PK	Writing Supervising Co-supervising Co-supervising	nov-20	dec-20	Work in Progress	Academic, specialized international outreach an academic publication	\$975 US (~850 EUR) for first 5000 words, add \$100 US for 1000 words Open-access publication fees (from 1500 - up to 4500 EUR)	1150,00 3000,00	NPP project NHM-UiO publishing agreements
5	Outreaching Norwegian media	Objective 1	ITT and AK	Contacting outreach department Tore Elgvin	mar-21	apr-21	Not started	Public outreach	Reach out to various science outreach media platforms (e.g., ScienceNordic, Titan, Forsknin.no, unifornum, etc.)	-	NHM-UiO

6	Preliminary work on participatory workshop design	Objective 2	NJG (ITT, AK, PK -support)	1- Listing key participants	dec-20	jan-21	Not started	Mailing list	Not applicable	-	NPP project
			<i>idem</i>	2- Designing a survey (logistics, format, content of the workshop)	dec-20	jan-21	Not started	Preliminary workshop framework	A poll platform Zoom (NHM, UiO)	-	NPP project
			NJG, PK, ITT, AK	3- Logistics: select venue options, travel, accomodation for participants	jan-21	feb-21	Not started	Logistical framework	To be defined budget- up to 100k NOK ~ 10k EUR	10000,00	NPP project
			NJG (ITT, AK, PK -support)	4- Format: suggest a workshop format, content	jan-21	feb-21	Not started	Workshop framework	Not applicable	-	NPP project
			NJG, PK, ITT, AK	5- Finalize: based on survey, state on the venues, format and content of the workshop	feb-21	mar-21	Not started	Final workshop framework and venues confirmed	A poll platform Zoom (NHM, UiO)	-	NPP project
7	Participatory workshop	Objective 2 and 3	NJG, PK, ITT, AK	To be defined in a participatory manner during Action Step 6	apr-21	apr-21	Not started	15-20 participants during 2 days in Oslo to discuss guidelines	To be defined but probably a white board blank papers, pen, etc	-	NPP project
			NJG, PK, ITT, AK	Recap thesis findings Focus group and plenary discussions							
8	Delivering the guidelines of sustainable foraging designed in a participatory manner	Objective 4	NJG (ITT, AK, PK -support)	1- Transcription of the workshop	may-21	jun-21	Not started	Transcripts of discussions	Not applicable	-	NPP project
			NJG, PK, ITT, AK	2- Drafting the pdf resource document	jun-21	aug-21	Not started	Analysis of discussions	Not applicable	-	NPP project
			<i>idem</i>	3- Finalizing the resource document	sept-21	dec-21	Not started	Delivering of key guidelines	budget - 20k NOK ~ 2000 EUR	2000,00	NSNF
			<i>idem</i>	4- Drafting of an online course (based on resource document)	jun-21	dec-21	Not started	<i>idem</i>	<i>idem</i>	2000,00	NSNF
9	Outreaching about the guidelines and about the participatory and learning process	Objective 2, 3 and 4	NJG and PK (supervision) (ITT, AK -support)	1- Drafting a lecture talk on sustainable foraging in Norway	sept-21	dec-21	Not started	Outreach to Norwegian foragers	Not applicable	-	NSNF and NPP
			<i>idem</i>	2- Drafting and taping a podcast about sustainable foraging in Norway	sept-21	dec-21	Not started	<i>idem</i>	Not applicable	-	NSNF and NPP
			<i>idem</i>	3- Outreaching Norwegian media	spring 22	spring 22	Not started	Public outreach	Not applicable	-	NSNF and NPP

**Total** 18180,00

## Conclusions

The results of this research indicate that, overall, current foraging activity of wild edible plants in Norway is not generating negative environmental impacts. However, both amateur and professional foraging activity may pose certain risks regionally or in the future and hence there is a need for greater guidance on sustainable harvesting practices for all stakeholders.

Despite foraging being perceived by many practitioners as part of a sustainable lifestyle, the increased popularity of this activity is beginning to cause localized overharvesting pressures in and around urban centres and can contribute to the spread of invasive alien edible species. These foraging risks can be associated to different socio-cultural and economic constructs, such as different knowledge and cultural expertise amongst foragers, and an increasing popularity of WEPs triggered by Nordic gastronomic food movements. This study highlights how both traditional and scientific knowledge are at the core of a sustainable foraging activity, and hence strong educational and transmission values are required to ensure sustainable foraging of wild edible plants. However, currently there is lack of available information on sustainable gathering practices and the lack of unity (i.e. knowledge exchange) amongst local key stakeholders within the Norwegian foraging community including amateurs, professional foragers, and chefs.

The recent 'fashionable' interest surrounding wild food plants offers a great opportunity for bringing together the Norwegian foraging community to co-create a common vision of sustainable foraging in Norway and clear guidelines to support this. It is therefore recommended that a participatory workshop is organised for the design of local guidelines for sustainable foraging and use of WEPs in Norway. Building on the already established network constituted by the Norwegian Association for Mycology and Foraging and the gastronomic movement led by Nordic chefs, this project lays the foundations to develop participatory approaches for locally led WEP conservation and protection schemes.



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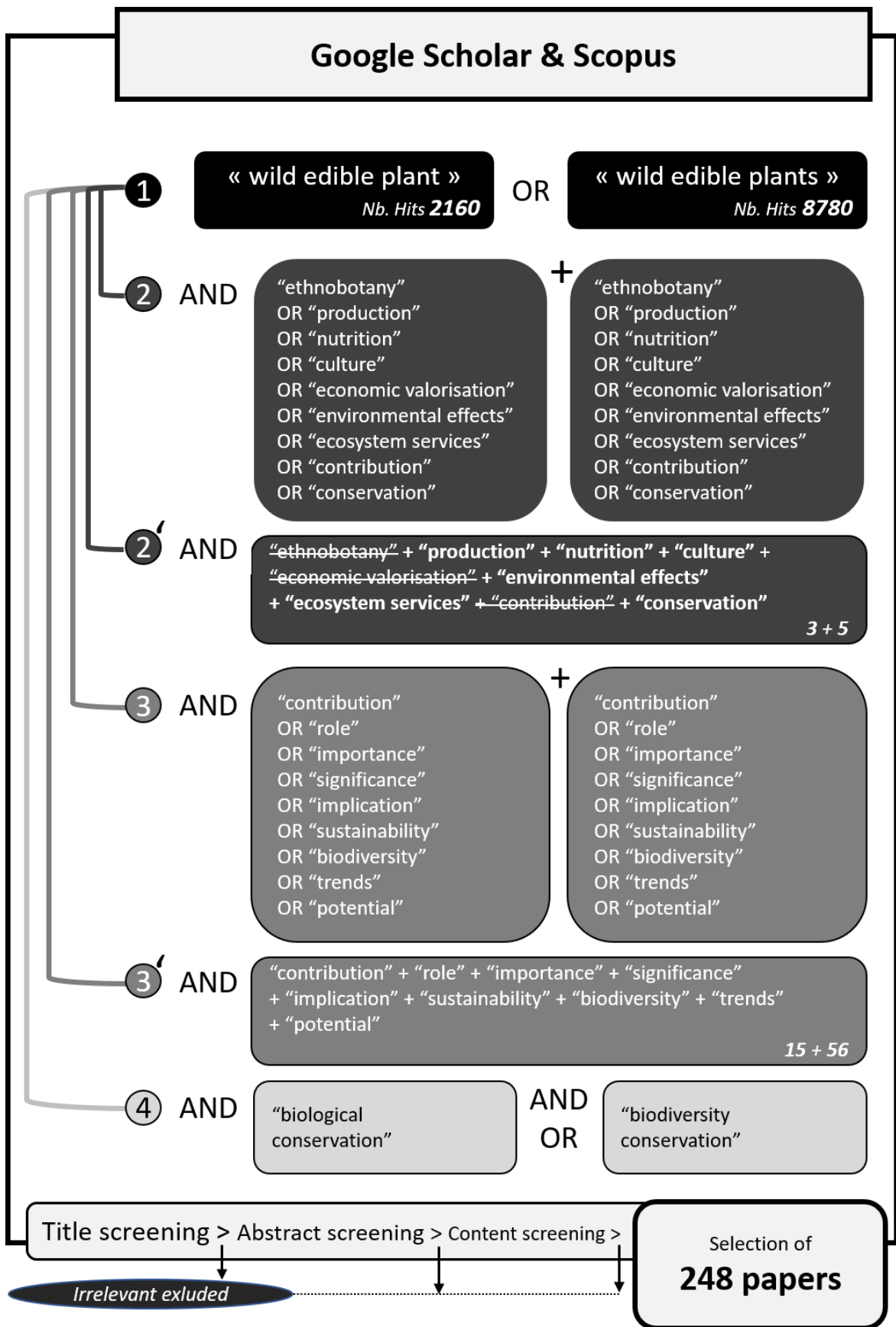
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## **APPENDICES**

## **Abstrakt**

Ville spiselige planters (VSP) rolle i å gi kulturelt sett riktig ernæring, matsikkerhet, økt økonomisk verdi og økologiske fordeler, er globalt anerkjent. I Europa ser det ut til at bruken av VSP til matauk er kjent fra oldtiden og helt fram til nåtiden, i dag ser man en økende trend av ville spiselige planter i eksklusive restauranter og som luksuriøse matvareartikler. Likevel ser man at bruken av VSP er underutnyttet og nærmest neglisjert, bevaringen av kunnskapen omkring VSP og bruken av de er dermed også truet. Det er også usikkert om plantepopulasjoner trues som konsekvens av sanking. I Norge er det nylig observert oversanking på enkelte arter i urbane strøk. Selv om det er gjort forskning for å dokumentere tradisjonell kunnskap tilknyttet VSP er det lite man vet om hvordan ny praksis av sanking påvirker biomangfoldet. Hensikten med denne studien er å undersøke når og om sanking i Norge slutter å være bærekraftig og hvilke konsekvenser dette har for biomangfoldet. Det ble gjort studier på ulike sosiokulturelle grupper som sanker, spesielt for å kunne sammenligne kokker og profesjonelle sankere med amatører. I samarbeid med Norges sopp- og nyttevekstforbund har jeg brukt etnografiske metoder og intervjuet 19 norske pådrivere innen sankemiljøet, inkludert kokker, forbundsleder og konserveringsekspert. Jeg samlet også etnobotanisk data gjennom en digital spørreundersøkelse hvor jeg mottok 219 responser, størst andel av de 219 var amatører. Innsamlet data samt tilgjengelig informasjon på artsøkologi og deres bærekraftstatus ble brukt for å vurdere hvordan sanking av VSP påvirker de spiselige plantene. Resultatet viser at sanking av VSP i Norge ikke er under umiddelbar trussel, men risikoen er til stedet. Jeg diskuterer disse risikoene for å utvikle lokale og praktiske retningslinjer for bærekraftig sanking av VSP i Norge.

*Nøkkelord: Biokulturelt mangfold | Sanking | Bærekraft | Nynordisk matbevegelse | Ville spiselig planter*



### Appendix 3 : Interview guide

1. Where are you from? Where are you based currently? What do you do for a living? What is your background? What are your interests (e.g. studies, work, occupation, community life...)?
2. Do you forage Wild Edible Plants? What does it mean to you? What is foraging? What does it mean to you? How would you define it? Why do you forage?
3. What are Wild Edible Plants? What means 'Wild Edible Plants' to you? What characterize Wild Edible Plants?
4. How did you started to forage? When?
5. When you started, what did you like most about foraging? What did you dislike most? Are these feelings still ongoing today? What changed overtime in your practice and perceptions?
6. What kind of foraging activities do you do? Where do you do them (e.g forests, hedges, field margins, green spaces, 'wild areas'...)? What characterizes 'wild areas'?
7. Are you concerned about environmental changes such as the erosion of biodiversity? Climate change? Other? How would you relate foraging Wild Edible Plants to these global trends? Do you think Wild Edible Plants has a beneficial role in conservation? Or negative impacts? Would you consider Foraging as a sustainable activity? What do you think about the sustainability of the practices?
8. Should we protect Wild Edible Plants? And the associated practice of foraging? Should we control it? Manage it? What are threats that have to be brought into more considerations?
9. How would you define or what characterizes 'Sustainable foraging of Wild Edible Plants'?
10. What are barriers in the conservation of Wild Edible Plants and foraging activity? How should we protect these plants for a sustainable use?
11. Who should be involved in the conservation of Wild Edible Plants? Foragers or 'people who gather plants in the wild' and/or other organizations/institutions? How to scale up the awareness for Wild Edible Plants long-term conservation and associated practices?
12. Could you see yourself, as a forager, taking on a role as a sort of "local ecological steward" for wild plants and biodiversity in your local green spaces? A local steward may integrate biodiversity safeguarding/managing into their foraging activities. This may be through, for example, responsible propagation and management of plants, or contributions to surveying and monitoring of species. In other words, combining a foraging role with conservator of nature role.
13. What might incentivise foragers to undertake such a role?
14. What would be the 5 plants that would need specific attention in terms of conservation?



## Notification Form 157596

### Last updated

05.08.2020

### Which personal data will be processed?

---

- Name (also with signature/written consent)
- Photographs or video recordings of people
- Sound recordings of people
- Background data that can identify a person
- Other data that can identify a person

### Type of data

---

**You have indicated that you will be processing background data that can identify individual persons, describe which**

education, professional occupation, workplace, position, municipality of residence, gender

**You have indicated that you will be processing other data that can identify individual persons, describe which**

membership of foraging organizations/associations

**Will you be processing special categories of personal data or personal data relating to criminal convictions and offences?**

No

### Project information

---

#### Project title

Sustainable Foraging of Wild Edibles Plants in Norway: an ethnobotanical perspective

**If the collected personal data will be used for other purposes, please describe**

It will not be used for any other purposes.

**Explain why the processing of personal data is necessary**

To analyse correlation between background and foraging practices. For example: how does education affect knowledge, perceptions and attitudes towards the foraging of wild plants? Do professional foragers collect plant species significantly different than amateur foragers from the Sopp- of nyttevekstforbund?

**External funding**

- The Research Council of Norway/Norges forskningsråd (NFR)

**Type of project**

Student project, Master's thesis

**Contact information, student**

Giraud Nicolas, nicolas.giraud@nmbu.no, tlf: 0033645072738

**Data controller**

---

**Data controller (institution responsible for the project)**

Universitetet i Oslo / Kulturhistorisk museum / Naturhistorisk museum

**Project leader (academic employee/supervisor or PhD candidate)**

Irene Teixidor Toneu, i.t.toneu@nhm.uio.no, tlf: 41283942

**Will the responsibility of the data controller be shared with other institutions (joint data controllers)?**

No

**Sample 1**

---

**Describe the sample**

Professional and amateur foragers (people who go outdoors to collect plants)

**Recruitment or selection of the sample**

The Sopp- og Nyttvekstforbund is an official project partner who will help us reach their members. Through their national network we will also get in touch with professional foragers.

**Age**

18 - 85

**Will you include adults (18 years and over) who do not have the capacity to consent?**

No

**Personal data relating to sample 1**

- Name (also with signature/written consent)
- Photographs or video recordings of people
- Sound recordings of people
- Background data that can identify a person
- Other data that can identify a person

**How will you collect data relating to sample 1?**

**Personal interview**

**Legal basis for processing general categories of personal data**

Consent (art. 6 nr. 1 a)

**Group interview**

**Legal basis for processing general categories of personal data**

Consent (art. 6 nr. 1 a)

**Information for sample 1**

**Will you inform the sample about the processing of their personal data?**

Yes

**How?**

Written information (on paper or electronically)

**Third Persons**

---

**Will you be processing data relating to third persons?**

No



## Documentation

---

### How will consent be documented?

- Manually (on paper)

### How can consent be withdrawn?

By emailing the student or one of the supervisors, as stated in the consent form.

### How can data subjects get access to their personal data or have their personal data corrected or deleted?

By emailing the researchers of the project, whose contact details are always provided.

### Total number of data subjects in the project

1-99

## Approvals

---

### Will you obtain any of the following approvals or permits for the project?

## Processing

---

### Where will the personal data be processed?

- Computer belonging to the data controller

### Who will be processing/have access to the collected personal data?

- Project leader
- Student (student project)

### Will the collected personal data be transferred/made available to a third country or international organisation outside the EU/EEA?

No

## Information Security

---

### Will directly identifiable data be stored separately from the rest of the collected data (e.g. in a scrambling key)?

Yes

**Which technical and practical measures will be used to secure the personal data?**

- Other security measures
- Personal data will be anonymised as soon as no longer needed

**Indicate which measures**

Personal data will be anonymised by using codes in any written paper or electronic document. A written list linking names with codes will be written in paper and kept under key at the Natural History Museum (University of Oslo)

**Duration of processing**

---

**Project period**

07.09.2020 - 31.05.2021

**Will personal data be stored after the end of the project?**

No, the collected data will be stored in anonymous form

**Which anonymization measures will be taken?**

- The identification key will be deleted
- Personally identifiable information will be removed, re-written or categorized

**Will the data subjects be identifiable (directly or indirectly) in the thesis/publications from the project?**

No

**Additional information**

---



**NSD's assessment**

**Project title**

Sustainable Foraging of Wild Edibles Plants in Norway: an ethnobotanical perspective

**Reference number**

157596

**Registered**

05.08.2020 av Nicolas Giraud - nicolagi@uio.no

**Data controller (institution responsible for the project)**

Universitetet i Oslo / Kulturhistorisk museum / Naturhistorisk museum

**Project leader (academic employee/supervisor or PhD candidate)**

Irene Teixidor Toneu, i.t.toneu@nhm.uio.no, tlf: 41283942

**Type of project**

Student project, Master's thesis

**Contact information, student**

Giraud Nicolas, nicolas.giraud@nmbu.no, tlf: 0033645072738

**Project period**

07.09.2020 - 31.05.2021

**Status**

05.08.2020 - Assessed

**Assessment (1)**

---

**05.08.2020 - Assessed**

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 05.08.2020, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan

starte.

#### MELD VESENTLIGE ENDRINGER

Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde:  
[https://nsd.no/personvernombud/meld\\_prosjekt/meld\\_endringer.html](https://nsd.no/personvernombud/meld_prosjekt/meld_endringer.html)

Du må vente på svar fra NSD før endringen gjennomføres.

#### TYPE OPPLYSNINGER OG VARIGHET

Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 31.05.2021.

#### LOVLIG GRUNNLAG

Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

#### PERSONVERNPRINSIPPER

NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke viderebehandles til nye uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

#### DE REGISTRERTES RETTIGHETER

Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

#### FØLG DIN INSTITUSJONS RETNINGSLINJER

NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og eventuelt rådføre dere med behandlingsansvarlig institusjon.

## Appendix 5 (p.3; continued)

Meldeskjema for behandling av personopplysninger

14/09/2020, 16:05

### OPPFØLGING AV PROSJEKTET

NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!

Kontaktperson hos NSD: Simon Gogl  
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

Appendix 6 : Consent form template (provided by NSD)

Vil du delta i forskningsprosjektet

## **Bærekraftig høsting av spiselige ville vekster i Norge: et arkeobotanisk perspektiv**

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å undersøke hvor bærekraftig sanking er i Norge. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

### **Formål**

Som en del av prosjektet Mennesker og planter utfører vi nå en studie med fokus på høsting av spiselige ville vekster i Norge. Det overordnede målet i prosjektet Mennesker og planter er å gjenopplage og forvalte kunnskap om nordiske plantetradisjoner. Vi undersøker planters rolle i nordisk og skandinavisk kultur helt fra vikingtiden og fram til i dag. Kildene vi tar utgangspunkt i er historiske tekster, arkeologiske rapporter, botaniske og arkeobotaniske kilder. Intervjuer og fokusgrupper vil bli gjennomført som en del av et tverrfaglig prosjekt og et delprosjekt av Mennesker og planter mellom Naturhistorisk museum i Oslo (Irene Teixidor-Toneu og Anneleen Kool) og en masterstudent i agroøkologi ved NMBU (Nicolas Giraud). I akkurat denne oppgaven vil vi undersøke hvordan sanking av nyttevekster kan påvirke planteøkologi, og aller viktigst, om sanking av nyttevekster har negative eller positive effekter på bevaring av biomangfoldet. Bærekraft utgjøres av både kultur og miljø. For å finne ut om noe er bærekraftig eller ikke, er det nødvendig å samle inn både kulturelle og økologiske data. Slik kan vi undersøke om sanking av nyttevekster vil påvirke artsmangfoldet i et område. Din besvarelse er svært verdifull for oss, og vi ønsker å takke deg på forhånd for din deltakelse. Ikke noen annet forskningsprosjekt vil bruke denne informasjonen.

### **Hvem er ansvarlig for forskningsprosjektet?**

Naturhistorisk museum, Universitetet i Oslo, er ansvarlig for prosjektet.

Dette prosjektet er i samarbeid med Sopp- og Nyttvekstforbund.

### **Hvorfor får du spørsmål om å delta?**

Du får spørsmål om å delta fordi du sanker spiselige ville vekster i Norge enten profesjonelt eller til eget bruk.

Hva innebærer det for deg å delta?

Hvis du velger å delta i prosjektet, vil vi stille deg en rekke spørsmål om sanking og bærekraft i Norge. Dette vil ta omtrent 45 minutter. Spørsmål handler om hvordan og hvorfor du sanker, hvilke planter du sanker og hvor, og hva du synes om bevaring av biomangfoldet og bærekraft av sanking. Det er ikke nødvendig å besvare alle spørsmålene i spørsmålsarket.

Hvis du samtykker, blir intervjuet lydinnspilt og notater blir tatt. Hvis du samtykker, vil vi ta et bilde av en sankingrelatert aktivitet (hvis/når relevant).

### **Det er frivillig å delta**

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke

Samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

### **Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger**

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrevet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

Det er bare masterstudent Nicolas og hans veiledere (Anneleen Kool og Irene Teixidor-Toneu, Naturhistorisk museum, UiO) som vil ha tilgang til dataene.

Ditt navn vil bli erstattet med en kode i alle notater og intervjuets transkripsjon. En separat navnekodeliste vil bli lagret atskilt fra alle anonymiserte data og lagret på papir under nøkkel i Naturhistorisk museum, UiO.

Nicolas Giraud vil samle inn, analysere og lagre dataene. Veiledere vil revidere dataene. Ingen fra andre institusjoner vil ha tilgang til dataene.

Deltakerne vil ikke være gjenkjennelige i publikasjoner. Vi forventer å publisere én vitenskapelig artikkel ut fra disse dataene.

### **Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?**

Opplysningene anonymiseres når prosjektet avsluttes/oppgaven er godkjent, noe som etter planen er Mai 2020. Alle dine personopplysninger vil bli slettet etter fullføring av prosjektet.

### **Dine rettigheter**

Så lenge du kan identifiseres i datamaterialet, har du rett til:

innsyn i hvilke personopplysninger som er registrert om deg, og å få utlevert en kopi av opplysningene,

å få rettet personopplysninger om deg,

å få slettet personopplysninger om deg, og

å sende klage til Datatilsynet om behandlingen av dine personopplysninger.

### **Hva gir oss rett til å behandle personopplysninger om deg?**

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra Naturhistorisk museum, Universitetet i Oslo, har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

### **Hvor kan jeg finne ut mer?**

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

Naturhistorisk museum, Universitetet i Oslo, ved Nicolas Giraud ([nicolas.giraud@nhm.uio.no](mailto:nicolas.giraud@nhm.uio.no)), Anneleen Kool ([anneleen.kool@nhm.uio.no](mailto:anneleen.kool@nhm.uio.no)) og Irene Teixidor-Toneu ([i.t.toneu@nhm.uio.no](mailto:i.t.toneu@nhm.uio.no)).

Vårt personvernombud: Roger Markgraf-Bye

Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med: NSD – Norsk senter for forskningsdata AS på epost ([personverntjenester@nsd.no](mailto:personverntjenester@nsd.no)) eller på telefon: 55 58 21 17.

Med vennlig hilsen

Irene Teixidor-Toneu  
(Forsker/veileder)

Nicolas Giraud  
(Student)

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--

## **Samtykkeerklæring**

Jeg har mottatt og forstått informasjon om prosjektet [sett inn tittel], og har fått anledning til å stille spørsmål. Jeg samtykker til:

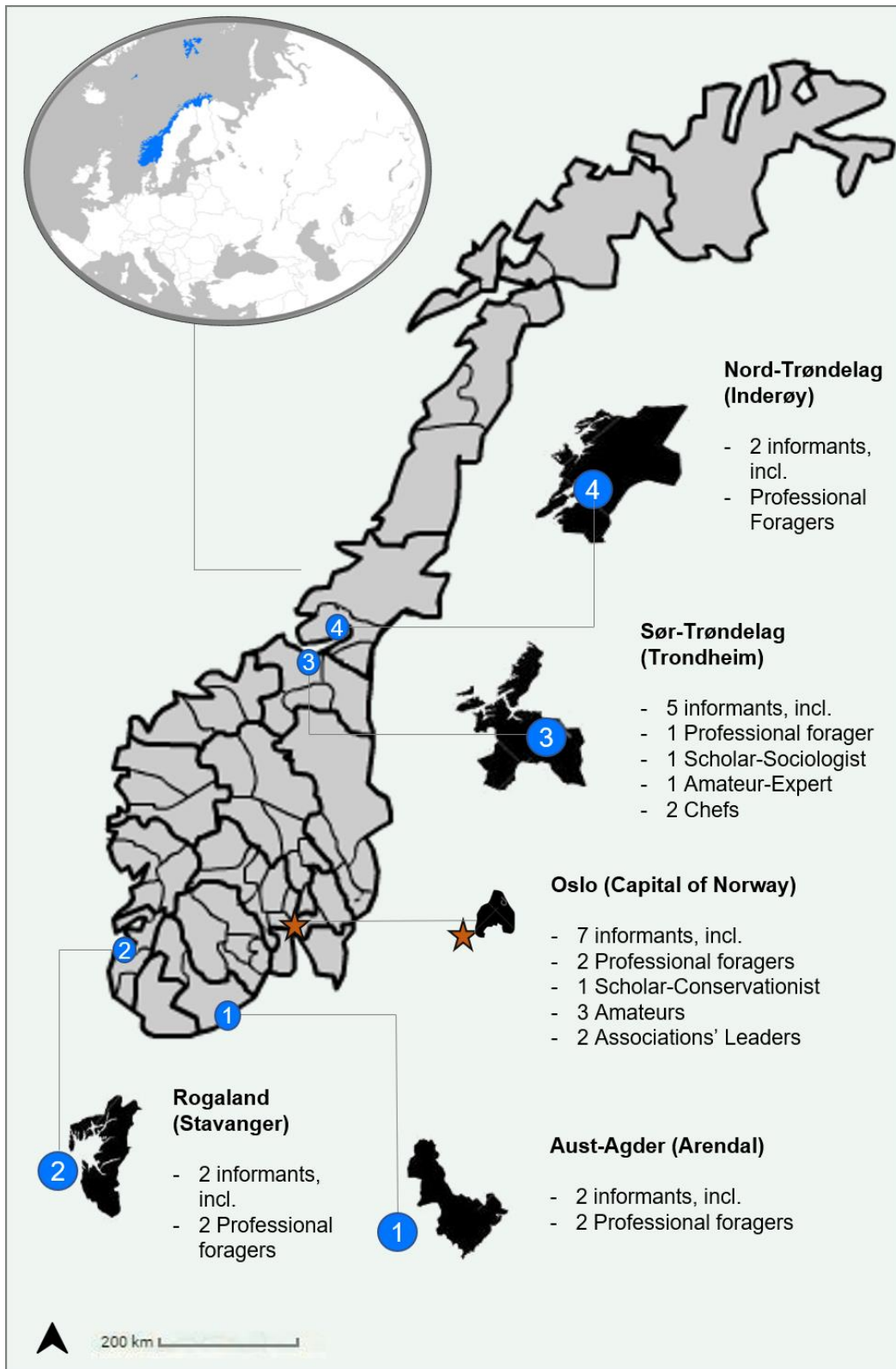
å delta i intervju

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

-----  
(Signert av prosjektdeltaker, dato)



Appendix 7 : Map of visited areas<sup>2</sup> and basic information on informants



<sup>2</sup> Sør- and Nord-Trøndelag are now one county, named Trøndelag  
Aust- and Vest-Agder are now one county, named Agder

# Foraging Wild Edibles Plants in Norway

Page 1

Welcome!

(Hvis du foredrar å svare på norsk, se [her](#))

As part of the project [Nordic People and Plants](#), which aims to rediscover and safeguard Nordic botanical heritage, we are conducting a study on Foraging Wild Edible Plants (WEP) in Norway. Nordic People and Plants studies the role of plants in Nordic culture from the Viking Age until today, drawing from historical, archaeological, botanical and ethnobotanical sources.

Wild Edible Plants are plants that usually grow without being cultivated, and include native and introduced species; we do not consider fungi (mushrooms) in this study, however we do consider berries as they are parts of plants and can be harvested from the wild.

This study aims to understand the impact of gathering and consuming WEP on plant ecology and specifically on biodiversity conservation in Norway. Sustainability is a dynamic process that bridges culture and the environment. We will gather both cultural and ecological data to study biodiversity conservation of foraged plants. Your responses are valuable to us, and we thank you in advance for your precious contribution.

This survey is part of a research project between the Natural History Museum of Oslo and Nicolas Giraud, MSc student in Agroecology at NMBU. The survey will be stored, and data analysed by the MSc researcher; however, individual answers and people's identity will stay anonymous. You are invited to participate, but it is not necessary that you answer all the questions. The questionnaire is anonymous - Please inform us if you would like to comment on the write up of the survey.

Contact details of the MSc researcher: [nicolas.giraud@nhm.uio.no](mailto:nicolas.giraud@nhm.uio.no)

Contact details of supervisors at NHM (UiO):

[anneleen.kool@nhm.uio.no](mailto:anneleen.kool@nhm.uio.no); [i.t.toneu@nhm.uio.no](mailto:i.t.toneu@nhm.uio.no)



Page break

**Reminder: Data will be stored safely and treated anonymously, and exclusively for the purpose of this research**

Consent

*I confirm that the researcher has explained the element of informed consent and my participation is voluntary. The purpose of the research has been explained. I therefore give my consent to gather my responses and analyse them according to the research purpose. I can revoke my declaration of consent at any time by sending a message to the following address:*

[nicolas.giraud@nhm.uio.no](mailto:nicolas.giraud@nhm.uio.no)



Page break

Page 3

**1. Introduction - Gathering and Consumption of Wild Edibles Plants (WEP)**

**Reminder: The study does not consider fungi (mushrooms) and berries are included as they are parts of wild edible plants**

Do you forage professionally or for you own consumption?

*With this question, I intend to differentiate commercial and non-commercial foraging activities. If you are a professional forager, you may also forage for your personal consumption and you can check both boxes.*

Commercial Foraging / Professional Use of WEP

Non-Commercial Foraging / Personal Use of WEP

Comments

This element is only shown when at least one of the options "Non-Commercial Foraging / Personal Use of WEP" or "Commercial Foraging / Professional Use of WEP" are selected in the question "Do you forage professionally or for you own consumption?"

Regarding the following foraging activities, what do you do?

*It is possible to select several answers.*

Gathering WEP

Processing and Consuming WEP

Gathering Ornamental plants

Gathering Medicinal plants

Teaching about plants (guiding and offering courses for example)

Learning about plants (following workshops, courses for example)

Gathering and Selling on markets, to restaurants, other channels

Other, please specify

None of them

Comments

*Please specify any other foraging activities you practice*

When did you started to forage?

This element is only shown when at least one of the options "Gathering WEP", "Gathering Ornamental plants", "Other, please specify", "Gathering Medicinal plants" or "Gathering and Selling on markets, to restaurants, other channels" are selected in the question "Regarding the following foraging activities, what do you do?"

*I started foraging when I was...*

Why do you forage? It is possible to select several answers.

**This question concerns non-commercial foraging activities; professional foragers can respond but have to consider personal use of wild flora only.**

For recreational reasons (because I like being outside)

For nutritional - health reasons (to eat more nutritious food and/or exercise for example)

For environmental reasons (for example, eating wild plants contributes to increased locally sourced food consumption)

For political reasons

For educational reasons

For economic reasons / food-autonomy

Other, please specify

No opinion

Comments

This element is only shown when at least one of the options "No opinion", "Other, please specify", "For political reasons", "For environmental reasons (for example, eating wild plants contributes to increased locally sourced food consumption)", "For economic reasons / food-autonomy", "For educational reasons", "For nutritional - health reasons (to eat more nutritious food and/or exercise for example)" or "For recreational reasons (because I like being outside)" are selected in the question "Why do you forage? It is possible to select several answers."

*Specifications if any*

When did you start to forage for commercial uses?

This element is only shown when the option "Commercial Foraging / Professional Use of WEP" is selected in the question "Do you forage professionally or for your own consumption?"

*I started foraging for commercial uses when I was...*

When in season, how often do you go forage?

*By this question, I intend to differentiate regular foragers from occasional ones*

If you were foraging in the past, how often did you go gathering WEP?

This element is only shown when the option "Not foraging anymore" is selected in the question "When in season, how often do you go forage?"

Comments regarding regularity of foraging activities

This element is only shown when the option "1-3 times a month", "1-3 times a month", "Not foraging anymore", "Everyday", "1-3 times every 2 weeks" or "1-3 times a week" is selected in the question "When in season, how often do you go forage?"

*Please specify anything that might be of interest concerning the regularity of your foraging activities*

How often do you consume WEP when in season?

Comments

This element is only shown when the option "Not consuming anymore", "Never", "Don't know", "1-3 times every 2 weeks", "1-3 times a week", "1-3 times a year", "1-3 times a month" or "Everyday" is selected in the question "How often do you consume WEP when in season?"



Page break

Page 4

What plants and parts do you forage?

You have to select at least one option.

Berries

Flowers

Leaves

Stems

Roots

Seeds

Others

*In the following questions, you will be asked to list all (parts of) plants you are harvesting. Your responses are essential to determine plant species of interest in Norway.*

List all plants you are harvesting berries from (vernacular and/or scientific name if known)

This element is only shown when the option "Berries" is selected in the question "What plants and parts do you forage?"

*Specify uses*

List all plants you are harvesting flowers from (vernacular and/or scientific name if known)

This element is only shown when the option "Flowers" is selected in the question "What plants and parts do you forage?"

*Specify uses*

List all plants you are harvesting leaves from (vernacular and/or scientific name if known)

This element is only shown when the option "Leaves" is selected in the question "What plants and parts do you forage?"

*Specify uses*

List all plants you are harvesting stems from (vernacular and/or scientific name if known)

This element is only shown when the option "Stems" is selected in the question "What plants and parts do you forage?"

*Specify uses*

List all plants you are harvesting roots from (vernacular and/or scientific name if known)

This element is only shown when the option "Roots" is selected in the question "What plants and parts do you forage?"



*Specify uses*

List all plants you are harvesting seeds from (vernacular and/or scientific name if known)


This element is only shown when the option "Seeds" is selected in the question "What plants and parts do you forage?"

*Specify uses*

Comments

This element is only shown when at least one of the options "Stems", "Leaves", "Seeds", "Roots", "Flowers", "Berries" or "Others" are selected in the question "What plants and parts do you forage?"

*You may forage (parts of) plants that have not been mentioned in this questionnaire; you may also harvest plants entirely. Here you can add any specifications or comments regarding the listing made above*

 Page break

How do you focus your work in a commercial setting? What is your relationship with restaurants and/or resellers?

This element is only shown when the option "Commercial Foraging / Professional Use of WEP" is selected in the question "Do you forage professionally or for you own consumption?"

*It is possible to select several answers*

Providing with what you find and advising/suggesting plants and uses to chefs

Providing only what is requested from the buyer

Other. Please specify in the comment box below

Comments

This element is only shown when at least one of the options "Providing with what you find and advising/suggesting plants and uses to chefs", "Other. Please specify in the comment box below" or "Providing only what is requested from the buyer" are selected in the question "How do you focus your work in a commercial setting? What is your relationship with restaurants and/or resellers?"

*How do you focus your work in a commercial setting? What is your relationship with restaurants and/or resellers?*

How do you deliver or sell your products?

This element is only shown when the option "Commercial Foraging / Professional Use of WEP" is selected in the question "Do you forage professionally or for you own consumption?"

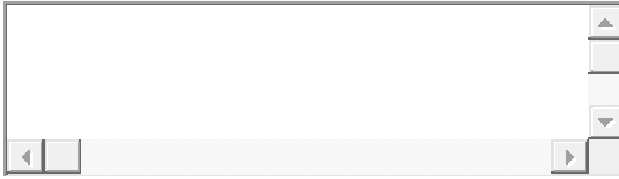
Self-employed

Employed at a restaurants, company

Other

Comments on delivering wild plants

This element is only shown when at least one of the options "Employed at a restaurants, company", "Self-employed" or "Other" are selected in the question "How do you deliver or sell your products?"

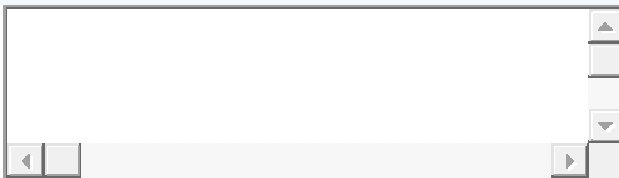



Do you buy WEP on markets?



Please list all markets you know and/or visit

This element is only shown when the option "Yes" is selected in the question "Do you buy WEP on markets?"



 Page break

How do you forage?

*It is possible to select several answers*

With people

On my own

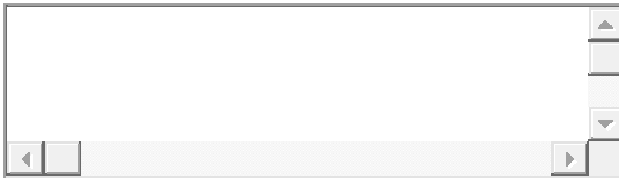
With a book/guide/phone app

Other

Comments

This element is only shown when at least one of the options "With a book/guide/phone app", "On my own", "Other" or "With people" are selected in the question "How do you forage?"

*Please specify what kind of book, guide, phone app, other, you are using while foraging*



How much do you forage?

*It is possible to select several answers*

Taking ONLY what you will use immediately or soon after

Taking MORE than you will use immediately or soon after

Taking only PARTS of plants you need, and leave the rest in the field

Taking the ENTIRE plants and sorting afterwards off site

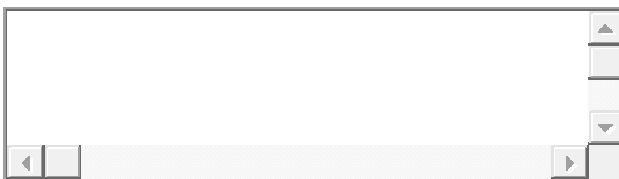
Following specific harvesting recommendations and techniques

Don't know

Comments

This element is only shown when at least one of the options "Following specific harvesting recommendations and techniques", "Taking MORE than you will use immediately or soon after", "Don't know", "Taking ONLY what you will use immediately or soon after", "Taking the ENTIRE plants and sorting afterwards off site" or "Taking only PARTS of plants you need, and leave the rest in the field" are selected in the question "How much do you forage?"

*Please specify any other ways of harvesting you may use, any recommendations you may follow, etc.*



Can you make a guess of the volumes/weights you harvest of each plant per season (including personal and commercial uses)?

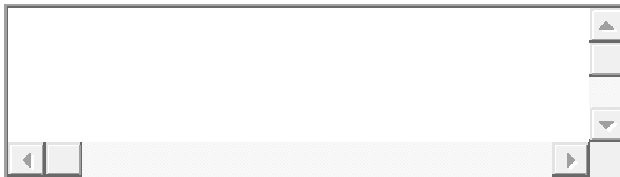
Yes

No

Comments

This element is only shown when the option "Yes" is selected in the question "Can you make a guess of the volumes/weights you harvest of each plant per season (including personal and commercial uses)?"

*Please specify how you monitor your harvests, and what plants are concerned*



If you take more than you will use immediately or soon after, how do you store wild plants?

This element is only shown when the option "Taking MORE than you will use immediately or soon after" is selected in the question "How much do you forage?"

Storing them in the fridge/freezer

Processing them

Drying them


Sharing them

Others

Comments

This element is only shown when at least one of the options "Drying them", "Processing them", "Others", "Sharing them" or "Storing them in the fridge/freezer" are selected in the question "If you take more than you will use immediatly or soon after, how do you store wild plants?"

*Please specify what you do with your harvest*

 Page break

Page 7

Do you know any regulations concerning foraging wild plant species and biodiversity conservation?

Comments

This element is only shown when the option "Yes" is selected in the question "Do you know any regulations concerning foraging wild plant species and biodiversity conservation?"

*List any regulations you know concerning foraging wild plant species and biodiversity conservation*

Do you follow the regulations you know?

This element is only shown when the option "Yes" is selected in the question "Do you know any regulations concerning foraging wild plant species and biodiversity conservation?"

Always

Often

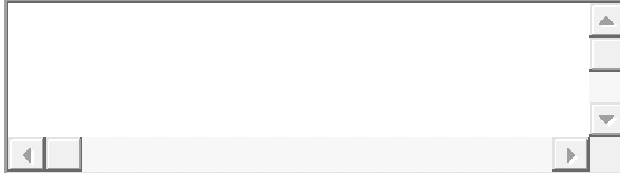
Sometimes



Never

Comments

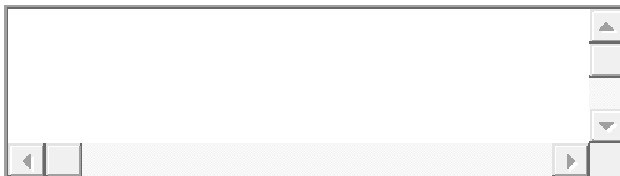
This element is only shown when the option "Sometimes", "Never", "Always" or "Often" is selected in the question "Do you follow the regulations you know?"



Where do you forage?

This element is only shown when at least one of the options "Following specific harvesting recommendations and techniques", "Taking MORE than you will use immediately or soon after", "Taking ONLY what you will use immediately or soon after", "Taking the ENTIRE plants and sorting afterwards off site" or "Taking only PARTS of plants you need, and leave the rest in the field" are selected in the question "How much do you forage?"

*List cities, rural spaces, forests, agricultural fields, natural fields, parks, cemeteries, etc. List all sites you know and go to and their specificities, such as type of field, plant communities found, land use, etc.*



Page break

Page 8

How would you assess your knowledge about foraging WEP?



Expert



Proficient performer



Intermediate performer

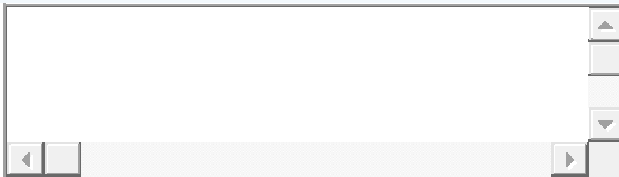
Novice / Beginner

Not knowledgeable at all

No opinion

Comments

This element is only shown when the option "No opinion", "Not knowledgeable at all", "Proficient performer", "Expert", "Novice / Beginner" or "Intermediate performer" is selected in the question "How would you assess your knowledge about foraging WEP?"



How do you identify plants?

With personal knowledge

With books or guides

With a phone app

Other

Comments

This element is only shown when at least one of the options "Other", "With a phone app" or "With books or guides" are selected in the question "How do you identify plants?"

*Specify book titles, authors, app name, other resources you use*



How did you learn about foraging wild plants?

From family / traditional knowledge (elders for exaple)

From friends

From personal interest trough readings, workshops, internet, etc

From an academic education

Other

Comments

This element is only shown when at least one of the options "From an academic education", "From personal interest trough readings, workshops, internet, etc", "Other", "From friends" or "From family / traditional knowledge (elders for exaple)" are selected in the question "How did you learn about foraging wild plants?"

*Specifications regarding knowledge about plants if any*

In your opinion, how does foraging affect biodiversity in Norway?

Positively

Negatively

It doesn't affect it / No impact

No opinion

Comments

This element is only shown when at least one of the options "Negatively", "Positively" or "It doesn't affect it / No impact" are selected in the question "In your opinion, how does foraging affect biodiversity in Norway?"

*Please specify how foraging could affect biodiversity*

Have you observed plant populations decrease or increase since you started foraging?

Decrease

Increase

No change

Don't know

Comments

This element is only shown when the option "Decrease" is selected in the question "Have you observed plant populations decrease or increase since you started foraging?"

*Please specify where plant populations may have increased or decreased, what plant species are concerned, and potential reasons for such changes*

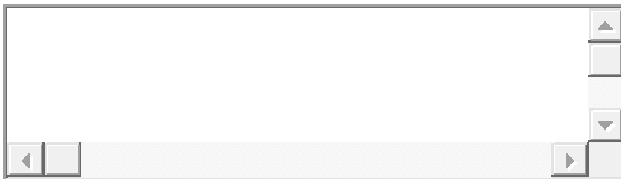
Do you take biodiversity into account when you forage?

## Comments

This element is only shown when the option "Yes" or "No" is selected in the question "Do you take biodiversity into account when you forage?"

*If you said yes, please specify how (e.g. following specific recommendations from knowledgeable people, from a guide...)*

*If you said that you were not considering biodiversity, could you specify why?*



Do you ever move, take seeds or cuttings from the plants you forage?

Cultivate/Propagate/Prune IN YOUR garden/balcony from collected wild seeds or plants

Cultivate/Propagate/Prune IN THE WILD where you usually harvest your wild edibles

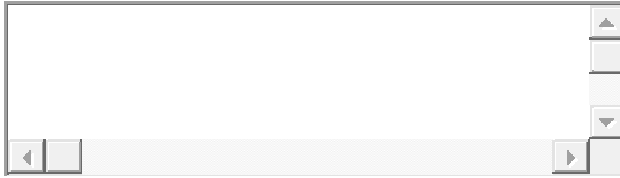
Cultivate/Propagate/Prune in the wild within new spots you just discovered


No

Other

## Comments

This element is only shown when at least one of the options "No", "Cultivate/Propagate/Prune IN YOUR garden/balcony from collected wild seeds or plants", "Cultivate/Propagate/Prune in the wild within new spots you just discovered" or "Cultivate/Propagate/Prune IN THE WILD where you usually harvest your wild edibles" are selected in the question "Do you ever move, take seeds or cuttings from the plants you forage?"



 Page break

## 2. Perceptions on cultural services and values associated with foraging WEP

On a scale from 1 (do not agree) to 5 (completely agree), how would you identify to these statements?

*WEP = Wild Edible Plants*

1 (do not agree)

2

3

4

5 (completely agree)

Foraging WEP is part of my culture, it's a cultural heritage/tradition

Foraging is a family heritage

Foraging contributes to my sense of community

Foraging WEP contributes to a healthy lifestyle

Foraging WEP contributes to enhance cuisine taste, develop new culinary traditions

- 
- 
- 
- 
- 
- 

Foraging WEP is recreational

- 
- 
- 
- 
- 

Foraging WEP is an educational activity

- 
- 
- 
- 
- 

Foraging WEP is a sustainable activity

- 
- 
- 
- 
- 

Foraging WEP can be unsustainable

- 
- 
- 
- 
- 

Some plants are more vulnerable than others and should be harvested in a specific way

- 
- 
- 
- 
- 

Comments

*Please elaborate on the sustainability of foraging activities and/or add any other value that you associate to foraging*

Page break

### 3. Socio-demographic data

**Reminder : Data will be stored safely and treated anonymously, and exclusively for the purpose of this research**

Are you a member of an association such as NSNF (soppognyttevekster), the Association for the protection of biodiversity (examples : Sabima, Friends of the Earth, etc.)?

What is your age group?

Occupation(s)

*If you are a student or retired, please indicate your area of study or former professional occupation(s)*

Place of birth (County)

*Please do not indicate the specific locality*

Place of residence (County)

*Please do not indicate the specific locality*

Education level / Area

*Examples*

Level: Bachelor / Master / PhD / Other

Area: Biology

*Please specify any education on botany or plant identification (e.g. webinars, workshops); indicate if self-trained and how*

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This is the end of the questionnaire, do you have anything else you would like to add about foraging Wild Edible Plants?

Feel free to get in touch if you have further comments or suggestions  
:

[nicolas.giraud@nhm.uio.no](mailto:nicolas.giraud@nhm.uio.no)

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*Many thanks for your contribution !*

*Take care*

# Bærekraftig høsting av spiselige ville vekster i Norge

Page 1

Velkommen!

(If you prefer the English version, click [here](#))

Som en del av prosjektet [Mennesker og planter](#) utfører vi nå en studie med fokus på høsting av spiselige ville vekster i Norge. Med spiselige ville vekster mener vi lokale og introduserte viltvoksende planter, inkludert bær. Denne studien inkluderer ikke sopp.

Det overordnede målet i prosjektet Mennesker og planter er å gjenoppdage og forvalte kunnskap om nordiske plantetradisjoner. Vi undersøker planters rolle i nordisk og skandinavisk kultur helt fra vikingtiden og fram til i dag. Kildene vi tar utgangspunkt i er historiske tekster, arkeologiske rapporter, botaniske og arkeobotaniske kilder.

I akkurat denne oppgaven vil vi undersøke hvordan sanking av nyttevekster kan påvirke planteøkologi, og aller viktigst, om sanking av nyttevekster har negative eller positive effekter på bevaring av biomangfoldet. Bærekraft utgjøres av både kultur og miljø. For å finne ut om noe er bærekraftig eller ikke, er det nødvendig å samle inn både kulturelle og økologiske data. Slik kan vi undersøke om sanking av nyttevekster vil påvirke artsmangfoldet i et område.

Denne spørreundersøkelsen er en del av et tverrfaglig prosjekt mellom Naturhistorisk museum i Oslo og Nicolas Giraud som tar en mastergrad i agroøkologi ved NMBU. Svarene vil bli lagret og data vil bli analysert av Nicolas. Både besvarelse og deltakers navn vil bli anonymisert. Det er ikke nødvendig å besvare alle spørsmålene i spørsmålsarket. Din besvarelse er svært verdifull for oss, og vi ønsker å takke deg på forhånd for din deltakelse.

Ta kontakt hvis du ønsker å komme med innspill på studien. Vi ser fram til å høre fra deg!

Kontakt masterstudent Nicolas på: [nicolas.giraud@nhm.uio.no](mailto:nicolas.giraud@nhm.uio.no)



Kontakt

veiledere

ved

NHM: [anneleen.kool@nhm.uio.no](mailto:anneleen.kool@nhm.uio.no) ; [i.t.toneu@nhm.uio.no](mailto:i.t.toneu@nhm.uio.no)



Page break

Page 2

**Husk! Dine data blir lagret på en trygg og anonym måte og brukes utelukkende i dette forskningsprosjektet.**

Samtykke

*Jeg bekrefter at forskerne har forklart hva det er jeg samtykker til og at min deltakelse er frivillig. Hensikten med forskningen så vel som risiko og fordeler er blitt forklart. Jeg gir derfor mitt samtykke til å samle svarene mine og analysere dem i henhold til forskningsformålet. Jeg kan når som helst tilbakekalle min samtykkeerklæring ved å sende en melding til følgende adresse:*

[nicolas.giraud@nhm.uio.no](mailto:nicolas.giraud@nhm.uio.no)



Page break

Page 3

### 1. Sanking og bruk av spiselige ville vekster (SVV)

**Merk: Denne studien inkluderer ikke bruk av sopp**

Sanker du profesjonelt eller til eget bruk?

*Med dette spørsmålet er hensikten å skille mellom sanking til kommersiell eller privat bruk. Hvis du er en profesjonell sanker som også sanker til privat bruk kan du krysse av i begge boksene.*

Kommersiell sanking og profesjonell bruk av SVV

Ikke-kommersiell sanking og personlig bruk av SVV

Kommentarer

This element is only shown when at least one of the options "Ikke-kommersiell sanking og personlig bruk av SVV" or "Kommersiell sanking og profesjonell bruk av SVV" are selected in the question "Sanker du profesjonelt eller til eget bruk?"

Av følgende sankingsaktiviteter, hva gjør du?

*Det er mulig å velge flere alternativer.*

Sanking av spiselige ville vekster (inkludert bær)

Tilberedelse og bruk av spiselige ville vekster (inkludert bær)

Plukking av blomster

Høsting av planter med medisinske egenskaper

Jeg tilbyr kurs og guiding om spiselige ville planter

Jeg tar eller har tatt kurs om spiselige ville vekster

Sanking og salg av SVV til marked/restauranter/venner/familie

Annet. Vennligst utdyp

Ingen av dem

**Kommentarer**

This element is only shown when at least one of the options "Sanking og salg av SVV til marked/restauranter/venner/familie", "Annet. Vennligst utdyp", "Høsting av planter med medisinske egenskaper", "Jeg tilbyr kurs og guiding om spiselige ville planter", "Tilberedelse og bruk av spiselige ville vekster (inkludert bær)", "Plukking av blomster", "Sanking av spiselige ville vekster (inkludert bær)" or "Ingen av dem" are selected in the question "Av følgende sankingsaktiviteter, hva gjør du?"

Hvor gammel var du da du startet å sanke?

This element is only shown when at least one of the options "Sanking og salg av SVV til marked/restauranter/venner/familie", "Annet. Vennligst utdyp", "Høsting av planter med medisinske egenskaper", "Plukking av blomster" or "Sanking av spiselige ville vekster (inkludert bær)" are selected in the question "Av følgende sankingsaktiviteter, hva gjør du?"

under 17

mellom 18-29

mellom 30-49

mellom 50-69

over 70

Hvorfor driver du med sanking av planter?

*Det er mulig å velge flere alternativer.*

*Dette er et spørsmål om ikke-kommersiell sanking; profesjonelle sankere kan svare, men må kun vurdere personlig bruk av ville planter.*

Rekreasjon

Mosjon og helsemessige årsaker

Miljømessige årsaker

Politiske årsaker

Av pedagogiske grunner (Jeg lærer bort kunnskap om sanking til andre)

Kunnskapsmessige årsaker (Jeg liker å lære om sanking)

Annet. Vennligst utdyp

Ingen grunn

Kommentarer

This element is only shown when at least one of the options "Ingen grunn", "Kunnskapsmessige årsaker (Jeg liker å lære om sanking)", "Annet. Vennligst utdyp", "Politiske årsaker", "Av pedagogiske grunner (Jeg lærer bort kunnskap om sanking til andre)", "Mosjon og helsemessige årsaker", "Miljømessige årsaker" or "Rekreasjon" are selected in the question "Hvorfor driver du med sanking av planter?"

Hvor gammel var du da du begynte å sanke kommersielt?

This element is only shown when the option "Kommersiell sanking og profesjonell bruk av SVV" is selected in the question "Sanker du profesjonelt eller til eget bruk?"

under 17

mellom 18-29

mellom 30-49

mellom 50-69

over 70

Hvor ofte sanker du når det er sesong for det?

Hvis du sanket spiselige ville vekster før, hvor ofte gjorde du det da?

This element is only shown when the option "Jeg sanker ikke lenger" is selected in the question "Hvor ofte sanker du når det er sesong for det?"

Kommentarer

This element is only shown when the option "1-3 ganger i uka", "1-3 ganger hver andre uke", "Hver dag", "Aldri", "Jeg sanker ikke lenger", "1-3 ganger i måneden" or "1-3 ganger i året" is selected in the question "Hvor ofte sanker du når det er sesong for det?"

Hvor ofte spiser du ville matplanter når det er sesong for det?

Kommentarer

This element is only shown when the option "1-3 ganger i året", "Aldri", "1-3 ganger hver andre uke", "1-3 ganger i måneden", "Hver dag", "1-3 ganger i uka" or "Jeg spiser ikke ville matplanter lenger" is selected in the question "Hvor ofte spiser du ville matplanter når det er sesong for det?"



Page break

Page 4

Hvilke planter sanker du og til hvilken bruk?

You have to select at least one option.

Bær

Blomster

Blader

Stilker

Røtter

Frø

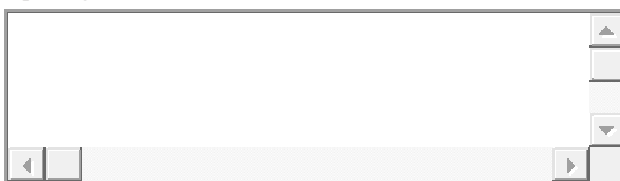
Annet

*De følgende spørsmålene handler om plantearter og plantedeler som du sanker. Dine svar er viktige for å få overblikk over hvilke planter det er som blir sanket i Norge og hvordan. Hvis du ikke samler en hvis type plante eller plantedel (bær for eksempel), kan du svare "Ingen".*

Liste over alle planter du høster bær fra (norsk og/eller vitenskapelig navn hvis mulig)

This element is only shown when the option "Bær" is selected in the question "Hvilke planter sanker du og til hvilken bruk?"

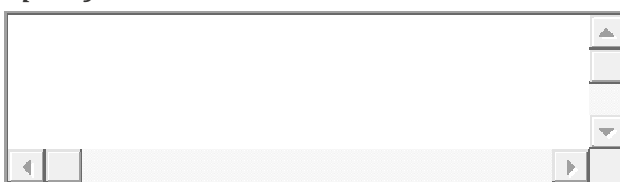
*Spesifiser bruk*



Liste over alle planter du høster blomster fra (norsk og/eller vitenskapelig navn hvis kjent)

This element is only shown when the option "Blomster" is selected in the question "Hvilke planter sanker du og til hvilken bruk?"

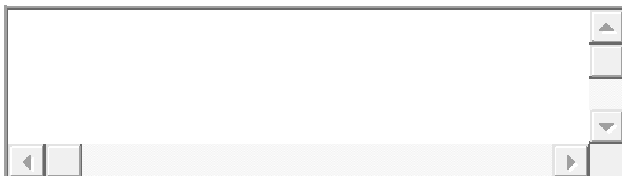
*Spesifiser bruk*



Liste over alle planter du høster blader fra (norsk og/eller vitenskapelig navn hvis mulig)

This element is only shown when the option "Blader" is selected in the question "Hvilke planter sanker du og til hvilken bruk?"

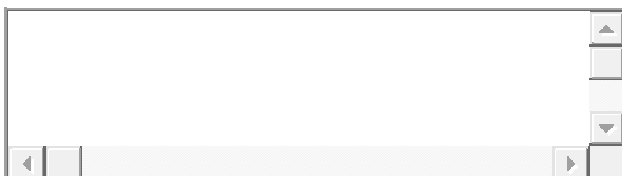
*Spesifiser bruk*

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Liste over alle planter du høster stilken fra (norsk og/eller vitenskapelig navn hvis mulig)

This element is only shown when the option "Stilker" is selected in the question "Hvilke planter sanker du og til hvilken bruk?"

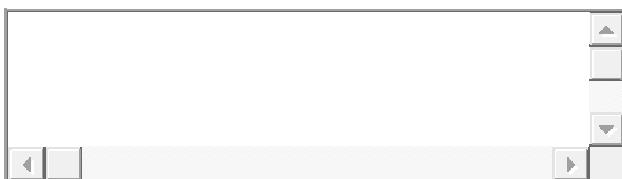
*Spesifiser bruk*

An empty rectangular list box with a light gray background. On the right side, there are three small square buttons stacked vertically, with the top one containing an upward-pointing triangle and the bottom one a downward-pointing triangle. On the bottom left and right corners, there are small square buttons containing left and right-pointing triangles, respectively.

Liste over alle planter du høster røtter fra (norsk og/eller vitenskapelig navn hvis mulig)

This element is only shown when the option "Røtter" is selected in the question "Hvilke planter sanker du og til hvilken bruk?"

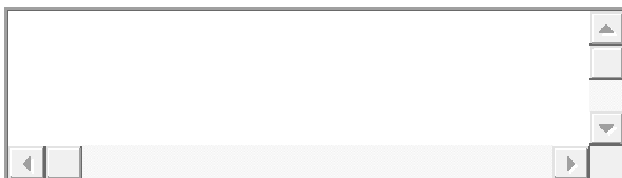
*Spesifiser bruk*

An empty rectangular list box with a light gray background. On the right side, there are three small square buttons stacked vertically, with the top one containing an upward-pointing triangle and the bottom one a downward-pointing triangle. On the bottom left and right corners, there are small square buttons containing left and right-pointing triangles, respectively.

Liste over alle planter du høster frø fra (norsk og/eller vitenskapelig navn hvis mulig)

This element is only shown when the option "Frø" is selected in the question "Hvilke planter sanker du og til hvilken bruk?"

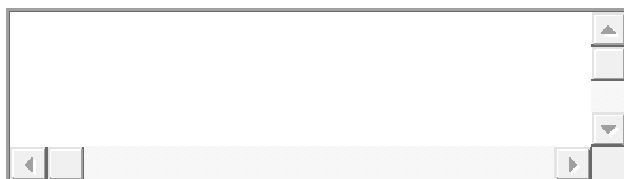
*Spesifiser bruk*

An empty rectangular list box with a light gray background. On the right side, there are three small square buttons stacked vertically, with the top one containing an upward-pointing triangle and the bottom one a downward-pointing triangle. On the bottom left and right corners, there are small square buttons containing left and right-pointing triangles, respectively.

Kommentarer

This element is only shown when at least one of the options "Frø", "Annet", "Stilker", "Røtter", "Blomster", "Blader" or "Bær" are selected in the question "Hvilke planter sanker du og til hvilken bruk?"

*Du sanker kanskje noen planter som ikke passet inn i de tidligere spørsmålene, eller så er det noen der du tar hele planten når du sanker. Her kan du legge til detaljer eller kommentarer som du ikke fikk med lengre opp.*



 Page break

Page 5

Hvordan prioriterer du det du sanker kommersielt? Hvordan samarbeider du med restauranter eller forhandlere?

This element is only shown when the option "Kommersiell sanking og profesjonell bruk av SVV" is selected in the question "Sanker du profesjonelt eller til eget bruk?"

*Det er mulig å velge flere alternativer.*

Jeg er selvstendig næringsdrivende og selger til de som vil kjøpe

Jeg leverer til restauranten/bedriften der jeg er ansatt

Annet, spesifiser gjerne i kommentarfeltet

Kommentarer

This element is only shown when at least one of the options "Jeg leverer til restauranten/bedriften der jeg er ansatt", "Annet, spesifiser gjerne i kommentarfeltet" or "Jeg er selvstendig næringsdrivende og selger til de som vil kjøpe" are selected in the question "Hvordan prioriterer du det du sanker kommersielt? Hvordan samarbeider du med restauranter eller forhandlere?"



Hvordan leverer eller selger du dine produkter?

Selvstendig næringsdrivende

Ansatt ved en restaurant eller annen bedrift

Annet

Kommentarer

This element is only shown when at least one of the options "Selvstendig næringsdrivende", "Ansatt ved en restaurant eller annen bedrift" or "Annet" are selected in the question "Hvordan leverer eller selger du dine produkter?"

Kjøper du ville matplanter på markeder?

Kommentarer

This element is only shown when the option "Ja (Vennligst nevnt de aktuelle markedene, samt navnet på plantene du er ute etter og deres bruksområde)" is selected in the question "Kjøper du ville matplanter på markeder?"

*Oppgi gjerne alle markeder du kjenner og / eller besøker*



Page break

Hvordan sanker du?

*Det er mulig å velge flere alternativer.*

Sammen med andre

På egenhånd

Vi bruker en guide/bok/telefonapp

Annet

Kommentarer

This element is only shown when at least one of the options "Annet", "På egenhånd", "Vi bruker en guide/bok/telefonapp" or "Sammen med andre" are selected in the question "Hvordan sanker du?"

*Vennligst spesifiser hva slags bok, guide, telefonapp, annet du bruker mens du sanker*

Hvor mye sanker du?

Jeg tar kun det jeg trenger der og da, eller i nærmeste framtid

Jeg tar mer enn jeg trenger der og da, eller i nærmeste framtid

Jeg tar kun delene jeg trenger og lar resten stå/ligge

Jeg tar hele planten og sorterer ut det jeg trenger et annet sted

Jeg følger spesifikke råd om høsting/sankingsteknikker

Vet ikke

Kommentarer

### *Følger du spesifikke regler og forhåndsregler ved sanking?*

Kan du gjøre et estimat av hvor mye (volum/ vekt) du høster av hver plante per sesong (inkludert personlig og kommersiell bruk)?

Ja

Nei

Kommentarer

This element is only shown when the option "Ja" is selected in the question "Kan du gjøre et estimat av hvor mye (volum/ vekt) du høster av hver plante per sesong (inkludert personlig og kommersiell bruk)?"

Vennligst spesifiser hvordan du ser hvor mye du høster for hvilke planter

Spesifiser hva du gjør med det du sanker i store mengder:

This element is only shown when the option "Jeg tar mer enn jeg trenger der og da, eller i nærmeste framtid" is selected in the question "Hvor mye sanker du?"

Jeg fryser det ned

Jeg bearbeider det (lager pesto, syltetøy, saft eller lignende)

Jeg tørker det

Jeg deler det med andre



Annet. Vennligst utdyp

Kommentarer

This element is only shown when at least one of the options "Jeg deler det med andre", "Annet. Vennligst utdyp", "Jeg bearbejder det (lager pesto, syltetøy, saft eller lignende)", "Jeg tørker det" or "Jeg fryser det ned" are selected in the question "Spesifiser hva du gjør med det du sanker i store mengder:"

*Spesifiser hva du gjør med det du sanker i store mengder*



Page break

Page 7

Kjenner du til noen forskrifter om sanking av ville plantearter og bevaring av biologisk mangfold?

Kommentarer

This element is only shown when the option "Ja" is selected in the question "Kjenner du til noen forskrifter om sanking av ville plantearter og bevaring av biologisk mangfold?"

*Lag en liste over forskrifter du kjenner til om sanking av ville plantearter og bevaring av biologisk mangfold*

Følger du forskriftene du kjenner til?

This element is only shown when the option "Ja" is selected in the question "Kjenner du til noen forskrifter om sanking av ville plantearter og bevaring av biologisk mangfold?"



Alltid



Ofte



Noen ganger



Aldri

Kommentarer

This element is only shown when the option "Noen ganger", "Aldri", "Alltid" or "Ofte" is selected in the question "Følger du forskriftene du kjenner til?"

Hvor sanker du spiselige ville vekster?

*Nevn by/tettsted, kommune på alle aktuelle områder. Angi også navn på skog, åker, naturområder, parker, kirkegård o.l., samt plantene du sanker der*



Page break

Page 8

Hvordan vil du klassifisere din kunnskap om ville matplanter?



Ekspertnivå (profesjonell sanker/utdannet)



Svært kunnskapsrik



Moderat kunnskapsrik



Nybegynner

118



Ingen kunnskap



Ingen mening

Kommentarer

Hvordan identifiserer du planter?



Med min egen kunnskap



Med en bok (eks. flora, guide). Vennligst spesifiser hvilken bok, forfatter og utgave



Med en app på mobile (eks. PlantNet). Vennligst spesifiser navnet på appen



Annet

Kommentarer

This element is only shown when at least one of the options "Med en app på mobile (eks. PlantNet). Vennligst spesifiser navnet på appen", "Annet" or "Med en bok (eks. flora, guide). Vennligst spesifiser hvilken bok, forfatter og utgave" are selected in the question "Hvordan identifiserer du planter?"

*Vennligst spesifiser hvilken bok, forfatter og utgave, navnet på appen*

Hvordan lærte du om sanking av nyttevekster?



Fra familie/overlevering av plantetradisjoner (for eks. gjennom foreldre, besteforeldre)

Fra venner

Personlig interesse, ved å lese, delta på kurs, internet, e.l.

Fra utdanning (eks. bachelor i botanikk, gartner e.l.). Vennligst spesifiser hvor du har utdanning fra, i hvilken disiplin og på hvilket nivå

Annet

Kommentarer

This element is only shown when at least one of the options "Annet", "Personlig interesse, ved å lese, delta på kurs, internet, e.l.", "Fra utdanning (eks. bachelor i botanikk, gartner e.l.). Vennligst spesifiser hvor du har utdanning fra, i hvilken disiplin og på hvilket nivå", "Fra familie/overlevering av plantetradisjoner (for eks. gjennom foreldre, besteforeldre)" or "Fra venner" are selected in the question "Hvordan lærte du om sanking av nyttevekster?"

Har du inntrykk av at høsting/sanking påvirker biomangfoldet i Norge?

Ja, på en god måte

Ja, på en dårlig måte

Nei, mitt inntrykk er at høsting/sanking ikke påvirker biomangfoldet i Norge. Vennligst utdyp

Ingen formening

Kommentarer

This element is only shown when at least one of the options "Ja, på en dårlig måte", "Nei, mitt inntrykk er at høsting/sanking ikke påvirker biomangfoldet i Norge. Vennligst utdyp" or "Ja, på en god måte" are selected in the question "Har du inntrykk av at høsting/sanking påvirker biomangfoldet i Norge?"

*Vennligst utdyp hvorfor du mener dette*

Har du observert endringer i størrelsen av plantepopulasjoner etter at du begynte med sanking?

Ja, jeg har observert at populasjoner har minket i størrelse

Ja, jeg har observert at populasjoner har økt i størrelse

Nei, jeg har ikke observert endringer i populasjonsstørrelse

Vet ikke

Kommentarer

This element is only shown when the option "Ja, jeg har observert at populasjoner har minket i størrelse" is selected in the question "Har du observert endringer i størrelsen av plantepopulasjoner etter at du begynte med sanking?"

*Vennligst spesifiser hvilken plante det er snakk om og hva du tror er grunnen til slike endringer*

Tar du hensyn til biomangfoldet når du høster/sanker?

Kommentarer

*Vennligst utdyp (eks. følger du offisielle regler/føringer eller råd fra en kunnskapsrik person?)*



*Hvis du ikke gjør det, kan forklare hvorfor?*

Hender det at du tar stiklinger, dyrker eller sår de ville matplantene du høster fra?

Ja, jeg tar stiklinger/dyrker/sår planter i hagen/balkongen fra ville matplanter

Ja, jeg planter stiklinger/dyrker/sår plantene der jeg allerede høster dem

Ja, jeg planter stiklinger/dyrker/sår de ville matplantene på andre passende steder som jeg har oppdaget

Nei

Annet

Kommentarer

This element is only shown when at least one of the options "Ja, jeg tar stiklinger/dyrker/sår planter i hagen/balkongen fra ville matplanter", "Ja, jeg planter stiklinger/dyrker/sår plantene der jeg allerede høster dem", "Annet", "Ja, jeg planter stiklinger/dyrker/sår de ville matplantene på andre passende steder som jeg har oppdaget" or "Nei" are selected in the question "Hender det at du tar stiklinger, dyrker eller sår de ville matplantene du høster fra?"



Page break

## **2. Oppfatninger av sankingens betydning for kulturelle verdier og tjenester**

På en skala fra 1 (uenig) til 5 (helt enig), hvordan kjenner du deg igjen i disse utsagnene

*SVV = spiselige ville vekster*

1 (uenig)

2

3

4

5 (helt enig)

Høsting av spiselige ville vekster er en del av min kultur/kulturelle arv

Høsting av spiselige ville vekster er en familietradisjon

Høsting av spiselige ville vekster forbedrer mitt lokale samfunn

Høsting av spiselige ville vekster bidrar til å gjøre min livsstil sunnere (næringsmessig)

Høsting av spiselige ville vekster bidrar til å forbedre min matlaging og kulinariske tradisjon

Høsting av spiselige ville vekster er en rekreasjonsaktivitet

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Høsting av spiselige ville vekster er en læringsaktivitet

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Høsting av spiselige ville vekster er en bærekraftig aktivitet

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Høsting av spiselige ville vekster kan være en lite bærekraftig aktivitet

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Noen planter er mer sårbare enn andre og bør bli høstet på en spesifikk måte

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Kommentarer

 Page break

### 3. Sosiodemografiske data

**Husk! Dine data blir lagret på en trygg og anonym måte og brukes utelukkende i dette forskningsprosjektet.**

Er du medlem av foreninger som Norges Sopp og Nyttevekstforening? Eller organisasjoner som SABIMA, Naturvernforbundet, KVANN, Framtiden i Våre Hender e.l.?

Aldersgruppe

Yrke/r

*Hvis du er student eller pensjonist, nevner gjerne ditt studie eller ditt tidligere yrke*

Fødselssted

*Her er vi ute etter område. Ikke angi adresse eller sensitiv informasjon*

Bosted

*Her er vi ute etter område. Ikke angi adresse eller sensitiv informasjon*

Utdanning

*Nivå og Felt (bachelorgrad, mastergrad, doktorgrad eller annet)*

*Har du erfaring fra botanikk- eller feltkurs, webinarer e.l.? Vennligst utdyp hvor du har din kompetanse fra*

Dette er slutten av spørreskjemaet, er det noe mer du vil si om sanking av ville spiselige planter?

*Kom gjerne med tilbakemeldinger på utførelsen av dette spørreskjemaet her, eller skriv direkte til forskeren på e-postadressen: [nicolas.giraud@nhm.uio.no](mailto:nicolas.giraud@nhm.uio.no)*

Tusen takk for din tid og dine svar !

## Appendix 10 : Online questionnaire – List of social media

### **Websites**

<https://www.nhm.uio.no/english/research/projects/people-and-plants/news/>

### **Facebook groups**

Nordic Agroecologist (NMBU) – Accessed June 4<sup>th</sup>

Society for Economic Botany/Society for Ethnobiology Student Group – Accessed June 4<sup>th</sup>

Slow Food Youth Network – Accessed June 4<sup>th</sup>

Agroecology Europe Youth Network – Accessed June 4<sup>th</sup>

Plant & Foraging Identification Workgroup – Accessed June 4<sup>th</sup>

Ethnobotany - plants and people – Accessed June 4<sup>th</sup>

Nordic People and Plants – Accessed June 4<sup>th</sup>

Villblomster – Accessed June 8<sup>th</sup>

Plant Lovers at NMBU – Accessed June 19<sup>th</sup>

Naturvernforbundet – Accessed June 19<sup>th</sup>

Institutt for plantevitenskap – NMBU – Accessed June 19<sup>th</sup>

## Appendix 11 : Wild edible plants Dataset – Number of reports (NRs)

Folk.Names	Latin.Names	Botanical.Family	Total.NR	Algae	Bark	Fruits.Berries	Buds	Cones	Flowers	Leaves	Nuts	Roots	Sap	Seeds	Shoots	Stems	Whole
svarthyll	<i>Sambucus_nigra</i>	Adoxaceae	59	0	0	31	0	0	27	1	0	0	0	0	0	0	0
hulle-bær	<i>Sambucus_sp</i>	Adoxaceae	22	0	0	4	0	0	18	0	0	0	0	0	0	0	0
rødhyll	<i>Sambucus_racemosa</i>	Adoxaceae	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0
søll;bu-tarre;butare	<i>Alaria_esculenta</i>	Alariaceae	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
meldestokk	<i>Chenopodium_album</i>	Amaranthaceae	22	0	0	0	0	0	0	19	0	0	0	1	0	1	1
tangmelde	<i>Atriplex_prostrata</i>	Amaranthaceae	9	0	0	0	0	0	1	8	0	0	0	0	0	0	0
strandmelde	<i>Atriplex_littoralis</i>	Amaranthaceae	3	0	0	0	0	0	1	2	0	0	0	0	0	0	0
salturtslekta	<i>Salicornia_sp</i>	Amaranthaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
ramslauk;ramsløk	<i>Allium_ursinum</i>	Amaryllidaceae	145	0	0	5	2	0	30	92	0	1	0	7	0	8	0
græs-løk	<i>Allium_schoenoprasum</i>	Amaryllidaceae	13	0	0	0	0	0	2	10	0	0	0	0	0	1	0
strandløk	<i>Allium_vineale</i>	Amaryllidaceae	11	0	0	0	0	0	3	4	0	3	0	0	0	1	0
seiersløk	<i>Allium_victoralis</i>	Amaryllidaceae	7	0	0	0	0	0	0	6	0	1	0	0	0	0	0
sibirsk-gressløk	<i>Allium_schoenoprasum_borealis</i>	Amaryllidaceae	5	0	0	0	0	0	3	2	0	0	0	0	0	0	0
vill-lauk	<i>Allium_oleraceum</i>	Amaryllidaceae	3	0	0	0	0	0	1	1	0	0	0	0	0	0	1
skvallerkål	<i>Aegopodium_podagraria</i>	Apiaceae	86	0	0	1	0	0	8	70	0	0	0	1	0	5	1
karve	<i>Carum_carvi</i>	Apiaceae	51	0	0	0	0	0	3	21	0	7	0	19	0	0	1
kvann	<i>Angelica_archangelica</i>	Apiaceae	35	0	0	0	0	0	3	11	0	4	0	4	0	13	0
spansk-kjørvel	<i>Myrrhis_odorata</i>	Apiaceae	18	0	0	0	0	0	3	8	0	0	0	5	0	2	0
strandkjeks	<i>Ligusticum_scoticum</i>	Apiaceae	10	0	0	0	0	0	2	6	0	0	0	1	0	1	0
løpstikke	<i>Levisticum_officinale</i>	Apiaceae	5	0	0	0	0	0	0	3	0	0	0	1	0	1	0
hundekjeks	<i>Anthriscus_sylvestris</i>	Apiaceae	3	0	0	0	0	0	1	1	0	1	0	0	0	0	0
jordnøtt	<i>Conopodium_majus</i>	Apiaceae	3	0	0	0	0	0	0	0	0	3	0	0	0	0	0
mesterrot	<i>Peucedanum_ostruthium</i>	Apiaceae	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0
NA	<i>Aegopodium_sp</i>	Apiaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
dill	<i>Anethum_graveolens</i>	Apiaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
kjørvel	<i>Anthriscus_cerefolium</i>	Apiaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0

selleri	<i>Apium graveolens</i>	Apiaceae	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
bjørnerot	<i>Meum athamanticum</i>	Apiaceae	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0
villpastinakk	<i>Pastinaca sativa</i>	Apiaceae	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
persille	<i>Petroselinum crispum</i>	Apiaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
gjeldkarve	<i>Pimpinella saxifraga</i>	Apiaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
asparges	<i>Asparagus officinalis</i>	Asparagaceae	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
maiblom	<i>Maianthemum bifolium</i>	Asparagaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
løvetann	<i>Taraxacum officinale</i>	Asteraceae	155	0	0	4	1	0	72	57	0	15	0	1	0	5	0
røllik;ryllik	<i>Achillea millefolium</i>	Asteraceae	64	0	0	0	0	0	25	35	0	0	0	1	0	3	0
prestekrage	<i>Leucanthemum vulgare</i>	Asteraceae	16	0	0	0	1	0	11	4	0	0	0	0	0	0	0
tunbalderbrå	<i>Lepidotheca suaveolens</i>	Asteraceae	13	0	0	1	0	0	8	4	0	0	0	0	0	0	0
ringblom	<i>Calendula officinalis</i>	Asteraceae	8	0	0	0	0	0	8	0	0	0	0	0	0	0	0
storborre	<i>Arctium lappa</i>	Asteraceae	6	0	0	0	0	0	0	0	0	4	0	0	0	2	0
strandstjerne	<i>Tripolium pannonicum</i>	Asteraceae	6	0	0	0	0	0	2	4	0	0	0	0	0	0	0
burrot	<i>Artemisia vulgaris</i>	Asteraceae	5	0	0	0	0	0	0	4	0	0	0	1	0	0	0
tusenfryd	<i>Bellis perennis</i>	Asteraceae	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0
balderbrå	<i>Tripleurospermum inodorum</i>	Asteraceae	4	0	0	0	1	0	3	0	0	0	0	0	0	0	0
hestehov	<i>Tussilago farfara</i>	Asteraceae	4	0	0	0	0	0	2	2	0	0	0	0	0	0	0
reinfann	<i>Tanacetum vulgare</i>	Asteraceae	3	0	0	0	0	0	2	1	0	0	0	0	0	0	0
borre	<i>Arctium sp</i>	Asteraceae	2	0	0	0	0	0	1	0	0	0	0	0	0	1	0
turt	<i>Cicerbita alpina</i>	Asteraceae	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
kvitbladtistel	<i>Cirsium heterophyllum</i>	Asteraceae	2	0	0	0	0	0	0	1	0	0	0	0	0	1	0
tistel	<i>Cirsium sp</i>	Asteraceae	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0
honningknoppurt	<i>Cyanus montanus</i>	Asteraceae	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0
solsikke	<i>Helianthus annuus</i>	Asteraceae	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0
nyseryllik	<i>Achillea ptarmica</i>	Asteraceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
malurtslekta	<i>Artemisia sp</i>	Asteraceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
fagerknoppurt	<i>Centaurea scabiosa</i>	Asteraceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
myrtistel	<i>Cirsium palustre</i>	Asteraceae	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
gul-gåseblom	<i>Cota tinctoria</i>	Asteraceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0

kornblom	Cyanus_segetum	Asteraceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
tistel	Cyrsium_sp;Carduus_sp;or others	Asteraceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
kamille	Matricaria_chamomilla	Asteraceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
NA	Matricaria_sp	Asteraceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
kjempespringfrø	Impatiens_glandulifera	Balsaminaceae	3	0	0	0	0	0	1	1	0	0	0	1	0	0	0
fjærehinne	Porphyra_umbilicalis	Bangiaceae	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
berberis	Berberis_vulgaris	Berberidaceae	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0
bjørk	Betula_pubescens	Betulaceae	59	0	2	1	2	0	1	44	0	0	9	0	0	0	0
hassel	Corylus_avellana	Betulaceae	12	0	0	0	0	0	0	0	12	0	0	0	0	0	0
dvergbjørk	Betula_nana	Betulaceae	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0
forglemmegei	Myosotis_sp	Boraginaceae	15	0	0	1	0	0	13	1	0	0	0	0	0	0	0
østersurt	Mertensia_maritima	Boraginaceae	3	0	0	0	0	0	1	2	0	0	0	0	0	0	0
agurkurt	Borago_officinalis	Boraginaceae	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0
honningurt	Phacelia_tanacetifolia	Boraginaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
lungeurt	Pulmonaria_officinalis	Boraginaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
valurt	Symphytum_officinale	Boraginaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
valurtslekta	Symphytum_sp	Boraginaceae	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
løkurt	Alliaria_petiolata	Brassicaceae	35	0	0	0	0	0	4	25	0	1	0	1	0	4	0
engkarse	Cardamine_pratensis	Brassicaceae	22	0	0	0	0	0	13	8	0	0	0	0	0	1	0
vinterkarse	Barbarea_vulgaris	Brassicaceae	20	0	0	0	1	0	10	8	0	0	0	0	0	1	0
strandkål	Crambe_maritima	Brassicaceae	15	0	0	2	0	0	3	10	0	0	0	0	0	0	0
russekål	Bunias_orientalis	Brassicaceae	9	0	0	0	0	0	4	4	0	0	0	0	0	1	0
pepperrøt	Armoracia_rusticana	Brassicaceae	8	0	0	0	0	0	1	2	0	4	0	0	0	1	0
skjørrebuksurt	Cochlearia_officinalis	Brassicaceae	8	0	0	0	0	0	4	4	0	0	0	0	0	0	0
gjetertaske	Capsella_bursa-pastoris	Brassicaceae	7	0	0	0	0	0	1	2	0	1	0	2	0	0	1
bekkekarse	Cardamine_amara	Brassicaceae	6	0	0	0	0	0	3	2	0	0	0	0	0	1	0
dagfiol	Hesperis_matronalis	Brassicaceae	5	0	0	0	0	0	3	2	0	0	0	0	0	0	0
strandreddik	Cakile_maritima	Brassicaceae	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0
åkersennep	Sinapis_arvensis	Brassicaceae	3	0	0	0	0	0	1	1	0	0	0	1	0	0	0
(mat-)karse	Lepidium_sativum	Brassicaceae	2	0	0	0	0	0	1	0	0	0	0	0	0	1	0



pengeurt	<i>Thlaspi_arvense</i>	Brassicaceae	2	0	0	0	0	0	0	2	0	0	0	0	0	0
korsblomst		Brassicaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0
skogkarse	<i>Cardamine_flexuosa</i>	Brassicaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0
brønnkarse	<i>Rorippa_palustris</i>	Brassicaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0
veikarse	<i>Rorippa_sylvestris</i>	Brassicaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0
blåklokke	<i>Campanula_rotundifolia</i>	Campanulaceae	12	0	0	0	0	0	11	1	0	0	0	0	0	0
storklokke	<i>Campanula_latifolia</i>	Campanulaceae	6	0	0	0	0	0	2	3	0	0	0	0	1	0
ugressklokke;ugrasklokke	<i>Campanula_rapunculoides</i>	Campanulaceae	4	0	0	0	0	0	2	2	0	0	0	0	0	0
humle	<i>Humulus_lupulus</i>	Cannabaceae	3	0	0	0	0	0	0	2	0	1	0	0	0	0
legevendelrot	<i>Valeriana_officinalis</i>	Caprifoliaceae	2	0	0	0	0	0	0	0	0	2	0	0	0	0
linnaea	<i>Linnaea_borealis</i>	Caprifoliaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0
vendelrot	<i>Valeriana_sambucifolia</i>	Caprifoliaceae	1	0	0	0	0	0	0	0	0	1	0	0	0	0
vassarve	<i>Stellaria_media</i>	Caryophyllaceae	13	0	0	0	0	0	0	12	0	0	0	0	0	1
strandarve	<i>Honckenya_peploides</i>	Caryophyllaceae	6	0	0	0	0	0	0	6	0	0	0	0	0	0
skogstjerneblom	<i>Stellaria_nemorum</i>	Caryophyllaceae	6	0	0	0	0	0	2	4	0	0	0	0	0	0
engsmelle	<i>Silene_vulgaris</i>	Caryophyllaceae	5	0	0	0	0	0	2	3	0	0	0	0	0	0
rød-jonsokblom	<i>Silene_dioica</i>	Caryophyllaceae	4	0	0	0	0	0	3	1	0	0	0	0	0	0
strandsmelle	<i>Silene_uniflora</i>	Caryophyllaceae	2	0	0	0	0	0	1	1	0	0	0	0	0	0
nelliklekta	<i>Dianthus_sp</i>	Caryophyllaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0
fjellsmelle	<i>Silene_aucaulis</i>	Caryophyllaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0
rosenrot	<i>Rhodiola_rosea</i>	Crassulaceae	7	0	0	0	0	0	0	2	0	5	0	0	0	0
smørbuk	<i>Hylotelephium_maximum</i>	Crassulaceae	5	0	0	0	0	0	1	4	0	0	0	0	0	0
hvitbergknapp	<i>Sedum_album</i>	Crassulaceae	2	0	0	0	0	0	1	1	0	0	0	0	0	0
einer	<i>Juniperus_communis</i>	Cupressaceae	59	0	0	56	0	0	0	2	0	0	0	1	0	0
skogsivaks	<i>Scirpus_sylvaticus</i>	Cyperaceae	3	0	0	0	0	0	0	2	0	0	0	0	0	1
tindved	<i>Hippophae_rhamnoides</i>	Elaeagnaceae	10	0	0	10	0	0	0	0	0	0	0	0	0	0
åkersnelle;kjerringrokk	<i>Equisetum_arvense</i>	Equisetaceae	5	0	0	0	0	0	0	4	0	0	0	0	0	1
blåbær	<i>Vaccinium_myrtillus</i>	Ericaceae	208	0	0	199	0	0	5	4	0	0	0	0	0	0
tyttebær	<i>Vaccinium_vitis-idaea</i>	Ericaceae	150	0	0	146	0	0	1	3	0	0	0	0	0	0
krebling	<i>Empetrum_nigrum</i>	Ericaceae	70	0	0	70	0	0	0	0	0	0	0	0	0	0

blokkebær;mikkelsbær	Vaccinium_uliginosum	Ericaceae	27	0	0	26	0	0	0	1	0	0	0	0	0	0	0
tranebær	Oxycoccus_palustris	Ericaceae	23	0	0	23	0	0	0	0	0	0	0	0	0	0	0
finnmarkspors	Rhododendron_tomentosum	Ericaceae	5	0	0	0	0	0	2	3	0	0	0	0	0	0	0
røsslyng	Calluna_vulgaris	Ericaceae	4	0	0	0	0	0	2	2	0	0	0	0	0	0	0
mjølbær	Arctostaphylos_uva-ursi	Ericaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
klokkelyng	Erica_tetralix	Ericaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
tranebær	Oxycoccus_spp	Ericaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
NA	Vaccinium_sp	Ericaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
rødkløver	Trifolium_pratense	Fabaceae	30	0	0	0	1	0	23	5	0	0	0	0	0	1	0
kvitkløver	Trifolium_repens	Fabaceae	10	0	0	0	0	0	8	2	0	0	0	0	0	0	0
kløver	Trifolium_sp	Fabaceae	10	0	0	1	0	0	6	3	0	0	0	0	0	0	0
fuglevikke	Vicia_cracca	Fabaceae	7	0	0	0	0	0	4	2	0	0	0	0	0	1	0
tiriltunge	Lotus_corniculatus	Fabaceae	3	0	0	0	0	0	2	1	0	0	0	0	0	0	0
gjerdevikke	Vicia_sepium	Fabaceae	3	0	0	0	0	0	1	2	0	0	0	0	0	0	0
NA	Vicia_sp	Fabaceae	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0
skogvikke	Vicia_sylvatica	Fabaceae	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0
knollerteknapp	Lathyrus_linifolius	Fabaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
NA	Lupinus_sp	Fabaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
legesteinkløver	Melilotus_officinalis	Fabaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
erteblomst	Pisum_sp	Fabaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
fôrvikke	Vicia_sativa	Fabaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
bøk	Fagus_sylvatica	Fagaceae	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0
grise-tang;grisetang	Ascophyllum_nodosum	Fucaceae	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
sang-tang	Fucus_serratus	Fucaceae	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
storkenebb	Geranium_sp	Geraniaceae	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0
stankstorkenebb	Geranium_robertianum	Geraniaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
solbær	Ribes_nigrum	Grossulariaceae	22	0	0	17	0	0	0	5	0	0	0	0	0	0	0
rips	Ribes_rubrum	Grossulariaceae	17	0	0	17	0	0	0	0	0	0	0	0	0	0	0
stikkelsbær	Ribes_uva-crispa	Grossulariaceae	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0
NA	Ribes_sp	Grossulariaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0

knapptang	Himantalia_elongata	Himantaliaceae	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
prikkperikum;johannesurt	Hypericum_perforatum	Hypericaceae	11	0	0	0	0	0	9	2	0	0	0	0	0	0	0
perikum	Hypericum_sp	Hypericaceae	4	0	0	0	0	0	3	0	0	0	0	0	0	1	0
firkantperikum	Hypericum_maculatum	Hypericaceae	2	0	0	0	0	0	0	1	0	0	0	0	0	0	1
fjæresauløk	Triglochin_maritima	Juncaginaceae	8	0	0	0	0	0	0	8	0	0	0	0	0	0	0
bergmynte;kongsgress	Origanum_vulgare	Lamiaceae	21	0	0	1	0	0	5	14	0	0	0	0	0	1	0
timian	Thymus_sp	Lamiaceae	8	0	0	0	0	0	2	5	0	0	0	1	0	0	0
korsknaapp	Glechoma_hederacea	Lamiaceae	6	0	0	0	0	0	3	3	0	0	0	0	0	0	0
mynte	Mentha_sp	Lamiaceae	6	0	0	0	0	0	2	4	0	0	0	0	0	0	0
døvnesele;dauvnesele	Lamium_album	Lamiaceae	4	0	0	0	0	0	2	2	0	0	0	0	0	0	0
lavendel(-slekta)	Lavandula_sp	Lamiaceae	3	0	0	0	0	0	1	1	0	0	0	0	0	1	0
åkermynte	Mentha_arvensis	Lamiaceae	3	0	0	0	0	0	1	2	0	0	0	0	0	0	0
guldå	Galeopsis_speciosa	Lamiaceae	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0
rødtvetann	Lamium_purpureum	Lamiaceae	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
rosmarin	Rosmarinus_officinalis	Lamiaceae	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
bakkemynte	Acinos_arvensis	Lamiaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
jonsokkoll	Ajuga_pyramidalis	Lamiaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
basilikum	Ocimum_basilicum	Lamiaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
merian	Origanum_majorana	Lamiaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
salvie;tesalvie	Salvia_officinalis	Lamiaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
bakketimian	Thymus_pulegioides	Lamiaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
sukker-tarre;sukkertare	Saccharina_latissima	Laminariaceae	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0
finger-tarre;fingertare	Laminaria_digitata	Laminariaceae	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
tettegras	Pinguicula_vulgaris	Lentibulariaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
lind	Tilia_cordata	Malvaceae	11	0	0	0	0	0	8	1	0	0	0	2	0	0	0
moskuskattost	Malva_moschata	Malvaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
NA	Malva_sp	Malvaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
NA	Tilia_sp	Malvaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
parklind	Tilia_x_europea	Malvaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
NA	Trillium_sp	Melanthiaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0

pors	Myrica_gale	Myricaceae	8	0	0	0	0	0	2	6	0	0	0	0	0	0	0
kryddernellik	Syzygium_aromaticum	Myrtaceae	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0
syrin	Syringa_vulgaris	Oleaceae	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0
geitrams	Epilobium_angustifolium	Onagraceae	157	0	0	1	0	0	75	44	0	0	0	0	1	36	0
willowherb	Epilobium_sp	Onagraceae	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0
strutseving	Matteuccia_struthiopteris	Onocleaceae	45	0	0	2	0	0	1	26	0	0	0	0	0	16	0
øyentrøst	Euphrasia_sp	Orobanchaceae	5	0	0	0	0	0	2	3	0	0	0	0	0	0	0
gjøkesyre;gaukesyre	Oxalis_acetosella	Oxalidaceae	60	0	0	1	0	0	24	34	0	0	0	0	0	1	0
søl	Palmaria_palmata	Palmariaceae	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
valmue	Papaver_sp	Papaveraceae	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
gran	Picea_abies	Pinaceae	68	0	1	0	0	4	3	1	0	0	0	0	59	0	0
furu	Pinus_sylvestris	Pinaceae	17	0	1	0	3	1	5	0	0	0	0	1	6	0	0
lerk	Larix_decidua	Pinaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
NA	Pinus_sp	Pinaceae	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
groblad	Plantago_major	Plantaginaceae	34	0	0	1	0	0	6	21	0	0	0	6	0	0	0
smalkjempe	Plantago_lanceolata	Plantaginaceae	4	0	0	0	0	0	0	3	0	0	0	1	0	0	0
rebejelle	Digitalis_purpurea	Plantaginaceae	3	0	0	0	0	0	0	2	0	0	0	1	0	0	0
tseskjeggveronika	Veronica_chamaedrys	Plantaginaceae	3	0	0	0	0	0	2	1	0	0	0	0	0	0	0
murtorskemunn	Cymbalaria_muralis	Plantaginaceae	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0
strandkjempe	Plantago_maritima	Plantaginaceae	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
gulaks	Anthoxanthum_odoratum	Poaceae	3	0	0	1	0	0	0	2	0	0	0	0	0	0	0
kveke	Elytrigia_repens	Poaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
marigras	Hierochloe_odorata	Poaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
takrør	Phragmites_australis	Poaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
engsyre	Rumex_acetosa	Polygonaceae	32	0	0	0	0	0	4	25	0	0	0	1	0	2	0
harerug	Bistorta_vivipara	Polygonaceae	15	0	0	0	0	0	4	1	0	0	0	10	0	0	0
parkslirekne	Reynoutria_japonica	Polygonaceae	12	0	0	0	0	0	0	2	0	0	0	0	1	9	0
høymole	Rumex_longifolius	Polygonaceae	12	0	0	0	0	0	1	4	0	3	0	3	0	1	0
syreslekta	Rumex_sp	Polygonaceae	12	0	0	1	0	0	1	10	0	0	0	0	0	0	0
rabarbra	Rheum_rhabarbarum	Polygonaceae	9	0	0	0	0	0	0	0	0	0	0	0	0	9	0

småsyre	Rumex_acetosella	Polygonaceae	9	0	0	0	0	0	2	7	0	0	0	0	0	0	0
fjellsyre	Oxyria_digyna	Polygonaceae	4	0	0	0	0	0	0	4	0	0	0	0	0	0	0
sisselrot	Polypodium_vulgare	Polypodiaceae	19	0	0	0	0	0	0	0	19	0	0	0	0	0	0
marianøkkeblom	Primula_veris	Primulaceae	7	0	0	0	0	0	5	2	0	0	0	0	0	0	0
skogstjerne	Lysimachia_europaea	Primulaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
NA	Primula_sp	Primulaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
kusymre	Primula_vulgaris	Primulaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
engsoleie	Ranunculus_acris	Ranunculaceae	3	0	0	0	0	0	2	1	0	0	0	0	0	0	0
hvitveis;kvitveis	Anemone_nemorosa	Ranunculaceae	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0
vårkål	Ficaria_verna	Ranunculaceae	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
blåveis	Hepatica_nobilis	Ranunculaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
ballblom	Trollius_europaeus	Ranunculaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
NA[grisetangdokke]	Vertebrata_lanosa	Rhodomelaceae	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
bringebær	Rubus_idaeus	Rosaceae	165	0	0	149	0	0	1	15	0	0	0	0	0	0	0
moltebær;molte	Rubus_chamaemorus	Rosaceae	122	0	0	121	0	0	1	0	0	0	0	0	0	0	0
(mark)-jordbær	Fragaria_vesca	Rosaceae	104	0	0	101	0	0	2	1	0	0	0	0	0	0	0
rogn;rognebær	Sorbus_aucuparia	Rosaceae	101	0	0	69	0	0	4	28	0	0	0	0	0	0	0
mjødurt	Filipendula_ulmaria	Rosaceae	100	0	0	2	0	0	71	26	0	0	0	0	0	1	0
bjørnebær	Rubus_plicatus_agg.	Rosaceae	54	0	0	52	0	0	0	2	0	0	0	0	0	0	0
steinnype	Rosa_canina	Rosaceae	40	0	0	18	0	0	21	1	0	0	0	0	0	0	0
marikåpe	Alchemilla_sp	Rosaceae	33	0	0	0	0	0	7	26	0	0	0	0	0	0	0
svartsurbær	Aronia_melanocarpa	Rosaceae	17	0	0	17	0	0	0	0	0	0	0	0	0	0	0
teie-bær	Rubus_saxatilis	Rosaceae	17	0	0	17	0	0	0	0	0	0	0	0	0	0	0
hegg	Prunus_padus	Rosaceae	13	0	0	8	0	0	4	1	0	0	0	0	0	0	0
slåpetorn	Prunus_spinosa	Rosaceae	12	0	0	12	0	0	0	0	0	0	0	0	0	0	0
enghumleblom	Geum_rivale	Rosaceae	9	0	0	0	0	0	6	2	0	0	0	0	0	1	0
villeple	Malus_sylvestris	Rosaceae	9	0	0	5	0	0	2	1	0	0	0	0	1	0	0
morell	Prunus_aviium	Rosaceae	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0
rynkerose	Rosa_rugosa	Rosaceae	7	0	0	0	0	0	7	0	0	0	0	0	0	0	0
NA	Rosa_sp	Rosaceae	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0

kirsebær	<i>Prunus_cerasus</i>	Rosaceae	3	0	0	2	0	0	1	0	0	0	0	0	0	0	0
junisøtmispel	<i>Amelanchier_spicata</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
hagtorn	<i>Crataegus_monogyna</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
skoghagtorn	<i>Crataegus_rhipidophylla</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
prydeple	<i>Malus_sp</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
tepperot	<i>Potentilla_erecta</i>	Rosaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
kirsetre	<i>Prunus_sp</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
aakerbær	<i>Rubus_arcticus</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
rukkebjørnebær	<i>Rubus_scissus</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
bjørnebærslekta	<i>Rubus_sp</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
svensk-asal	<i>Sorbus_intermedia</i>	Rosaceae	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
asalslekten	<i>Sorbus_sp</i>	Rosaceae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
myske	<i>Galium_odoratum</i>	Rubiaceae	5	0	0	0	0	0	0	4	0	0	0	0	0	1	0
gulmaure	<i>Galium_verum</i>	Rubiaceae	3	0	0	0	0	0	2	1	0	0	0	0	0	0	0
stormaure	<i>Galium_album</i>	Rubiaceae	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0
klengemaure	<i>Galium_aparine</i>	Rubiaceae	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
kvitmaure;hvitmaure	<i>Galium_boreale</i>	Rubiaceae	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0
NA	<i>Acer_sp</i>	Sapindaceae	7	0	0	0	0	0	6	0	0	0	1	0	0	0	0
spisslønn	<i>Acer_platanoides</i>	Sapindaceae	3	0	0	0	0	0	2	0	0	0	1	0	0	0	0
bergfrue	<i>Saxifraga_cotyledon</i>	Saxifragaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
kongslys	<i>Verbascum_sp</i>	Scrophulariaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
blomkarse	<i>Tropaeolum_majus</i>	Tropaeolaceae	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0
bred-dunkjevle	<i>Typha_latifolia</i>	Typhaceae	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0
dunkjevleslekta	<i>Typha_sp</i>	Typhaceae	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
alm	<i>Ulmus_glabra</i>	Ulmaceae	11	0	0	3	0	0	0	1	0	0	0	7	0	0	0
havsalat	<i>Ulva_lactuca</i>	Ulvaceae	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
tarmgrønnske	<i>Ulva_intestinalis</i>	Ulvaceae	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
brennesle	<i>Urtica_dioica</i>	Urticaceae	144	0	0	2	0	0	3	116	0	2	0	13	0	7	1
NA	<i>Viola_sp</i>	Violaceae	37	0	0	0	0	0	35	2	0	0	0	0	0	0	0
stemorsblom	<i>Viola_tricolor</i>	Violaceae	15	0	0	0	0	0	14	1	0	0	0	0	0	0	0

skogfiol	<i>Viola_riviniana</i>	Violaceae	7	0	0	0	0	0	7	0	0	0	0	0	0	0
fjellfiol	<i>Viola_biflora</i>	Violaceae	4	0	0	0	0	0	4	0	0	0	0	0	0	0
myrfiol	<i>Viola_palustris</i>	Violaceae	3	0	0	0	0	0	3	0	0	0	0	0	0	0
engfiol	<i>Viola_canina</i>	Violaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0
marsfiol	<i>Viola_odorata</i>	Violaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0
dagliljeslekta	<i>Hemerocallis_sp</i>	Xanthorrhoeaceae	1	0	0	0	0	0	1	0	0	0	0	0	0	0
marhalm[ålegras]	<i>Zostera_sp</i>	Zosteraceae	1	1	0	0	0	0	0	0	0	0	0	0	0	0

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## Appendix 12 : Wild edible plants Dataset – Ecological Plant Traits

Folk.Names	Latin.Names	Perennation	Life form	Woody ness	Clonality
svarthyll	<i>Sambucus_nigra</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
hylle-bær	<i>Sambucus_sp</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
rødhyll	<i>Sambucus_racemosa</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
søll;butarre; butare meldestokk	<i>Alaria_esculenta</i>	-	Algae	-	-
tangmelde	<i>Chenopodium_album</i>	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
strandmelde	<i>Atriplex_prostrata</i>	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
salturtslekta	<i>Salicornia_sp</i>	-	-	-	-
ramslauk;ramsløk	<i>Allium_ursinum</i>	Perennial	Bulbous geophyte	Herbaceous	Little or no vegetative spread
græs-løk	<i>Allium_schoenoprasum</i>	Perennial	Bulbous geophyte	Herbaceous	Rhizome shortly creeping; bulbs clustered on a short rhizome
strandløk	<i>Allium_vineale</i>	-	-	-	-
seiersløk	<i>Allium_victorialis</i>	-	-	-	-
sibirsk-gressløk	<i>Allium_schoenoprasum_borealis</i>	Perennial	Bulbous geophyte	Herbaceous	Rhizome shortly creeping; bulbs clustered on a short rhizome
vill-lauk	<i>Allium_oleraceum</i>	Perennial	Bulbous geophyte	Herbaceous	Tuberous or bulbous, slowing cloning by offsets; detaching ramets on inflorescence
skvallerkål	<i>Aegopodium_podagraria</i>	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
karve	<i>Carum_carvi</i>	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
kvann	<i>Angelica_archangelica</i>	Perennial	Hemicryptophyte	Herbaceous	-
spansk-kjørvel	<i>Myrrhis_odorata</i>	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
strandkjeks	<i>Ligusticum_scoticum</i>	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
løpstikke	<i>Levisticum_officinale</i>	Perennial	Hemicryptophyte	Herbaceous	-
hundekjeks	<i>Anthriscus_sylvestris</i>	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread; clonal growth is accompanied by almost no lateral spread



jordnøtt	Conopodium_majus	Perennial	Non-bulbous geophyte (rhizome, corm or tuber)	Herbaceous	Little or no vegetative spread
mesterrot	Peucedanum_ostruthium	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
NA	Aegopodium_sp	-	-	-	-
dill	Anethum_graveolens	Annual	Therophyte (annual land plant)	Herbaceous	-
kjørvel	Anthriscus_cerefolium	Perennial	Hemicryptophyte	Herbaceous	-
selleri	Apium_graveolens	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
bjørnerot	Meum_athamanticum	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
villpastinakk	Pastinaca_sativa	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
persille	Petroselinum_crispum	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
gjeldkarve	Pimpinella_saxifraga	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
asparges	Asparagus_officinalis	-	-	-	-
maiblom	Maianthemum_bifolium	Perennial	Non-bulbous geophyte (rhizome, corm or tuber)	Herbaceous	Rhizome far-creeping
løvetann	Taraxacum_officinale	-	-	-	-
røllik;ryllik	Achillea_millefolium	Perennial	Chamaephyte	Herbaceous	Rhizome far-creeping
prestekrage	Leucanthemum_vulgare	Perennial	Phanerophyte	Woody	Little or no vegetative spread
tunbalderbrå	Lepidotheca_suaveolens	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
ringblom	Calendula_officinalis	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
storborre	Arctium_lappa	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
strandstjerne	Tripolium_pannonicum	-	-	-	-
burot	Artemisia_vulgaris	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
tusenfryd	Bellis_perennis	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping
balderbrå	Tripleurospermum_inodorum	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
hestehov	Tussilago_farfara	Perennial	Non-bulbous geophyte (rhizome, corm or tuber)	Herbaceous	Rhizome far-creeping

reinfann	Tanacetum_vulgare	Perennial	Hemipterophyte	Herbaceous	Rhizome shortly creeping
borre	Arctium_sp	-	-	-	-
turt	Cicerbita_alpina	Perennial	Hemipterophyte	Herbaceous	Rhizome far-creeping
kvitbladtistel	Cirsium_heterophyllum	Perennial	Hemipterophyte	Herbaceous	Rhizome shortly creeping
tistel	Cirsium_sp	-	-	-	-
honningknoppurt	Cyanus_montanus	Perennial	Hemipterophyte	Herbaceous	Rhizome far-creeping
solsikke	Helianthus_annuus	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
nyseryllik	Achillea_ptarmica	Perennial	Hemipterophyte	Herbaceous	Rhizome shortly creeping
malurtslekta	Artemisia_sp	-	-	-	-
fagerknoppurt	Centaurea_scabiosa	Perennial	Hemipterophyte	Herbaceous	Little or no vegetative spread
myrtistel	Cirsium_palustre	Biennial, including monocarpic perennials	Hemipterophyte	Herbaceous	Little or no vegetative spread
gul-gåseblom	Cota_tinctoria	-	-	-	-
kornblom	Cyanus_segetum	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
tistel	Cyrsium_sp;Carduus_sp;or others	-	-	-	-
kamille	Matricaria_chamomilla	-	-	-	-
NA	Matricaria_sp	-	-	-	-
kjempespringfrø	Impatiens_glandulifera	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
fjærehinne	Porphyra_umbilicalis	-	Algae	-	-
berberis	Berberis_vulgaris	Perennial	Nanophanerophyte	Woody	Rhizome shortly creeping
bjørk	Betula_pubescens	Perennial	Phanerophyte	Woody	Little or no vegetative spread
hassel	Corylus_avellana	Perennial	Phanerophyte	Woody	Little or no vegetative spread
dvergbjørk	Betula_nana	Perennial	Nanophanerophyte	Woody	Rhizome shortly creeping
forglemmegei	Myosotis_sp	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
østersurt	Mertensia_maritima	Perennial	Hemipterophyte	Herbaceous	Little or no vegetative spread
agurkurt	Borago_officinalis	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread

honningurt	Phacelia_tanacetifolia	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
lungeurt	Pulmonaria_officinalis	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
valurt	Symphytum_officinale	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
valurtslekta	Symphytum_sp	-	-	-	-
løkurt	Alliaria_petiolata	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
engkarse	Cardamine_pratensis	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread; Plantlets formed on leaves
vinterkarse	Barbarea_vulgaris	Biennial, including monocarpic perennials; perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
strandkål	Crambe_maritima	Perennial	Hemicryptophyte, root sprouts only when disturbed	Herbaceous	Little or no vegetative spread
russekål	Bunias_orientalis	Perennial; occasionally biennial	-	Herbaceous	-
pepperrot	Armoracia_rusticana	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
skjørbuksurt	Cochlearia_officinalis	Perennial; Biennial	Hemicryptophyte	Herbaceous	-
gjetertaske	Capsella_bursapastoris	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
bekkekarse	Cardamine_amara	Perennial	Hemicryptophyte	Herbaceous	Shortly creeping and rooting at nodes
dagfiol	Hesperis_matronalis	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
strandreddik	Cakile_maritima	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
åkersennep	Sinapis_arvensis	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
(mat-)karse	Lepidium_sativum	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
pengeurt	Thlaspi_arvense	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
korsblomst	Brassicaceae	-	-	-	-
skogkarse	Cardamine_flexuosa	Perennial; Annual	Hemicryptophyte; Theophyte (annual land plant)	Herbaceous	Little or no vegetative spread
brønnskarse	Rorippa_palustris	Perennial	Perennial hydrophyte; Chamaephyte	Herbaceous	Extensively creeping and rooting at nodes
veikarse	Rorippa_sylvestris	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping
blåklokke	Campanula_rotundifolia	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping; Shortly creeping and rooting at nodes

storklokke	Campanula_latifolia	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
ugressklokke;ugrasklokke	Campanula_rapunculoides	Perennial	Non-bulbous geophyte (rhizome, corm or tuber)	Herbaceous	Rhizome far-creeping; Carrot-like tubers and roots; Lateral spread is by underground stolons
humle	Humulus_lupulus	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
legevindelrot	Valeriana_officinalis	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread; Rhizome shortly creeping
linnaea	Linnaea_borealis	Perennial	Chamaephyte	Semi-woody	Extensively creeping and rooting at nodes
vindelrot	Valeriana_sambucifolia	-	-	-	-
vassarve	Stellaria_media	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
strandarve	Honckenya_peplodes	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
skogstjerneblom	Stellaria_nemorum	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping
engsmelle	Silene_vulgaris	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
rød-jonsokblom	Silene_dioica	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
strandsmelle	Silene_uniflora	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
nelliksekta	Dianthus_sp	-	-	-	-
fjellsmelle	Silene_aucaulis	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
rosenrot	Rhodiola_rosea	-	-	-	-
smørbuk	Hylotelephium_maximum	-	-	-	-
hvitbergknapp	Sedum_album	Perennial	Chamaephyte	Herbaceous	Extensively creeping and rooting at nodes; Irregularly fragmenting
einer	Juniperus_communis	Perennial	Phanerophyte; Chamaephyte (the upper size is a tree size, prostrate forms are chamaephytes)	Woody	Little or no vegetative spread
skogsivaks	Scirpus_sylvaticus	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping
tindved	Hippophae_rhamnoides	-	-	-	-
åkersnelle;kjerringrokk	Equisetum_arvense	Perennial	Non-bulbous geophyte (rhizome, corm or tuber)	Herbaceous	Rhizome far-creeping
blåbær	Vaccinium_myrtillus	Perennial	Chamaephyte; nanophanerophyte; dwarf shrub	Woody	Rhizome far-creeping
tyttebær	Vaccinium_vitis-idaea	Perennial	Chamaephyte; dwarf shrub	Woody	Rhizome far-creeping

kreklng	<i>Empetrum_nigrum</i>	Perennial	Chamaephyte; dwarf shrub	Woody	Extensively creeping and rooting at nodes
blokkebær;mikk elsbær	<i>Vaccinium_uliginosu m</i>	Perennial	Chamaephyte; nanophaneorphyte; dwarf shrub	Woody	Rhizome far-creeping
tranebær	<i>Oxycoccus_palustris</i>	Perennial	Chamaephyte	Herbac eous	Extensively creeping and rooting at nodes
finnmarkspors	<i>Rhododendron_tom entosum</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
røsslng	<i>Calluna_vulgaris</i>	Perennial	Chamaephyte; nanophaneorphyte; dwarf shrub	Woody	Little or no vegetative spread; shortly creeping and rooting at nodes
mjølbær	<i>Arctostaphylos_uva- ursi</i>	Perennial	Chamaephyte	Woody	Extensively creeping and rooting at nodes
klokkelyng	<i>Erica_tetralix</i>	-	-	-	-
tranebær	<i>Oxycoccus_spp</i>	-	-	-	-
NA	<i>Vaccinium_sp</i>	-	-	-	-
rødkløver	<i>Trifolium_pratense</i>	Perennial	Hemicryptophyte	Herbac eous	Little or no vegetative spread
kvitkløver	<i>Trifolium_repens</i>	Perennial	Hemicryptophyte; Chamaephyte	Herbac eous	Extensively creeping and rooting at nodes
kløver	<i>Trifolium_sp</i>	-	-	-	-
fuglevikke	<i>Vicia_cracca</i>	Perennial	Hemicryptophyte	Herbac eous	Rhizome shortly creeping
tiriltunge	<i>Lotus_corniculatus</i>	Perennial	Hemicryptophyte	Herbac eous	Little or no vegetative spread
gjerdevikke	<i>Vicia_sepium</i>	Perennial	Hemicryptophyte	Herbac eous	Rhizome shortly creeping
NA	<i>Vicia_sp</i>	-	-	-	-
skogvikke	<i>Vicia_sylvatica</i>	Perennial	Hemicryptophyte	Herbac eous	Rhizome shortly creeping
knollerteknapp	<i>Lathyrus_linifolius</i>	Perennial	Non-bulbous geophyte (rhizome, corm or tuber)	Herbac eous	Rhizome far-creeping; Rhizome system is tuberous
NA	<i>Lupinus_sp</i>	-	-	-	-
legesteinkløver	<i>Melilotus_officinalis</i>	Biennial, including monocarpic perennials	Hemicryptophyte	Herbac eous	Little or no vegetative spread
erteblostm	<i>Pisum_sp</i>	Annual	Therophyte (annual land plant)	Herbac eous	Little or no vegetative spread
førvikke	<i>Vicia_sativa</i>	Annual	Therophyte (annual land plant)	Herbac eous	Little or no vegetative spread
bøk	<i>Fagus_sylvatica</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
grise- tang;grisetang	<i>Ascophyllum_nodos um</i>	-	Algae	-	-

sang-tang	Fucus_serratus	-	Algae	-	-
storkenebb	Geranium_sp	-	-	-	-
stankstorkenebb	Geranium_robertianum	-	-	-	-
solbær	Ribes_nigrum	Perennial	Nanophanerophyte	Woody	Little or no vegetative spread
rips	Ribes_rubrum	Perennial	Nanophanerophyte	Woody	Little or no vegetative spread
stikkelsbær	Ribes_uva-crispa	Perennial	Nanophanerophyte	Woody	Little or no vegetative spread
NA	Ribes_sp	Perennial	Nanophanerophyte	Woody	Little or no vegetative spread
knapptang	Himantalia_elongata	-	Algae	-	-
prikkperikum;johannesurt	Hypericum_perforatum	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping; Clones formed by suckering from roots
perikum	Hypericum_sp	-	-	-	-
firkantperikum	Hypericum_maculatum	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
fjæresauløk	Triglochin_maritima	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping
bergmynte;kongress	Origanum_vulgare	Perennial	Chamaephyte; Hemicryptophyte (genuinely intermediate)	Herbaceous	Little or no vegetative spread; shortly creeping and rooting at nodes
timian	Thymus_sp	-	-	-	-
korsknaapp	Glechoma_hederacea	Perennial	Hemicryptophyte	Herbaceous	Extensively creeping and rooting at nodes
mynte	Mentha_sp	-	-	-	-
døvnesele	Lamium_album	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
lavendel(-slekta)	Lavandula_sp	-	-	-	-
åkermynte	Mentha_arvensis	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
gulddå	Galeopsis_speciosa	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
rødtvetann	Lamium_purpureum	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
rosmarin	Rosmarinus_officinalis	Perennial	Nanophanerophyte	Woody	-
bakkemynte	Acinos_arvensis	-	-	-	-
jonsokkoll	Ajuga_pyramidalis	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
basilikum	Ocimum_basilicum	-	-	-	-

merian	<i>Origanum_majorana</i>	-	-	-	-
salvie;tesalvie	<i>Salvia_officinalis</i>	-	-	-	-
bakketimian	<i>Thymus_pulegioides</i>	Perennial	Chamaephyte	Semi-woody	Extensively creeping and rooting at nodes
sukker- tarre;sukkertare	<i>Saccharina_latissima</i>	-	Algae	-	-
finger- tarre;fingertare	<i>Laminaria_digitata</i>	-	Algae	-	-
tettegras	<i>Pinguicula_vulgaris</i>	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread; Detaching ramets at or below ground
lind	<i>Tilia_cordata</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
moskuskattost	<i>Malva_moschata</i>	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
NA	<i>Malva_sp</i>	-	-	-	-
NA	<i>Tilia_sp</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
parklind	<i>Tilia_x_europea</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
NA	<i>Trillium_sp</i>	-	-	-	-
pors	<i>Myrica_gale</i>	Perennial	Nanophanerophyte	Woody	Rhizome far-creeping
kryddernellik	<i>Syzygium_aromaticum</i>	-	-	-	-
syryn	<i>Syringa_vulgaris</i>	Perennial	Phanerophyte	Woody	Rhizome shortly creeping
geitrams	<i>Epilobium_angustifolium</i>	Perennial	Non-bulbous geophyte (rhizome, corm or tuber); Hemicryptophyte	Herbaceous	Clones formed by suckering from roots
willowherb	<i>Epilobium_sp</i>	-	-	-	-
strutseving	<i>Matteuccia_struthiopteris</i>	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
øyentrøst	<i>Euphrasia_sp</i>	-	-	-	-
gjøkesyre;gaukesyre	<i>Oxalis_acetosella</i>	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping
søl	<i>Palmaria_palmata</i>	-	Algae	-	-
valmue	<i>Papaver_sp</i>	-	-	-	-
gran	<i>Picea_abies</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
furu	<i>Pinus_sylvestris</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
lerk	<i>Larix_decidua</i>	Perennial	Phanerophyte	Woody	Little or no vegetative spread
NA	<i>Pinus_sp</i>	-	-	-	-

groblad	Plantago_major	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
smalkjempe	Plantago_lanceolata	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping
reverbjelle	Digitalis_purpurea	Biennial, including monocarpic perennials	Hemicryptophyte	Herbaceous	Little or no vegetative spread
tveskjeggveronika	Veronica_chamaedrys	Perennial	Chamaephyte; Hemicryptophyte (intermediate, overwinters pretty close to the ground)	Herbaceous	Extensively creeping and rooting at nodes
murtorskemunn	Cymbalaria_muralis	Perennial	Chamaephyte	Herbaceous	Extensively creeping and rooting at nodes
strandkjempe	Plantago_maritima	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
gulaks	Anthoxanthum_odoratum	Perennial	Hemicryptophyte	Herbaceous	Tussock-forming graminoid, may slowly spread
kveke	Elytrigia_repens	-	-	-	-
marigras	Hierochloe_odorata	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
takrør	Phragmites_australis	Perennial	Perennial hydrophyte; Non-bulbous geophyte (rhizome, corm or tuber)	Herbaceous	Rhizome far-creeping
engsyre	Rumex_acetosa	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
harerug	Bistorta_vivipara	Perennial	Hemicryptophyte	Herbaceous	Rhizome shortly creeping
parkslirekne	Reynoutria_japonica	-	-	-	-
høymole	Rumex_longifolius	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
syreslekta	Rumex_sp	-	-	-	-
rabarbra	Rheum_rhabarbarum	-	-	-	-
småsyre	Rumex_acetosella	Perennial	Hemicryptophyte	Herbaceous	Clones formed by suckering from roots
fjellsyre	Oxyria_digyna	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
sisselrot	Polypodium_vulgare	Perennial	Hemicryptophyte	Herbaceous	-
marianøkleblom	Primula_veris	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
skogstjerne	Lysimachia_europaea	-	-	-	-
NA	Primula_sp	-	-	-	-
kusymre	Primula_vulgaris	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread



engsoleie	Ranunculus_acris	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
hvitveis;kvitveis	Anemone_nemorosa	Perennial	Non-bulbous geophyte (rhizome, corm or tuber)	Herbaceous	Rhizome shortly creeping
vårkål	Ficaria_verna	-	-	-	-
blåveis	Hepatica_nobilis	Perennial	Hemicryptophyte	Herbaceous	-
ballblom	Trollius_europaeus	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
NA[grisetangdo kke]	Vertebrata_lanosa	-	Algae	-	-
bringebær	Rubus_idaeus	Perennial	Nanophanerophyte	Woody	Clones formed by suckering from roots
moltebær;molt e	Rubus_chamaemorus	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
(mark)-jordbær	Fragaria_vesca	Perennial	Hemicryptophyte	Herbaceous	Far-creeping by stolons in illuminated medium
rogn;rognebær	Sorbus_aucuparia	Perennial	Phanerophyte	Woody	Little or no vegetative spread
mjørdurt	Filipendula_ulmaria	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
bjørnebær	Rubus_plicatus_agg.	Perennial	-	-	-
steinnype	Rosa_canina	Perennial	Nanophanerophyte	Woody	-
marikåpe	Alchemilla_sp	-	-	-	-
svartsurbær	Aronia_melanocarpa	-	Shrub	Woody	-
teie-bær	Rubus_saxatilis	Perennial	Hemicryptophyte	Herbaceous	Far-creeping by stolons in illuminated medium
hegg	Prunus_padus	Perennial	Phanerophyte	Woody	Little or no vegetative spread
slåpetorn	Prunus_spinosa	Perennial	Phanerophyte	Woody	Clones formed by suckering from roots
enghumleblom	Geum_rivale	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
villeple	Malus_sylvestris	-	-	-	-
morell	Prunus_avium	Perennial	Phanerophyte	Woody	Clones formed by suckering from roots
rynkerose	Rosa_rugosa	Perennial	Nanophanerophyte	Woody	Rhizome far-creeping; Clones formed by suckering from roots
NA	Rosa_sp	-	-	-	-
kirsebær	Prunus_cerasus	Perennial	Phanerophyte	Woody	Clones formed by suckering from roots
junisøtmispel	Amelanchier_spicata	-	-	-	-
hagtorn	Crataegus_monogyna	Perennial	Phanerophyte	Woody	Little or no vegetative spread

skoghagtorn	Crataegus_rhipidophylla	-	-	-	-
prydeple	Malus_sp	-	-	-	-
tepperot	Potentilla_erecta	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
kirsetre	Prunus_sp	Perennial	Phanerophyte	Woody	-
aakerbær	Rubus_arcticus	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
rukkebjørnebær	Rubus_scissus	-	-	-	-
bjørnebærslekta	Rubus_sp	Perennial	-	-	-
svensk-asal	Sorbus_intermedia	Perennial	Phanerophyte	Woody	Little or no vegetative spread
asalslekten	Sorbus_sp	-	-	-	-
myske	Galium_odoratum	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
gulmaure	Galium_verum	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
stormaure	Galium_album	-	-	-	-
klengemaure	Galium_aparine	Annual	Therophyte (annual land plant)	Herbaceous	Little or no vegetative spread
kvitmaure;hvitmaure	Galium_boreale	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
NA	Acer_sp	-	-	-	-
spisslønn	Acer_platanoides	Perennial	Phanerophyte	Woody	Little or no vegetative spread
bergfrue	Saxifraga_cotyledon	-	-	-	-
kongslys	Verbascum_sp	-	-	-	-
blomkarse	Tropaeolum_majus	-	-	-	-
bred-dunkjevle	Typha_latifolia	Perennial	Perennial hydrophyte	Herbaceous	Rhizome far-creeping
dunkjevleslekta	Typha_sp	-	-	-	-
alm	Ulmus_glabra	-	-	-	-
havsalat	Ulva_lactuca	-	Algae	-	-
tarmgrønske	Ulva_intestinalis	-	Algae	-	-
brennesle	Urtica_dioica	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping; far-creeping stolons in illuminated medium
NA	Viola_sp	-	-	-	-

stemorsblom	Viola_tricolor	Annual; Perennial	Therophyte (annual land plant); Hemicryptophyte	Herbaceous	Little or no vegetative spread
skogfiol	Viola_riviniana	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread; Clones formed by suckering from roots
fjellfiol	Viola_biflora	-	-	-	-
myrfiol	Viola_palustris	Perennial	Hemicryptophyte	Herbaceous	Rhizome far-creeping
engfiol	Viola_canina	Perennial	Hemicryptophyte	Herbaceous	Little or no vegetative spread
marsfiol	Viola_odorata	Perennial	Hemicryptophyte	Herbaceous	Far-creeping by stolons in illuminated medium
dagliljeslekta	Hemerocallis_sp	-	-	-	-
marhalm[ålegrens]	Zostera_sp	-	-	-	-

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## Appendix 13 : Wild edible plants Dataset – IUCN Classification and Commented Sustainability Scores

Folk.Names	Latin.Names	Comments_sustainability	Score
svarthyll	<i>Sambucus_nigra</i>	Potentially becoming invasive through foraging	G*
hulle-bær	<i>Sambucus_sp</i>	Probably mostly <i>S. nigra</i> ; potentially becoming invasive through foraging	G*
rødhyll	<i>Sambucus_racemosa</i>	-	G
søll;butarre;butare	<i>Alaria_esculenta</i>	-	G
meldestokk	<i>Chenopodium_album</i>	-	G
tangmelde	<i>Atriplex_prostrata</i>	-	G
strandmelde	<i>Atriplex_littoralis</i>	-	G
salturtslekta	<i>Salicornia_sp</i>	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
ramslauk;ramsløk	<i>Allium_ursinum</i>	Overharvesting does happen at local scales	G*
græs-løk	<i>Allium_schoenoprasum</i>	-	G
strandløk	<i>Allium_vineale</i>	-	G
seiersløk	<i>Allium_victoralis</i>	-	G
sibirsk-gressløk	<i>Allium_schoenoprasum_borealis</i>	-	G
vill-lauk	<i>Allium_oleraceum</i>	-	G
skvallerkål	<i>Aegopodium_podagraria</i>	-	G
karve	<i>Carum_carvi</i>	When seeds are collected it is necessary to leave some on site to ensure reproduction	G*
kvann	<i>Angelica_archangelica</i>	Root harvesting is highly detrimental to plant communities	G*
spansk-kjørvel	<i>Myrrhis_odorata</i>	-	G
strandkjeks	<i>Ligusticum_scoticum</i>	-	G
løpstikke	<i>Levisticum_officinale</i>	-	G
hundekjeks	<i>Anthriscus_sylvestris</i>	-	G
jordnøtt	<i>Conopodium_majus</i>	-	G
mesterrot	<i>Peucedanum_ostruthium</i>	-	R
NA	<i>Aegopodium_sp</i>	-	G

dill	Anethum_graveolens	Picking the flowers may contribute to manage this alien species	G*
kjørvel	Anthriscus_cerefolium	-	G
selleri	Apium_graveolens	-	G
bjørnerot	Meum_athamanticum	-	R
villpastinakk	Pastinaca_sativa	-	G
persille	Petroselinum_crispum	Picking the leaves may contribute to manage this alien species	G*
gjeldkarve	Pimpinella_saxifraga	-	G
asparges	Asparagus_officinalis	-	G
maiblom	Maianthemum_bifolium	-	G
løvetann	Taraxacum_officinale	-	G
røllik;ryllik	Achillea_millefolium	-	G
prestekrage	Leucanthemum_vulgare	-	G
tunbalderbrå	Lepidotheca_suaveolens	-	G
ringblom	Calendula_officinalis	Picking the flowers may contribute to manage this alien, invasive species. Attention should be put not to spread the fruits	G*
storborre	Arctium_lappa	Root harvesting is highly detrimental to plant communities	O
strandstjerne	Tripolium_pannonicum	-	G
burrot	Artemisia_vulgaris	-	G
tusenfryd	Bellis_perennis	-	G
balderbrå	Tripleurospermum_inodorum	-	G
hestehov	Tussilago_farfara	-	G
reinfann	Tanacetum_vulgare	-	G
borre	Arctium_sp	-	G
turt	Cicerbita_alpina	-	G
kvitblattistel	Cirsium_heterophyllum	-	G
tistel	Cirsium_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
honningknoppurt	Cyanus_montanus	Picking the flowers may contribute to manage this alien, invasive species	G*
solsikke	Helianthus_annuus	-	G
nyseryllik	Achillea_ptarmica	-	G

malurtslekta	Artemisia_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
fagerknoppurt	Centaurea_scabiosa	-	G
myrtistel	Cirsium_palustre	-	G
gul-gåseblom	Cota_tinctoria	-	G
kornblom	Cyanus_segetum	Plant population declining although it's introduced. Harvesting impact unlikely because there only one respondant reported harvesting the flowers	G*
tistel	Cyrsium_sp;Carduus_sp ;or others	-	G
kamille	Matricaria_chamomilla	-	G
NA	Matricaria_sp	-	G
kjempespringfrø	Impatiens_glandulifera	-	G
fjærehinne	Porphyra_umbilicalis	-	G
berberis	Berberis_vulgaris	-	G
bjørk	Betula_pubescens	Bark and sap harvesting can be highly detrimental to trees' health	G*
hassel	Corylus_avellana	-	G
dvergbjørk	Betula_nana	-	G
forglemmegei	Myosotis_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
østersurt	Mertensia_maritima	-	G
agurkurt	Borago_officinalis	Picking the flowers and leaves may contribute to manage this alien, invasive species	G*
honningurt	Phacelia_tanacetifolia	Picking the flowers may contribute to manage this alien, invasive species	G*
lungeurt	Pulmonaria_officinalis	Picking the leaves may contribute to manage this alien, invasive species	G*
valurt	Symphytum_officinale	-	G
valurtslekta	Symphytum_sp	-	G
løkurt	Alliaria_petiolata	-	G
engkarse	Cardamine_pratensis	-	G
vinterkarse	Barbarea_vulgaris	Picking the flowers and leaves may contribute to manage this alien, invasive species. Attention should be put not to spread the fruits	G*
strandkål	Crambe_maritima	-	G
russekål	Bunias_orientalis	-	G
pepperrot	Armoracia_rusticana	Picking the flowers and leaves may contribute to manage this alien, invasive species. Attention should be put not to spread the fruits and when digging for roots, as cuttings may contribute to spreading the plant	G*
skjørbuksurt	Cochlearia_officinalis	-	G

gjetertaske	<i>Capsella bursa-pastoris</i>	-	G
bekkekarse	<i>Cardamine amara</i>	-	G
dagfiol	<i>Hesperis matronalis</i>	Picking the flowers and leaves may contribute to manage this alien, invasive species. Attention should be put not to spread the fruits	G*
strandreddik	<i>Cakile maritima</i>	-	G
åkersennep	<i>Sinapis arvensis</i>	-	G
(mat-)karse	<i>Lepidium sativum</i>	-	G
pengeurt	<i>Thlaspi arvense</i>	-	G
korsblomst	Brassicaceae	-	G
skogkarse	<i>Cardamine flexuosa</i>	-	G
brønnkarse	<i>Rorippa palustris</i>	Picking the leaves may contribute to manage this alien, invasive species.	G*
veikarse	<i>Rorippa sylvestris</i>	-	G
blåklukke	<i>Campanula rotundifolia</i>	-	G
storklokke	<i>Campanula latifolia</i>	-	G
ugressklokke;ugra sklokke	<i>Campanula rapunculoides</i>	-	G
humle	<i>Humulus lupulus</i>	-	G
legevendelrot	<i>Valeriana officinalis</i>	-	R
linnaea	<i>Linnaea borealis</i>	-	G
vendelrot	<i>Valeriana sambucifolia</i>	-	G
vassarve	<i>Stellaria media</i>	-	G
strandarve	<i>Honckenya peploides</i>	-	G
skogstjerneblom	<i>Stellaria nemorum</i>	-	G
engsmelle	<i>Silene vulgaris</i>	-	G
rød-jonsokblom	<i>Silene dioica</i>	-	G
strandsmelle	<i>Silene uniflora</i>	-	G
nellikselekt	<i>Dianthus sp</i>	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
fjellsmelle	<i>Silene acaulis</i>	-	G
rosenrot	<i>Rhodiola rosea</i>	Root harvesting is highly detrimental to plant communities	O
smørbukk	<i>Hylotelephium maximum</i>	-	G

hvitbergknapp	Sedum_album	-	G
einer	Juniperus_communis	-	G
skogsivaks	Scirpus_sylvaticus	-	G
tindved	Hippophae_rhamnoides	-	G
åkersnelle;kjerrin grokk	Equisetum_arvense	-	G
blåbær	Vaccinium_myrtillus	-	G
tyttebær	Vaccinium_vitis-idaea	-	G
kekling	Empetrum_nigrum	-	G
blokkebær;mikkel sbær	Vaccinium_uliginosum	-	G
tranebær	Oxycoccus_palustris	-	G
finnmarkspors	Rhododendron_toment osum	-	G
røsslyng	Calluna_vulgaris	-	G
mjølbær	Arctostaphylos_uva- ursi	-	G
klokkelyng	Erica_tetralix	-	G
tranebær	Oxycoccus_spp	-	G
NA	Vaccinium_sp	-	G
rødkløver	Trifolium_pratense	-	G
kvitkløver	Trifolium_repens	-	G
kløver	Trifolium_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
fuglevikke	Vicia_cracca	-	G
tiriltunge	Lotus_corniculatus	-	G
gjerdevikke	Vicia_sepium	-	G
NA	Vicia_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
skogvikke	Vicia_sylvatica	-	G
knollerteknapp	Lathyrus_linifolius	-	G
NA	Lupinus_sp	-	G
legesteinkløver	Melilotus_officinalis	-	G
ertebloomst	Pisum_sp	-	G



fôrvikke	Vicia_sativa	-	G
bøk	Fagus_sylvatica	-	G
grise- tang;grisetang	Ascophyllum_nodosum	-	G
sang-tang	Fucus_serratus	-	G
storkenebb	Geranium_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
stankstorkenebb	Geranium_robertianum	-	G
solbær	Ribes_nigrum	-	G
rips	Ribes_rubrum	-	G
stikkelsbær	Ribes_uva-crispa	-	G
NA	Ribes_sp	-	G
knapptang	Himantalia_elongata	-	G
prikkperikum;johannesurt perikum	Hypericum_perforatum	-	G
firkantperikum	Hypericum_maculatum	-	G
fjæresauløk	Triglochin_maritima	-	G
bergmynte;kongsgress	Origanum_vulgare	Even if LC, the species is not very abundant	G*
timian	Thymus_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
korsknepp	Glechoma_hederacea	-	G
mynte	Mentha_sp	-	G
døvnesele;dauvnesele	Lamium_album	-	G
lavendel(-slekta)	Lavandula_sp	-	G
åkermynte	Mentha_arvensis	-	G
gulddå	Galeopsis_speciosa	-	G
rødtvetann	Lamium_purpureum	-	G
rosmarin	Rosmarinus_officinalis	-	G
bakkemynte	Acinos_arvensis	-	G
jonsokkoll	Ajuga_pyramidalis	-	G
basilikum	Ocimum_basilicum	-	G

merian	Origanum_majorana	-	G
salvie;tesalvie	Salvia_officinalis	Picking the leaves may contribute to manage this alien species.	G*
bakketimian	Thymus_pulegioides	-	G
sukker- tarre;sukkertare	Saccharina_latissima	-	G
finger- tarre;fingertare	Laminaria_digitata	-	G
tettegras	Pinguicula_vulgaris	-	G
lind	Tilia_cordata	-	G
moskuskattost	Malva_moschata	Picking the flowers may contribute to manage this alien, invasive species.	G*
NA	Malva_sp	-	G
NA	Tilia_sp	-	G
parklind	Tilia_x_europea	Picking the flowers may contribute to manage this alien species.	G*
NA	Trillium_sp	-	G
pors	Myrica_gale	-	G
kryddernellik	Syzygium_aromaticum	-	G
syryn	Syringa_vulgaris	Picking the flowers may contribute to manage this alien species that is invasive in some areas including Oslo and the Oslo fjord islands. Attention should be put not to spread it	G*
geitrams	Epilobium angustifolium	-	G
willowherb	Epilobium_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
strutseving	Matteuccia_struthiopteris	-	O
øyentrøst	Euphrasia_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
gjøkesyre;gaukesyre	Oxalis_acetosella	-	G
søl	Palmaria_palmata	-	G
valmue	Papaver_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
gran	Picea_abies	Bark and sap harvesting can be highly detrimental to trees' health	G*
furu	Pinus_sylvestris	Bark and sap harvesting can be highly detrimental to trees' health	G*
lerk	Larix_decidua	-	G
NA	Pinus_sp	-	G

groblad	Plantago_major	-	G
smalkjempe	Plantago_lanceolata	-	G
revebjelle	Digitalis_purpurea	-	G
tveskjeggveronika	Veronica_chamaedrys	-	G
murtorskemunn	Cymbalaria_muralis	-	G
strandkjempe	Plantago_maritima	-	G
gulaks	Anthoxanthum_odoratum	-	G
kveke	Elytrigia_repens	-	G
marigras	Hierochloe_odorata	-	G
takrør	Phragmites_australis	-	G
engsyre	Rumex_acetosa	-	G
harerug	Bistorta_vivipara	-	G
parkslirekne	Reynoutria_japonica	-	G
høymole	Rumex_longifolius	-	G
syreslekta	Rumex_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
rabarbra	Rheum_rhabarbarum	-	G
småsyre	Rumex_acetosella	-	G
fjellsyre	Oxyria_digyna	-	G
sisselrot	Polypodium_vulgare	Root harvesting is highly detrimental to plant communities	O
marianøkleblom	Primula_veris	-	G
skogstjerne	Lysimachia_europaea	-	G
NA	Primula_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
kusymre	Primula_vulgaris	-	G
engsoleie	Ranunculus_acris	-	G
hvitveis;kvitveis	Anemone_nemorosa	-	G
vårkål	Ficaria_verna	-	G
blåveis	Hepatica_nobilis	-	G
ballblom	Trollius_europaeus	-	G

NA[grisetangdokke]	Vertebrata_lanosa	-	G
bringebær	Rubus_idaeus	-	G
moltebær;molte	Rubus_chamaemorus	Harvesting regulations exist	G*
(mark)-jordbær	Fragaria vesca	-	G
rogn;rognebær	Sorbus_aucuparia	-	G
mjødurt	Filipendula_ulmaria	-	G
bjørnebær	Rubus_plicatus_agg.	-	G
steinnype	Rosa_canina	-	G
marikåpe	Alchemilla_sp	Harvesters should be aware that some species have conservation issues and be able to identify them	G*
svartsurbær	Aronia_melanocarpa	Picking berries may contribute to the spread of this alien, invasive plant	O
teie-bær	Rubus_saxatilis	-	G
hegg	Prunus_padus	-	G
slåpetorn	Prunus_spinosa	-	G
enghumleblom	Geum_rivale	-	G
villeple	Malus_sylvestris	It is likely that what people harvest in the woods are hybrids	R*
morell	Prunus_avium	-	G
rynkerose	Rosa_rugosa	-	G
NA	Rosa_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*
kirsebær	Prunus_cerasus	-	G
junisøtmispel	Amelanchier_spicata	-	G
hagtorn	Crataegus_monogyna	-	G
skoghagtorn	Crataegus_rhipidophylla	-	G
prydeple	Malus_sp	-	G
tepperot	Potentilla_erecta	-	G
kirsetre	Prunus_sp	-	G
aakerbær	Rubus_arcticus	-	G
rukkebjørnebær	Rubus_scissus	-	G
bjørnebærslekta	Rubus_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*

svensk-asal	Sorbus_intermedia	-	G
asalslekten	Sorbus_sp	Only one respondent reported on harvesting this this genus with threatened species, which makes any sustainability issue unlikely	G*
myske	Galium_odoratum	-	G
gulmaure	Galium_verum	-	G
stormaure	Galium_album	-	G
klengemaure	Galium_aparine	-	G
kvitmaure;hvitmaure	Galium_boreale	-	G
NA	Acer_sp	-	G
spisslønn	Acer_platanoides	-	G
bergfrue	Saxifraga_cotyledon	-	G
kongsllys	Verbascum_sp	-	G
blomkarse	Tropaeolum_majus	-	G
bred-dunkjevle	Typha_latifolia	-	G
dunkjevleslekta	Typha_sp	-	G
alm	Ulmus_glabra	-	R
havsalat	Ulva_lactuca	-	G
tarmgrønske	Ulva_intestinalis	-	G
brennesle	Urtica_dioica	-	G
NA	Viola_sp	Species are difficult to identify, and some are vulnerable or endangered. Collecting flowers affects population viability. Harvesters should be aware that some species have conservation issues and be able to identify them	O
stemorsblom	Viola_tricolor	-	G
skogfiol	Viola_riviniana	-	G
fjellfiol	Viola_biflora	-	G
myrfiol	Viola_palustris	-	G
engfiol	Viola_canina	-	G
marsfiol	Viola_odorata	Picking flowers may contribute to manage this alien, invasive plant and it should be encouraged	G*
dagliljeslekta	Hemerocallis_sp	-	G
marhalm[ålegras]	Zostera_sp	Probably no problem because very few people harvest these, but harvesters should be aware that some species have conservation issues and be able to identify them	G*

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## SYNTHESIS OF THE ASSESSMENT - Master Thesis - Isara, Lyon, France

To be completed by the jury's chairperson (Name): Alexander Wezel  
copy to give to the student.

STUDENT: Nicolas Giraud

SKILLS EVALUATED		Must be developed	Acquired	Good ability	Excellent mastery
<u>ORAL DEFENCE</u>  *A-	To take a step back and expose the main points of analysis				X
	To be able to give a good quality presentation (support, time, expression)				X
	To argue and answer questions			X	
<u>DOCUMENTS</u>  *B+	To expose a problematic and methodology used			X	
	To produce a high quality document (follow instructions, layout, language, bibliography, spelling)				X
	To present results in the form of relevant tables, graphs, diagrams, photos			X	
	To analyse results and discuss them (valuing of the work or operational value of the master thesis)				X
	To use and implement theoretical aspects (valorisation of bibliography, learnt during master course)			X	
	To produce a quality "resource document" (only applicable for ISARA engineer students) and relevant annexes				
<u>SKILLS DEVELOPED DURING THE WORK</u>  *A-	To be adaptable (interpersonal skills, integration, compliance)			X	
	To be able to organize the work (including respecting timelines)				X
	To develop and adapt a methodology (rigorous overall approach) to professional realities				X
	To develop capacity for initiative				X
	To use critical thinking			X	
	To master specific skills while adapting to new situations				X

Global evaluation

\*\*

A- (16/20)

Date, signature of jury's chairperson:  
24.11.20



**Validation of the theme \*\* (at the back of the document): YES – NO otherwise:.....**

Particular conditions: .....

If the conditions are not validated on the date of ....., the grade will be discussed again at the jury of the fifth year.

\* Grades to be used: Fail (F), Pass (E), Satisfactory (D), Good (C), Very Good (B); Excellent (A); + or – can be used to nuance the grades. French equivalents: A (16-20), B (14-15.9), C (12-13.9), D (11-11.9), E (10-10.9), F (<10)

\*\* Themes: Quality /Security /Environment – Research/Development – Production management/Supply Chain – Marketing/Strategy – Economy/Development – Agricultural production.