CHAPTER 7

ETHNOBOTANY

THE ACADEMIC STUDY OF OUR RELATIONSHIP WITH PLANTS

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Plants are a part of our everyday life and have always been. Ethnobotany is the study of the complex relationship between humans and the plant world found in their surroundings. This discipline has a long history of academic research all over the world. Ethnobotanical research includes the use of plants in all aspects of life, e.g. specific customs, religious beliefs, food, medicine, fibres, and other cultural or economic aspects. The use of certain species of plants can give important information on the complex interaction of people and plants in the past, the present, and the future. In some cases, even the linguistic analysis of specific local plant names can be used to inform us about past land use or specific vegetation features. This chapter provides an overview of ethnobotany and how ethnobotanical work can be done, also referring to central handbooks on the subject. We explain some of the most important methods on how to study ethnobotany in historical contexts and in present communities, including different kinds of interviews. The chapter also highlights the importance and contributions of ethnobotany in undertakings based in Historical Ecology by gaining additional information on local communities in past and present.

Introduction

From the beginning of time, humans have used plants for a multitude of purposes. It is therefore fair to say that the knowledge about how to use and relate to plants is as old as humanity itself (e.g. Figure 7.1). A central concept in ethnobotany is traditional ecological knowledge (TEK), defined as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment. As a knowledge–practice–belief complex, traditional ecological knowledge includes the religious traditions of a society" (Berkes 1993).

Ethnobotany is the academic discipline studying traditional ecological knowledge and the complex relationships between people and the plant world, including the nomenclature, use and beliefs surrounding them, in past and present communities. Ethnobotany provides insights into people's use of plants as basis for material culture, for food, medicine and other physical needs. It also informs about intangible aspects, the practical methods used, how people have taken care of significant plants, and their role in customs, beliefs and spiritual practices (Figure 7.2.). Plant knowledge and practices in local communities may have been transmitted between generations, but can also have been learnt from books or from people outside the local community. Therefore, ethnobotanical studies may also inform about social and cultural influences and conditions outside the local setting.

Figure 7.1. The ability to gather food and to find water is one of the oldest needs of humankind. Plants could of course be eaten directly, but also help people in hunting and finding water. The left picture shows the reconstruction of the only known complete Saami bow made from the combination of *tjurved* ([bull's wood], compression wood, the harder underside of a coniferous tree that has grown leaning on one side) and willow (*Salix*), put together with glue made from bones of perch (*Perca fluviatilis*), and wrapped with bark from birch (*Betula sp.*). Note the Iron tip and ring on the bottom which makes the bow useful as a ski pole for cross country skiing. The right picture shows the fountain apple moss (*Philonotis fontana*) growing in water springs. Its pale green colour stands out in the vegetation. One of our first ethnobotanists, Carl Linnaeus, noted on his Lapland journey that the Saami people used the moss as a guide to find cold springs where they could store food.

The subject has several interdisciplinary and intellectual origins, within both natural and social sciences. Ethnobotany can broadly be described by the two parts of the term, where "ethno" implies the study of people, and "botany" the study of plants. Between them lies a wide spectrum of research angles ranging from archaeology and history to natural product chemistry and bioengineering of new crops, but with a focus on relationships between people (and communities) and plants. Ethnobotany makes important contributions to Historical Ecology and other scientific endeavors based on both natural and social sciences, such as conservation biology and ecological restoration, political ecology, linguistics, cultural ecology, environmental ethics, nutrition and pharmacognosy (Nolan & Turner 2011). Where many other historical ecological disciplines grasp over-all perspectives of people-nature interactions such as general land use, ethnobotany contributes with in-depth knowledge about intimate interactions between humans and ecosystems.

Figure 7.2. Harvest of birch bark in a young tree stand in Värmland, Sweden (around 1900). Ethnobiological aspects of using birch bark includes the tangible objects made from the bark, as well as intangible knowledge about the harvest and crafting of for example baskets, bags, and roofing. Note the boy holding a wooden flute which in Sweden is traditionally wrapped in birch bark. Acknowledging the importance of birch bark in people's lives raises awareness about past livelihoods, the importance of the tree species for supplying enough bark for roofing, may also lead to the search of traces from old peelings (which constitutes a biological cultural heritage). Photo: A. Aurelius.

Historical perspectives on ethnobotany

Ethnobotany can be considered a very old discipline with a tradition over millennia (referring to people's knowledge and relationship with plants) or fairly new, slightly over a century old (referring to the scientific study of people's relationship with plants; Schultes & von Reis 1995, Albuquerque et al. 2017). Researchers, adventurers, travelers, merchants, and others have always collected knowledge concerning local uses of different organisms, with the intent to spread the use to new areas or to find novel uses. Many of the ancient civilizations had written documents about plant use, e.g. in Sumerian, Egyptian, Assyrian, Vedic and Chinese medical manuscripts (Balick & Cox 1996; Svanberg & Łuczaj 2014). Ancient Greek and Roman authors documented their knowledge of plant use as well as the uses by neighbouring civilizations. From ancient Greece, approximately 78 vernacular plant names from the Dacian language were recorded, found in Pseudo-Apuleius and Vienna Dioscorides botanical works from the 4th and 6th centuries, respectively (Bocşe & Mihaiu 1995). Such documentation of vernacular names is of linguistic importance and helps us understand more about the extinct ancient languages from Dacia and neighbouring tribes. One of the most complex writings regarding the

traditional plant use in Ancient Rome is Pliny the Elder's Natural History (*Naturalis Historiae*) from the first century AD, especially in the books XII-XXVII (Pliny 1855–1857; available in English https://www.gutenberg.org/ebooks/author/50041). In Europe, mediaeval herbalists continued the tradition dating back to Greco-Roman antiquity regarding the use and knowledge of medicinal plants (Svanberg & Łuczaj 2014). Carolus Clusius (1526–1609) is considered one of the most important late mediaeval Western botanists and during his travels he collected considerable information of the folk use of certain plant species from different areas of Europe (Svanberg & Łuczaj 2014). During Carl Linnaeus travels through different Swedish provinces in the 18th century, he collected information about the national flora and fauna, natural resources and people's knowledge about them (Balick & Cox 1996; Tunón 2015). In 1749, Linnaeus published his utilitarian Flora oeconomica, the domestic values of wild plants growing in Sweden, a forerunner of the 19th century subject "economic botany" (Figure 7.3).

The term "ethnobotany" was coined 1895 in a lecture by the American botanist John William Harshberger, dealing with the use of plants by aboriginal peoples. Harshberger also pointed out ethnobotanical studies as potentially useful for "suggesting new lines of manufacture" (Harshberger 1896), an example of a line of thinking that has been and still is the background to many studies. Other terms used to describe the relationship between local communities and the surrounding flora were for instance "applied botany", "aboriginal botany", "botanical ethnography", and "plantlore" (Clément 1998).

During the 19th century linguists, ethnologists, and folklorists, as well as botanists, and natural historians studied local plant use and plant folklore in many European countries (Tunón 2015). Ethnobotany as a more scientific subject started to develop in Europe before and especially after the Second World War, by folklorists and other social scientists like Heinrich Marzell (1885–1970), Eugène Rolland (1846–1909) and other pioneers (see Svanberg & Łuczaj 2014). There have also been highly developed, national ethnobiological traditions in different countries, rather unknown outside of its national borders, because most of its research was published in the native language.

The academic subject developed further by scholars in the tradition of economic botany (North America). As ethnobotany became a subdiscipline of anthropology during the 1950's, American ethnobotanical research shifted from the study of solely utilitarian use of plants to the recording of vernacular plant names and the classification (folk taxonomies) of plants within indigenous cultures (Ford 2011). In 1955 the Society for Economic Botany was formed (the society changed its name in 2022 to the Society for Ethnobotany). There was also an increased interest in ethnobotany from the botanical perspective during the 1980's and 1990's due to bioprospecting from the pharmaceutical industry as well as the processes that led up to the UN Convention on Biological Diversity in 1992. The International Society of Ethnobiology was founded in 1988 and the International Society of Ethnopharmacology in 1990.

According to the American anthropologist Eugene S. Hunn (2007), ethnobotany has gone through four stages, referring to an increased awareness and gradual increased inclusion of local people. The first stage focused on the recording and listing of names and uses. A second stage (cognitive ethnobiology) applied cognitive, linguistic, and cultural theories on ethnobotany. During the third stage (ethnoecology), traditional knowledge and practices were fused with ecological anthropology, and the fourth stage (Indigenous ethnobiology) developed a more active participation of the local communities themselves in science (see also Cotton 1996). Ethnobotany has also developed during the last century, from descriptive documentation to more multidisciplinary and analytical (e.g. Anderson 2016). Another historical review of ethnobiology (including ethnobotany) and its various epistemological frameworks is given by the Catalan biologist Ugo D'Ambrosio.

Ethnobotany is part of the wider disciplinary context of ethnobiology. Ethnobotany, and other sub disciplines of ethnobiology (such as ethnozoology or ethnoecology), can be approached from a multitude of different scientific disciplines; ethnology, anthropology, archaeology, history, biology, medicine, and indigenous peoples' rights, just to mention a few.

As mentioned, ethnobotany is a vital part of TEK, and can therefore serve as a foundation to study other aspects of TEK, including landscape management, social institutions, and worldviews (Berkes 2008, see Figure 1.1, Page 17). Ethnobotany helps to grasp the significance of various plant species within the context of local culture and to identify cultural keystone species.


CAROLI LINNÆI
MED. ET BOTAN. PROFESS. UPSAL.
FLORA
SVECICA
Exhibens
PLANTAS
PER
REGNUM SVECIÆ CRESCENTES,
SYSTEMATICE
Cum
DIFFERENTIIS SPECIERUM
SYNONYMIS AUTORUM
NOMINIBUS INCOLARUM
SOLO LOCORUM
USU PHARMACOPÆORUM.
STOCKHOLMIÆ
Sumtu & literis LAURENTII SALVII
1745.

Figure 7.3. Carl Linnaeus (1707–1778), the "father of botany" was also an ethnobotanist. During his travels, among many other things, he collected information about the use and value of plants growing in Sweden. His work *Swedish flora*, beside the descriptions of the plants and habitats, also contains information about how the plants have been used and some local names. A section from the famous portrait of Linnaeus in Saami clothes by Martin Hoffman from 1737.

Changing ethnobotanical knowledge

Traditional ecological knowledge, including ethnobotanical knowledge, is being transmitted from person to person, from one generation to the next, with possible innovation added by each generation (Berkes 2008). This knowledge is adaptive, it is constantly changing in relation to the needs of people. Practices in use will be preserved and developed in its social-ecological context, while knowledge which is no longer needed, will fall out of use, erode and eventually be forgotten (e.g. Axelsson Linkowski et al. 2017). Elements of knowledge may also be preserved ex situ through documentations made by researchers, other visitors or by the users themselves. However, the practical knowledge, the unspoken and context-dependent understanding is difficult to fully record in writing and the documented knowledge is "frozen" in time. Documentations represent

snapshots of the conditions at a certain moment affected by the situation at the time. Still, documentations made by travelers and others are invaluable sources to knowledge that otherwise would have been completely forgotten.

Ethnobotanical knowledge does not only come from intergenerational transmission, neither in historical contexts nor in current day rural communities with traditional lifestyles. The flow of information via people and literature has therefore been mixed with knowledge derived from experience-based local knowledge. One important source of knowledge transmission is literature and magazines. In Europe, information from classical literature and other scholarly books has been widely spread in the society, implying that even very old rural practices and perceptions may be based on external influences. With time, the availability of books and magazines has accelerated the spreading and influence from "non-local" information on local traditions. At times, new uses of plants have been intentionally introduced, for example during times of famine with an increased need to utilise local food sources. Several waves of interest in "traditional" plant knowledge during the last century have contributed with this spreading of knowledge. In southeastern Europe, books are still owned by a few people and subjects of prestige and respect among the rural communities (Leu 1996). People with access to books are prone to pick up knowledge from them, however plant names and uses learned from book are not necessarily widely spread among the people in the community that don't have access to these books.

Knowledge acquired from books, magazines or other sources outside the community (or the region), can indeed be traditional and experience-based by the nature of their information, but it may originate from a different area or even country than the studied community and far back in time (Figure 7.4.). It is often difficult to distinguish between different sources of knowledge, but it may be important for example concerning local plant names or medicinal or other plant uses. Similar reflections have also been made regarding the situation of the origin of plant knowledge in Sweden (e.g. Tunón 2005).

Foreign influences may be revealed by plant names. In Sweden, St. John's wort (*Hypericum perforatum* and *H. maculatum*) is called johannesört (in analogy with many other languages). The name was imported from Germany many centuries ago and refers both to the red pigment in the flowers ('the blood' symbolizing to the decapitation of John the Baptiste) and that the flowering starts around St. John's eve, around 21 June. However, prior to climate change, the flowering in Sweden started approximately a fortnight later and therefore the connection between the name and the flowering date is not particularly logical for Swedish conditions. Another vernacular name for St. John's wort is/was hirkumpirkum, a misconception of the Latin name of the genus.

Hunn (2007, cf. Balée 1994:164–165) mentions "the divide between communities rooted in the land and those caught up in our contemporary global flows of capital, labor, and commodities", meaning that communities with more traditional lifestyles and stronger dependence to local biological resources are suggested to have a closer relationship with nature and its inhabitants and therefore a more extensive traditional knowledge, than most of us. Currently, there is an increasing interest among people in general on how to identify, harvest and use wild plants for food and medicine, and information is spread via numerous books and influencer accounts on social media, which contributes further to the spreading of ethnobotanical knowledge.

Figure 7.4. A local expert on medicinal plants from the village Solcani from the Republic of Moldova. Combining both traditional local knowledge and information from magazines and media, she cultivated most of the medicinal plants in her garden, but also collected some plants in the landscape surrounding her village. Photo: Cosmin Ivaşcu.

Ethnobotanical textbooks

During the past decades there have been numerous useful textbooks published in the field of ethnobotany and the authors have taken different angles in order to introduce the subject and possible research perspectives. Mostly they provide examples on how dependent we are on plant resources for all kinds of reasons. Here we mention a few renowned and useful books (in chronological order).

Schultes, R.E. & Von Reis, S. (eds.). 1995. Ethnobotany: Evolution of a Discipline. Dioscorides Press, Portland, USA.

This anthology with over 40 authors and 37 chapters reflect over a wide range of different perspectives on ethnobotany. The chapters are divided in units, e.g. socioethnobotany, historical ethnobotany, ethnobotanical conservation and ethnopharmacology. The book has a fairly strong focus on practical aspects of ethnobotany to evaluate traditional uses and their potential role in local health, drug development, landscape governance, policy planning, etc., to a large extent a continuation of the historical perspective of utilitarianism. The chapters serve as well written examples to inspire future works. However, the book does not deliver much practical methodology in general terms.

Balick, M.J., Cox, P.A. 1996. Plants, people, and culture. The science of ethnobotany. Scientific American Library, New York.
The book is an overview over human dependence on plants in six chapters. There are many examples of medical drugs of plant origin that have been derived from the knowledge of local peoples. Naturally, there are also stories and reflections related to other kinds of plant use and even aspects of ethnobotany's role in nature conservation. Like the previous book, this is a book for inspiration rather than one of methodologies. There are some practical lessons to reflect upon, for instance, the authors state that ethnobotanist need to be "able to step for a time completely out of their own cultures and embrace the indigenous worldview as a new reality". The authors state that "modern ethnobotanists adopt the role of participant-observer, living with the people under study, observing their daily life and customs, and learning about their lifestyle, foods, disease systems, and myths and legends. In true participatory ethnobotany, the indigenous person becomes a teacher, a colleague, and a respected and valued friend" (p. 42).

Cotton, C.M. 1996. Ethnobotany: principles and applications. John Wiley & Sons, Chichester – New York – Brisbane – Toronto – Singapore.
This book delivers an introduction to the history of ethnobotany as a subject and a valuable table over how different people have defined the subject through the years from 1873 to 1994. This gives insights into what have been considered as the main focus of the subject by different researchers and how to, at least hypothetically, draw the border to, for instance, economic botany. It also covers how the subject has broadened, from first and foremost studying the practical use of plants, to also include beliefs of all kinds. Cotton also describes elementary botany and phytochemistry in order to better understand traditional botanical knowledge. She mentions that ethnobotanical studies have departed from three different approaches; utilitarian ethnobotany (in order to find useful plants), cognitive ethnobotany (including also cultural and social aspects of plants), and the ecological/cultural ecological approach (human activities are dependent on the ecological surrounding, and the other way around). One chapter of the book specifically reflects on methods for ethnobotanical studies. Since multidisciplinarity is seen as a strength of the subject, the methods depart from several different research disciplines. The second half of the book is a parade of different examples of ethnobotanical studies with various angles and experiences that provide food for thoughts for future studies.

Höft, M., Barik, S.K., Lykke, A.M. 1999. Quantitative ethnobotany. Applications of multivariate and statistical analyses in ethnobotany. People and plants working paper 6. UNESCO, Paris.
This is a relatively narrow working paper that presents a number of multivariate and statistical methods for the analysis of ethnobotanical data. The aim is to enhance the indicative value of ethnobotanical studies; to make qualitative studies more quantitative. Ethnobotanical data could, through different kinds of statistical methods, be interpreted in a way that more objectively shows different patterns, e.g. relative importance of different plant genera, preferences, and quantitative impact on the ecosystems.

Cunningham, A.B. 2001. Applied ethnobotany: People, wild plant use & conservation. Earthscan Publications, London & Sterling, VA.
This book is a manual for ethnobotany. It begins with an overview over local people as ecological factors and how flora are shaped by humans, followed by reflections regarding participatory working methods for vegetation inventories. A collaboration with the local people needs to be based on the right methods on a case-by-case-consideration. Consequently, it reflects upon, for instance, when a Participatory Rural Appraisal-

method (PRA) is advantageous over interview methods, how to design a questionnaire, or relevant botanical techniques. It discusses pitfalls when it comes to nomenclature, scientific versus ethnotaxonomy and so on, as well as how to analyse the local market using a checklist for ethnobotanical surveys. It also provides techniques for assessing availability of plant resources, for example how to measure heights of standing trees, in order to estimate sustainability of harvesting. Furthermore, it describes how aerial photographs and satellite images can be used to determine land patterns to compare with the results of participatory mapping. There are vast amounts of insights collected in relatively dense texts that inspire practical work.

Martin, G.J. 2004. Ethnobotany: a methods manual. Earthscan, Oxon, UK. & New York.
This book (first published in 1995 and revised in 2004) is an appreciated manual with practical recommendations and that also benefits local communities. The book consists of eight chapters; data collection, botany, ethnopharmacology, anthropology, ecology, economics, linguistics, and finally ethnobotany related to conservation and community development. It covers the six main disciplines in ethnobotany and provides extensive reflections regarding methodologies in all of these areas. The book is filled with examples and case studies to inspire the reader to design a future project. Participatory Rural Appraisal (PRA) is for instance described as a time efficient way of data collection. Martin also highlights that ethnobotanical data can consist of many different materials, e.g. interviews, photographs and plant material, which makes it necessary to consider how to construct a relevant database.

Albuquerque, U.P., Ramos, M.A., Ferreira Júnior, W.S., de Medeiros, P.M. 2016. Ethnobotany for beginners. Springer briefs in plant science. Springer, Cham, Switzerland.
A relatively easy textbook aiming to help beginners "interested in a quick and pleasant read". The authors state that the keyword is "reflection". With reflection, an ethnobotanist can start to understand people's relation to plants, the interaction of nature and culture described as biocultural diversity. They stress that ethnobotany is the recent science studying the ancient relationship between people of living cultures and plants. Hence, they consider studies of past cultures as archaeoethnobotany or paleoethnobotany, and the methodologies used differ. The ethnobotanist's academic background will focus on the people's knowledge from different perspectives. When ethnobotany departs from botany it often focusses on listing useful plants. When it departs from anthropology it seeks the understanding the role of plants for the culture, while an ethnoscientific approach focus on how the people themselves understand their plant knowledge and culture, for instance when it comes to ethnotaxonomy. The authors argues that the way forward is interdisciplinarity. Chapter 4 focuses on investigation methods and highlights methods like individual interviews, participant observation, free listing, participatory methodologies, and triangulation techniques. They conclude the methodology chapter with some recommendations, e.g. "treat informants as expert of the subject, as they truly are, since they possess knowledge of phenomena that are unknown to us…".

Tunón, H., Dahlström, A. 2010. Nycklar till kunskap. Om människans bruk av naturen. "Keys to knowledge. About human use of nature". Centrum för biologisk mångfald, Uppsala.
We would like to mention a book that is of limited accessibility to many readers since it is published in Swedish, but that has a perspective that differs from the previously mentioned one.

As several of the other books it is an anthology and, even if it is meant as a textbook in ethnobotany/ethnobiology and agrarian history, it is not written by ethnobotanists. It is a multidisciplinary book with chapters focused on methodologies dealing with different sources that can provide information for

ethnobotanical studies. Consequently, the 33 chapters of the book includes how to work with archives, farmers' diaries, plant names, written sources, artefacts, paintings and photographs, historical maps, interviews, participatory ethnographic mapping, inventories of biological cultural heritage, archaeobotany, palynology, osteoarchaeology, and dendrochronology. Hence, the book provides an introductory palette on a wide range of examples of methodologies that can provide valuable information or be used for triangulation to verify other data. We will summarise and use reflections from this book in the methodology section of this chapter.

Anderson, E.M., Pearsall, D. M., Hunn, E. S., Turner, N., J. (eds). 2011. Ethnobiology. Wiley-Blackwell Inc., Hoboken, New Jersey, USA.
Although it is not solely focused on ethnobotany, this book is a must read and one of the best synthesis on ethnobiology that includes besides ethnobotany, also ethnozoology, ethnomedicine, and other ethnosciences. The authors start with the intellectual origins of this emerging discipline and embedded subdisciplines, discuss the current state of ethnobiological research all over the word and their importance for ethics, conservation science or historical ecology. One chapter deals exclusively with the development of ethnobiology in Europe. Three chapters focus only on ethnobotany and specific problems related to endeavours focused on the study of humans - plant relationships also from a historical perspective. Chapters 10 and 11 deal exclusively with reconstructing ancient subsistence patterns through the use of botanical remnants in archeological findings.

How to do ethnobotanical research

Ethnobotany is generally considered a "discipline located at the intersection between natural science and social science", and since these "two" cultures have different research traditions, the research of one of them is sometimes misunderstood by researchers from the other (Vallès & Goarantje 2016). Consequently, as mentioned earlier, ethnobotanical studies can be performed in many ways and from various perspectives. Some researchers work solely with historical ethnobotany and rely mainly on archives, documents, already published research, and dictionaries on for instance vernacular plant names, uses and beliefs regarding the plant world from different areas or countries. Others work with contemporary ethnobotanical information in the field, by visiting a certain community and working in contact with people in the local community, i.e. standard anthropological or ethnological methodologies.

There is a continuous discussion whether the subject of ethnobotany is more natural science than social science, the other way around or even equally of both? Belonging in two different research traditions can be seen both as a strength and a weakness. Interdisciplinary work creates opportunities to go beyond disciplinary paradigms and examine each subject in a new way. However, there is also a potential risk that interdisciplinarity might result in questioning of the validity of methodologies used by the "other" discipline and conceptual conflicts when it comes to the interpretation of data and what conclusions that could be made. In ethnobotany it is also necessary to create a functioning transdisciplinary collaboration (i.e. with people outside academia), especially in studies dealing with contemporary knowledge, which are strongly dependent on a close relationship with the knowledge holders. It has been suggested that ethnobotanical research is a form of citizen science. A close relationship between researchers and the studied community can be beneficial or problematic. On the beneficial side a close proximity may result in a sort of local "peer review" of results and conclusions, but on the other hand the scientific credibility might be questioned as the close relationship may result in an avoidance to publish "unpleasant" findings. However, available ethical guidelines are helpful for avoid potential problems (e.g. Vallés & Garnatje 2016; Tunón et al. 2016 & 2020).

Good relations are important in ethnobotanical fieldwork

As with all kinds of research, it is important to specify research questions and to consider which community to address. For example, ethnobotanical fieldwork can be linked to the ethnographic features of a certain community, to living ethno-cultural traditions, to linguistic particularities, to remoteness or isolation of a community from urban settlements or to other large communities, specific histories, particular land use and local economy or rich folklore.

To establish contacts within a community is one of the most crucial aspects of the research, and the success of the forthcoming fieldwork is dependent on this step. It is extremely helpful to have a recommendation from one of the members of the community and especially, from people that are respected. In rural communities, such as in the Romanian villages where we have done fieldwork, it may be helpful to start with contacting the mayor, the priest, veterinarians, or schoolteachers for arranging meetings with other members of the community. Another approach is to make contact with people in spontaneous meetings in the field and explain your interests and purposes.

It is also important to have an idea of how many interviews would be a minimum in order for the research to be sufficiently representative of the community. Recommendations are important, in order to come into contact with the right local experts of each subject. The methodology is referred to as the snow-ball sampling method, an anthropological qualitative research model which is successfully applied in many ethnobiological undertakings (Parker at al. 2019). For example, someone might know much about medicinal plants, another person forage mushrooms and edible plants, while others are experts on ethnoveterinary practices or ethnobiological knowledge such as fishing or livestock breeding. Traditional ecological knowledge is often not evenly spread between the members of a community, which makes it necessary to interview several people (Berkes 2008).

Botanical identification and voucher specimens

Ethnobotanical information must be linked as clearly as possible to the correct species; however, this is not always easy. It is advisable that the informants themselves have collected or physically pointed out the relevant species independently, to avoid mixing up species. If the interview is made in the absence of the species in question, it may be difficult to identify the right species because plant names used by informants may not be following the nomenclature of scholarly botany. Not even an "official" plant name in the local language or a scientific plant name may necessarily be used in a correct way. It is possible that the informant may have mistaken the botanical name and is referring to a different species. A vernacular name sometimes refers to several different species. In such cases the botanical identification will easily be erroneous. Another advantage of doing ethnobotanical interviews in the field, is that the species in the surroundings may trigger new perspectives that otherwise would have not come up.

A general rule is to always collect a voucher specimen to deposit at a university herbarium or similar for reference (Balick & Cox 1996, p. 46–51; Cunningham 2001, p. 18–19, Martin 2004, p. 28–65). Contact relevant universities prior to your study in order to include the required information with your voucher specimen. Researchers may themselves collect the species mentioned by the informants and make herbarium specimens, but then informants should also be asked to confirm that the collected species is the one referred to in the interview. The second-best option to collect voucher specimens, is to take photographs of the plants pointed out by the informants in order to secure a valid identification of the species. It is also valuable to take photographs of the surroundings where you found the plant in order to be able to interpret the ecological environment and possible human impact on the landscape (Martin 2004 p. 138–170).

Interviews and questionnaires

Interviews are probably the most important tool in ethnological, anthropological, and ethnobotanical studies. Interviews may seem easy to use, but the skill improves a lot with experience, not the least because every occasion is different. A poorly designed interview generates misinformation and makes it difficult to obtain reliable data (Albuquerque et al. 2017, p. 28).

Interviews can be performed in various ways depending on the purpose of the study. Interviews can be in the form of open-ended conversations, they can be structured very strictly, they can be semi-structured, unstructured, or something in between (Cotton 1996 p. 90–106; Martin 2004, p. 96–135; Albuquerque et al. 2017, p. 28). An open type of interview can start with a theme around which the interviewer and informant discuss, for example hay harvests. Depending on the interest and knowledge of the informant, the conversation can move freely in different directions, for example about the practical and technical aspects of hay harvests (tools, drying methods, storing, timing and time consumption), the social life of mowing (who participated, were there celebrations, music, etc.), or the subsistence aspects (the role of hay in the total economy, other kinds of feed, buying hay) etc. A structured interview uses each time the same, predetermined, questions, asked in the same order to each informant. Semi-structured interviews typically combine predetermined questions with open-ended questions in order to steer the dialogue but still being open to what comes up during the interview. Also a structured interviews can adopt open-ended questions to follow up answers, i.e. "Why?, "How?", and "What?", that can't be answered with a simple "yes" or "no".

Gary Martin stressed that "Intuition and experience are the best guides to informal ways of gathering information. When beginning fieldwork, we are drawn into a broad range of conversations. With inspiration and good luck, we find ourselves asking the questions that open the way to understanding a foreign culture" (Martin 2004, p. 109).

A questionnaire can be seen as a written list of interview-questions, that can be filled in by the informant, or by the researcher based on answers given by the informant. A limitation with questionnaires is that they are not interactive in response to the given answers. But questionnaires have the advantage of enabling the collection of information from a large number of respondents and they can easier be analyzed using quantitative methods. One result of the covid-pandemic was increased possibilities to do online-interviews, which may be a time and cost-effective alternative. The online alternative is not suitable for all occasions or all interviewees, but it may work well for example with people that are used to online meetings or when the interviewer and the interviewee already are well acquainted. Cotton also points out a need to cross-verify information retrieved from interviews and questionnaires through triangulation (1996, p. 95). When non-contradictory data are obtained with different methods or from different data sources, it strengthens the results (Albuquerque et al. 2017, p. 32–34).

Interviews can be made with several informants at the same time, for example in focus groups. Focus group interviews have successfully been applied in many ethnobiological research contexts. They are conducted with approximately four to ten people at a time. These individuals have been invited in advance to participate in the research to discuss a certain topic. The interviewer acts as a facilitator and introduces open-ended questions but mainly stays out of the conversation. The intention is that the informants engage primarily with each other, rather than with the facilitator, so that the conversation develops based on their discussion. The conversation is recorded and used in the research. One of the main deficits of this method is that it requires a long preparation time and the researchers need to take into consideration the availability of the people for the physical interviews. Furthermore, there is a risk that some informants are too dominant, and others with important perspectives may remain silent. It is important for the researcher to be observant and facilitate the interview in a way that

includes all interviewees. Another deficit might be that sensitive or otherwise personal information might be less likely to be shared together with a group of people living in the same location. In order to overcome the two last weaknesses, follow up interviews can be made in smaller groups. One of the main benefits of this method is that the interviewees can validate and reflect upon the answers given by other participants and thus creating a constructive dialogue that may come up with more in-depth information.

Figure 7.5. During field work about Romanians alder meadows, interviews were taking place partly through participation in the work. Being in the field together with the informants during harvest, facilitates and deepens the discussion on various aspects on and relating to hay. Botiza, Romania. Photo: Anna Westin.

The artefact interview method was developed by Brian M. Boom in the 1980's and is a methodology where the interview departs from an artefact made from plants or a particular plant use context (Balick & Cox 1996, p. 44). This method creates opportunities to highlight aspects of a particular subject that would not come to the mind of the interviewee in a 'formal' interview (unless the interviewer already had very good knowledge of the subject). Artefact interviews using photographs or other depictions of plant species or specific activities may be particularly suitable during ex situ situations. The pictures should preferably show fresh plant material in situ. It is also valuable if the pictures show as much detail as possible of, for instance, the flowers, fruits, bark, stem cuttings, exudates, and associated fauna and/or flora. Such depictions can be useful even at occasions outside the vegetation period. Some studies have shown that the informants have better possibilities to recognize species from a photograph compared to a voucher specimen (Thomas et al. 2007). Such interviews can also be made in situ in a place relevant for the subject of the interview, a method sometimes called place-

based elicitation (Figure 7.5.). Being in a landscape where the plants in the centre of the interview are present, can evoke knowledge and memories that the informant otherwise would not have mentioned.

A methodology used in Sweden by the siblings Yngve and Lilian Ryd is deep interviews with a very limited number of informants. They have focused on describing practices and practical traditions among elderly Saami people around Jokkmokk in the North of Sweden; a work that has resulted in many books. The methodology is simple: to repeatedly and for several hours at the time interview and discuss a particular subject with the informant. The interview sessions are often repeated several days in a row to dwell deeper and deeper into details and to find inconsistencies in the answers. After each interview session the researcher analyzes and rewrites the notes into a logical story and identifies new questions for the next sessions the following day. It is important to have repeated sessions over a short timespan since the technique brings back or reconstructs memories that have been "forgotten" and memories that the informant was unaware of having (Ryd 2009, 2010a; Ryd 2010b).

A quick guide to vast knowledge systems, according to Yngve Ryd (2009):

- Discuss the same question with the same informant several times in order to get the details right.
- Be persistent. If an unanswered question is repeated several times an answer may come.
- Revisit good informants over and over again. If they remember one subject well, they can probably deliver information on other subjects.
- Knowledge is best retrieved at the "kitchen table" where it is necessary to find verbal explanations. When in the field it is far too easy to just point as an explanation.
- Total focus during the interview session, and the time for a break. It is not a leisurely conversation.
- Be aware that physical frailty does not necessarily reflect the mental state of the informant. They can still have a good memory.
- There are more relevant subjects than researchers so encourage people to write down their knowledge if possible.
- Many different subjects are described in the literature, a white spot (hole) in the knowledge system is only identified through the interaction with informants.
- It is not serious to have a time plan. A time plan may have a limiting effect and contribute to a premature termination of a project.

Participatory methods

In interviews, the informant often takes a relatively passive role, as opposed to participatory methods where the informants are highly active. The idea is that the participation should be non-hierarchical and egalitarian to give all participants a voice (Martin 2004, p. 5–10, 107–109; Cunningham, 2001 p. 23–26). In Participatory Rural Appraisal (PRA), local people take active part throughout the study "in the design of the study, data collection, analysis of the findings and discussions of how the results can be applied for the benefit of the community."

Transect walks are a participatory methodology where the researchers and members from the community follow a defined path and data is collected during the walk. The transect walks can focus on all sort of cultural activities or other subjects, e.g. use of medicinal plants, edible plants, or natural resource in general, as well as geographical organization of village life. It can also be used to establish a better contact between the researcher and the community due to the relatively relaxed and casual conditions of such a study. The method can be used

with ordinary people or key informants and is focused on creating an opportunity to discuss, observe, identify and reflect over relevant items for the village (Cunningham 2001, p. 23).

Timelines are a method that can be used to identify historic events, game-changers, turning points, or anything of importance for an area or connected to a particular land use. Events on a timeline could be the year for the introduction of a specific technology, the implementation of a new regulation related to land use, forest fires or an important climate incident. Timelines gives a possibility to evaluate how past events made a difference for people, their use of resources, or how important land uses have changed (Cunningham 2001, p. 23).

Creating seasonal calendars is a method to visualise the annuality of important land uses and biological resources (Cunningham 2001, p. 23). What do people do in different seasons? What are the important activities over the year? What resources are harvested during what months?

Ecomapping, land use mapping, cultural mapping, or village mapping depending on the scale, are different names describing a participatory method where members of the community put "cultural data" on a map. It is often used to visualise the local community's connection to their traditional territories, but is also useful to indicate other aspects of people's relationships with the landscape. Ethnobotanical mapping can include the occurrences of different kinds of plants that are used by the community. An important ambassador for this method is the British anthropologist Hugh Brody, who has used ecomapping in many different projects to empower local communities in different parts of the world. His book Maps and dreams (Brody 1981) is something of a classic in explaining the underlying ideas of this methodology. Another practical manual is Chief Kerry's moose – a guidebook to land use and occupancy mapping, research design and data collection (Tobias 2000). It is rich in hands-on experiences and inspiration for how to design such a study. Mapping can be done directly on a map or on a clean paper depending on availability. We suggest starting a mapping session by asking the participant to describe the geographical characteristics of their landscapes in order to create the framework of the map. What are the characteristic features of the landscape? Hills, waterways, lakes, mires, etc. Then continue with drawing the different kinds of land uses performed at specific places, and how people move in the landscape. What are places that are of particular importance to the local community or fractions of it? What do they do there? When? How? and Why? This information may then be corroborated during field visits to the different areas by finding elements in the landscape that support their stories (Tunón & Byström 2010, p. 285–296).

Citizen science projects use observations and data contributed by members of local communities and other "citizens". The projects are planned and designed by researchers, who also analyze the data and interpret findings. In citizen sience, the role of the "citizens" is only to contribute with information to a specific research context (e.g. Fraisl et al. 2022). This is in contrast to community-based monitoring (CBM), where the local community documents data based on their own interests (Reyes-García et al. 2022). People in the local community identify a need and design a project to meet it, sometimes in collaboration with researcher, but not always; the initiative originates always from the community.

Photovoice is another methodology with potentials for ethnobotany and historical ecology (Sutton-Brown 2014; Dedrick 2018, Carroll et al. 2018). The method was developed in the 1990's and has, according to our knowledge, not come to any common use within Historical Ecology. It is often used by marginalized groups to visually identify, document, and represent cultural aspects within their community. The members take or select photographs depicting what they consider typical, characteristic, or relevant for specific concepts or contexts. What is, for instance, an adequate representation of medicinal plant use in your community? Or, can the different stages in hay harvests in your village be depicted?

Local markets are an interesting source of data, highlighted by Anthony B. Cunningham and Gary Martin (Cunningham 2001, p. 60–95; Martin 2004, p. 191–200). Both authors deliver valuable insights in how markets work and their values to the local economy and that they may play an important role as part of a trade network. Martin points out that any study of the economic values of biodiversity must take the local markets into account as many plant species that have a strict local value meaning only will appear on local marketplaces. Therefore, they claim, surveys of biological resources must include talking to producers, sellers, and consumers. When doing such surveys, Martin lists the following important aspects: information on the vendor; origin of the produce; condition of the goods; management and marketing of the resource; quantity, price and availability; changes in demand and supply; and additional information.

Participatory methodologies can be seen as versions of dialogue workshops or focus group interviews in the field. Balick and Cox (1996) argue that formal interviews, where interviewers have a more objective role to the community, are difficult to combine with participatory methods. Also since the latter aims to "consciously reduce the formal distance between observer and subject, they are vulnerable to the criticism that they move too deeply into indigenous paradigms" (p. 43). The ethical issues of close proximity in Community Based Participatory Research (CBPR) projects have previously been highlighted by Tunón et al. (2020). When it comes to participatory methodologies, Participatory Learning & Action: A trainer's guide (Pretty et al. 1995) can be recommended for inspiration.

Ethical implications and access and benefit sharing

Researchers and adventurers have studied the practices and the knowledge of indigenous and local communities for centuries. For a very long time there was very little respect towards the knowledge holders. However, things slowly started to change, and in 1988 the International Society of Ethnobiology (ISE) held a congress in Belém and decided on the Declaration of Belém, a document highlighting the responsibilities researchers have towards the local people that supply their knowledge to scientific studies. This has since been developed into an ISE Ethics Programme and the ICE Code of Ethics with 17 principles and 12 practical guidelines. Compulsory elements are the issue of free, prior informed consent and the principles of precaution and diligence, as well as the issue of reciprocity and giving back to the community. The latter, to present the findings for the local community and not only for the scientific community, is an often neglected element in research projects. The ICE Code of Ethics is one of many valuable guidelines to ensure the rights of the local people. It is important to stress that ethical behavior is not just about ticking off the right boxes in a list of principles, but rather a respectful relationship between researchers and a local community. This process is often time consuming, and researchers need to invest enough time to meet and get acquainted with the community and finally be accepted by it. To be familiar with the challenges, responsibilities, and provocations of folk biological research, it is necessary to consult the emerging literature on this subject and also to adhere to appropriate ethical guidelines. Practicing full disclosure is beneficial for both the researcher and the local community, since much of this type of research is in fact co-production of knowledge (Berkes 2008) and might also help the local community in several ways in the long run. A problem is that, for the researcher, this relationship is often limited to a specific, often relatively short period relating to a funded project, while the local community is looking for a long term and more reliable liaison (Tunón et al. 2016).

Another important issue is intellectual property rights and access and benefit sharing (ABS). The first principle of the ISE Code of Ethics states that:

> "Indigenous peoples, traditional societies, and local communities have prior, proprietary rights over, interests in and cultural responsibilities for all air, land, and waterways, and the natural

> resources within them that these peoples have traditionally inhabited or used, together with all knowledge, intellectual property and traditional resource rights associated with such resources and their use."

Consequently, the informants own their knowledge, and this ownership must be respected in ethical fieldwork. Often people are happy to share their knowledge with people they trust, and it may be tempting to collect information for future publications without disclosing to the local people what it will be used for. That people share information with you does not necessarily mean that they give you the permission to spread it further. To collect data for future studies without informed consent was common in the past, but it is now considered unethical. Therefore, all field work nowadays requires that researchers first inform the participants and get consent prior to the study. In practice, this means that the researcher must give full information about their interests and the purpose of the research (nature conservation, epistemological value, cultural heritage, development of new drugs or other reasons) as well as the planned outcomes (types of publications, exhibitions etc.) before informants agree to take part in the study. The researcher should also give the informants their contact information, if the informants change their mind or if they want to add information afterwards. From serious journals, prior informed consent may be a requirement for being able publishing the results. It is always advisable to let the interviewees read the minutes from the interviews and suggest corrections. Sometimes, key informants might even be integrated in the research team and become co-authors (see also chapter 10). Also, in order to collect specimens from different plant species, it might be advisable to have permission of the community or at least of the landowner, if the species is found on private land. In this case it is always important to consider the national conditions since national regulation may differ.

Apart from the ethical permissions from the local community, it may be necessary to have permissions from the government. The negotiations of the UN Convention on Biological Diversity (CBD) have resulted in the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, a global framework for ABS-issues, which also regulate the access to "traditional knowledge associated with genetic resources" when it comes to bilateral exchange. It is important to keep track of what requirements for due diligence are applicable for the countries of the research group as well as the knowledge holders. Researchers in the European Union need to pay due respect to the EU regulation (511/2014) on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization in the Union.

Ethnobotanical studies in archives and literature

Plants in historical documents

Plants of economic interest are mentioned in various historical documents, and some of this information may be of ethnobotanical relevance. Cadastral maps from Sweden, which recorded economic (taxation) capacity of farms and villages, may contain information about the abundance of woody species used for firewood, timber, fencing and roofing (reed, birch bark) etc. (see also chapter 2). Any disputed resource is also likely to occur in court records. Unless the purpose of the source was to document plants and their uses, the ethnobotanical information in these sources can be expected to be biased towards economically interesting species and occasional anecdotal records.

Ethnographic sources

In the urge to document folklore and traditional lifestyles, ethnological institutions in different European countries have long collected information from rural people (Tunón 2015, with the distribution of

questionnaires about traditional customs, agriculture, language, beliefs, infrastructure, childcare and many other themes (see also chapter 2). For example, in Sweden, hundreds of different questionnaires have been distributed to informants around the country since the early 20th century. Many of the questionnaires include questions relating to plants, and specific ethnobotanical questionnaires have also been sent out. The replies to these questionnaires are rich sources to the diverse relationships between people and plants in the past. However, one should be aware of source critical aspects. At least during the early days, informants were rather restricted in their answers by the formulations of questions and the communication with the museum officials (Wall & Richette 2010; Östling 2010).

Literature

Literature of ethnobotanical relevance can be found from Antiquity and onwards. However, sources must be treated on a case-by-case basis. Some literature is based on firsthand experience while others are at best secondary or tertiary sources. Many books are compilations of information of unknown origin and/or bad translations from other languages. Another common problem with elderly literature is that authors sometimes tend to "translate" foreign plant species into "comparable" native species, more understandable to the local readers, which may lead to a situation where a particular plant is erroneously claimed to have been used in a certain situation. Descriptions of a particular use may also be appearing in several different sources without enough information to make it possible to determine that it is actually describing the same, or different, cases. One important category of literature are travelogues by travelers such as Carl Linnaeus and his disciples, where findings were made public for a larger audience. These books are often botanically correct and the knowledge and uses are often localized to an exact place and a defined date. However, they do have a tendency to leave out observations of common species and activities and focus on the more things they found "interesting" and that made impression on them. Consequently, as a common rule, an absence in a source does not necessarily mean an absence in reality. Another inspiring source is descriptions in fictional literature, like novels, short stories, and poetry, even if they are not always ethnologically entirely correct, they may deliver local perspectives on plants and plant uses.

From the 20th century onward, there is also a rich body of literature where ethnobotanical knowledge-based information from various sources (including older literature and field work), have been synthesised into valuable publications. For instance, from the Nordic countries there is the Danish Folk og flora [People and flora] by Vagn J. Brøndegaard (1978–1980), Norwegian Planter og tradisjon [Plants and tradition] by Ove Arbo Høeg (1976), and Swedish Människan och floran [Man and flora] (edited by Tunón et al., 2005). The perspective of these books differ slightly. While Brøndegaard's volumes mainly are based on literature sources, Høeg's book is based on the stories of a huge number of local informants. Tunón et al. have edited a multi-disciplinary anthology with a large number of scholars, thus being a scientific–popular scientific meta-study of historical and contemporary plant use in Sweden. Comparable books have been produced in several different countries and give a good background for further studies no matter if it refers to local conditions or at a higher level.

Examples of ethnobotanical research projects and methods

Ethnobotany can be integrated into several research projects and undertakings in Historical Ecology, nature conservation, and also in immaterial and material cultural heritage and traditions. Here we will exemplify ethnobotanical methods through case studies and methodological considerations from our own and other people's work.

Integrating ethnobotany into ethnographic research in Romania

In the project FOODIE, a team of anthropologists and ethnologists researched the diverse and uncharted domain of traditional foods in Romania and historic Romanian speaking communities outside the national borders. Ethnobotany was integrated as an important dimension of research. In the local cuisine of rural communities there are a considerable number of wild plant species used for preparing different dishes (Figure 7.6). Several wild plants are also used for medicinal beverages or recreational teas (Sõukand et al. 2013). The project also recorded traditional and local varieties of fruit trees that were planted in gardens and orchards. FOODIE is an example of how ethnobotany is starting to be acknowledged and integrated as an important method of research, diversifying the research base of food studies (see also Pieroni and Leimer Price 2006, Fontefrancesco et al. 2022, Sõukand et al. 2013).

Figure 7.6. Left: A traditional fermented cider-like drink called oțet or acriturǎ in the Apuseni Mountains, made from lingonberry (*Vaccinium vitis-idaea*). Photo Cosmin **Ivașcu**. Right: Mushrooms are collected in many rural areas of Romania, both by rural and urban people. Many rural people have traditional knowledge regarding many edible mushroom species, and through a wide variety of books, mushrooms have been made more available to forage for everyone. This picture shows a traditional mushroom stew made predominantly from the chanterelle (*Cantharellus cibarius*) served with polenta. Photo Cosmin **Ivașcu**.

Impact by external sources of plant knowledge in southeast Europe

Impressive traditional plant knowledge is still alive in rural communities of Romania. In one community in Maramureș, most of the locals recommended a person whom they considered the expert in the use of medicinal plants from the local flora. He had extremely detailed knowledge about medicinal use. However, a first noticeable impression was that he did not use local plant names, but more common, standard names, found in books on biology and medicinal plants. He showed us that his main source of knowledge was the book Health from God's Garden: Herbal Remedies for Glowing Health and Well-Being, written by the Austrian author Maria Treben (1987, first published in German in 1980). The book has become a best seller of traditional Austrian and Central European medicinal plant use, common especially in Central European countries, but after the 1990 is also beginning to be quite common in Eastern European countries. Although the local expert was familiar with the local methods and practices on plants, he considered them to be less trustworthy than the practices described in the book.

A similar event took place during field work in Banat, southwest Romania, where another local plant expert, familiar with many traditional practices, used the book by Maria Treben as the primary source of reliable information. The Hungarian edition of Treben's book is quite widespread among the Csángós, eastern Carpatians, affecting the vernacular plant nomenclature in this area and the medicinal use of plants (Babai & Molnar 2016). Mattalia et al. (2020) found that the Hutsuls living in Ukraine, were very fond of their books regarding the topic of medicinal use of plants and herbal tea recipes, among them Maria Treben's book. Furthermore, Ukrainian Hutsul used books and newspapers more commonly than Hutsul living in Romania. This phenomenon was linked to the emergence and spread of popular books on medicinal plants within the USSR starting with the year 1970 that had success, being re-issued several times (Mattalia et al. 2020).

During our fieldwork with the FOODie project research team (see above), in the Republic of Moldova, which was part of USSR from 1945 until 1991, we observed that some locals specialized in medicinal plants collection and cultivation. Also here, we found a strong component of knowledge acquired from reading popular medicinal books in the former USSR and from magazines. The plants were collected from the own garden and other areas from the village and then sold at a local level mainly dried to be used as tea for medicinal purposes or recreation. The external influence was obvious especially regarding local species nomenclature (using some Russian plant names). This does not mean traditional ethnobiological knowledge is not present anymore, on the contrary, it might be present but also adapted to new socio-economic conditions of the local communities.

By studying historical ethnobotanical literature from the interwar period, it is clear that many communities from the Republic of Moldova (at that time called Bessarabia and was a part of the Romanian Kingdom) had incredibly rich ethnobotanical knowledge and very elaborate receipes for the preparation of medicinal teas to treat different illnesses. When such cases are encountered, it is mandatory that the researcher try to identify the influence of external sources in local intergenerationally transmitted knowledge, especially when the rest of the community considers certain persons as local experts (see Bexultanova et al. 2022, Mattalia et al. 2020). The existence of local experts specialized in medicinal plants with external knowledge sources (books, magazines) is a recent reality in (south-eastern) European rural communities, but researchers should not underestimate the traditions of peasant herbalists that might still exist in some European regions.

Ethnobotany as an important source of information in nature conservation

There are good reasons to do ethnobotanical research within landscapes with remarkable plant diversity such as high nature value (HNV) farming, diverse cultural landscapes. and species rich grasslands. Learning from the local communities, how they classify and use the different plant taxa and how they classify and manage different vegetation types, will inform nature conservation about possible ways of land management.

In the Romanian Eastern Carpathians, a Hungarian ethnic group (Csángó) practices small-scale agriculture in one of Europe's youngest cultural landscapes with species rich grasslands. The Csángós have deep ecological knowledge on the vegetation structure, a complex folk habitat classification, but also a rich local nomenclature and medicinal knowledge on many of the species that grow on the semi-natural grasslands in their landscape (Babai & Molnar 2016). Other communities with a long history of complex intertwined practices of cereal cultivation and pastoralism in the mountainous region of Maramureş have developed an extremely interesting and detailed classification of hay according to several ecological factors (altitude, slope orientation, dominant plant species etc.) being around 16 categories in one village (**Ivaşcu** et al. 2016). The classification of hay was common also in other villages from in Maramureş and coincided with a deep knowledge among the locals for other medicinal, tinctorial, food and other uses of the wild plants growing in the landscape. In some other areas

we found a less complex classification of hay, either due to environmental or cultural factors (e.g. Banat, Bucovina etc.) (Ivașcu unpublished). This shows that local communities practicing traditional methods of agriculture and animal husbandry still possess incredibly detailed knowledge of vegetation and habitat dynamics as well as the management shaping them. Learning from these people will enable more successful management in areas where traditions have been lost but biodiversity is still rich.

Experiences from ecomapping in the North

During the last decades we have used ecomapping to visualise land use in several studies, for example with summer farmers in Western Dalecarlia, in the central parts of Sweden. Summer farming is a form of sedentary transhumance pastoralism where one or more satellite farms are situated further away in the outlying lands, in order to utilize grazing resources too far to reach on a daily basis from the central farm. Historically the animals were herded to graze in the forests, mires, or alpine meadows in the vicinity of the summer farm. Today the animals are most often free ranging or fenced in the infields (Tunón & Bele 2019). In our study we mapped the areas grazed by the livestock, according to the summer farmers, along with other local information about e.g. nature values, important areas, and stories about the animal husbandry (Figure 7.7.). Among other things, the study showed that the infields, as defined by the National Board of Agriculture, constituted of on average 7.3 % of the total grazing area that the farmers pointed out as grazed by their livestock (Poudel 2010).

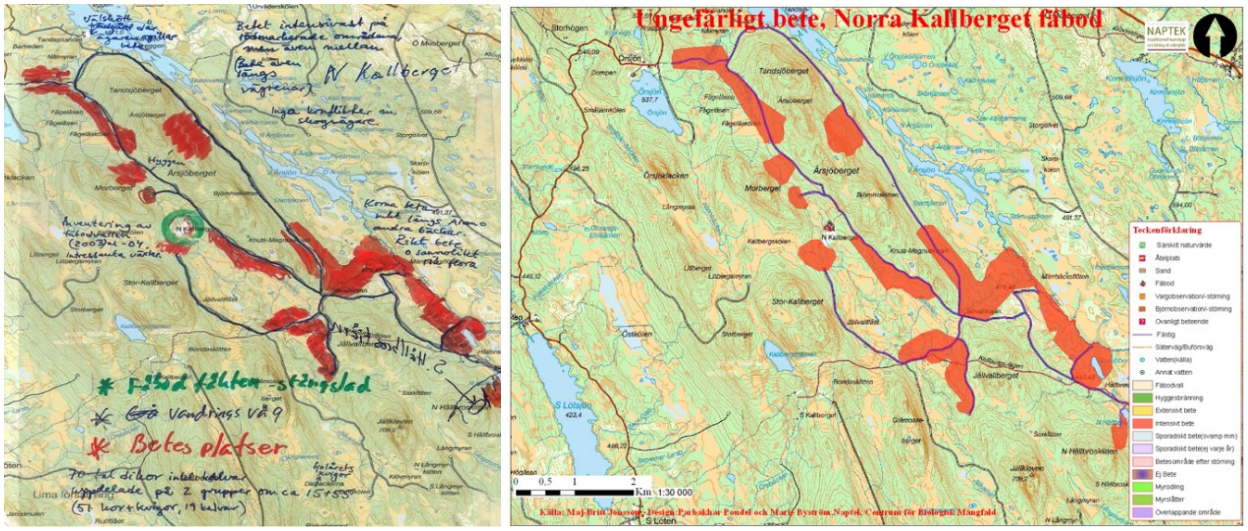

Figure 7.7. The sketch made by the farmer (left) is translated into a GIS-map (right), which gives us the opportunity to calculate grazed areas and also to show the areas used by this particular summer farm in relation to other summer farms in the vicinity.

In an assignment from the Government of Åland in 2019, we used participatory ecomapping techniques to document the multiple use of coastal areas on Åland, for the development of a coastal and marine spatial planning document. In several focus group interviews and dialogue workshops, fishers, hunters, local heritage people and others from the local community discussed different aspects and uses of the coastal area with the purpose to identify valuable areas for different parts of the communities and reduce the risks of future conflicts. One of the results from this study was a map over the perceptions of status and trends of coastal birds in different parts of the Åland archipelago (Figure 7.8; Tunón et al. 2020).

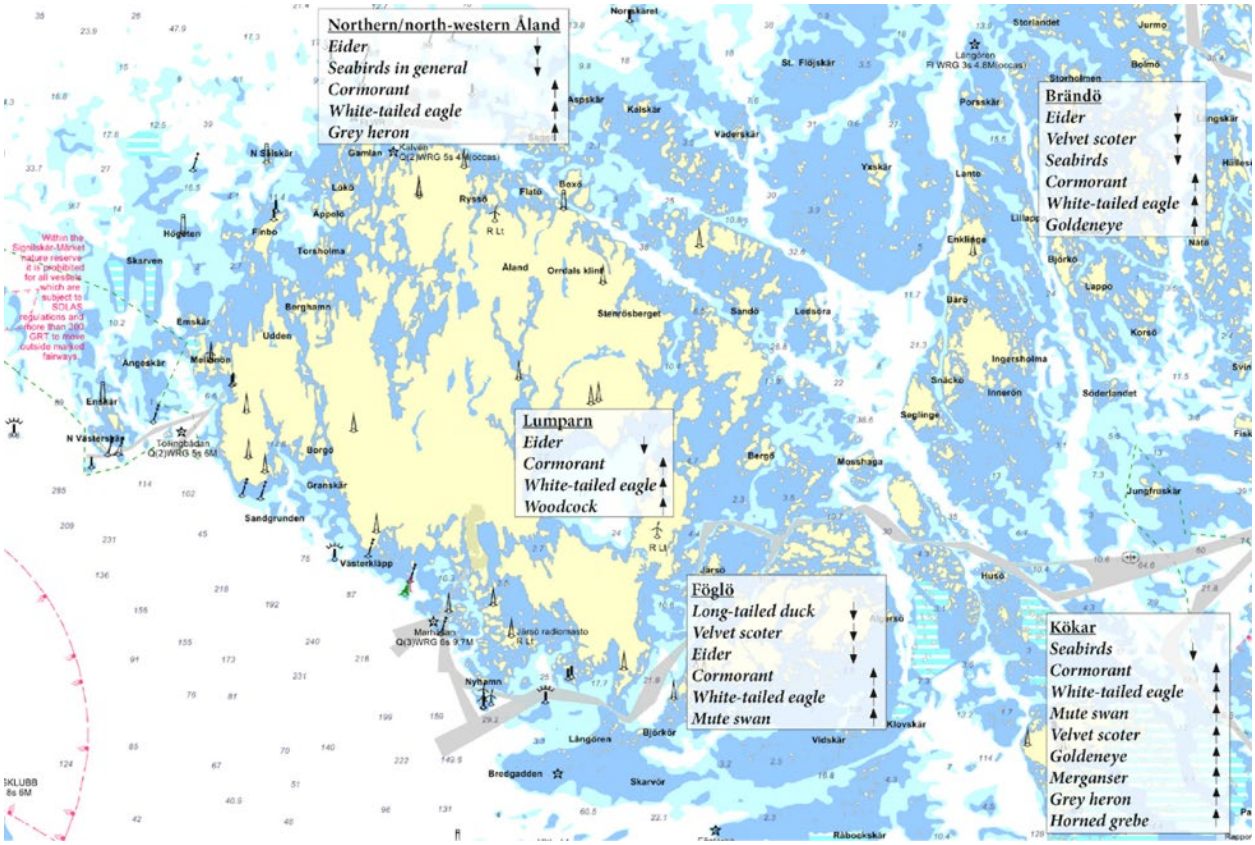

Figure 7.8. A map over the trends of coastal birds in the Åland archipelago based on combined statements by local people in a number of focus group interviews and dialogue workshops. Upward pointing arrow means that the population of the bird species is increasing, and vice versa.

In another project, we helped the local communities in the archipelago south of Kalix in Northern Sweden to visualize their experiences from net fishing in the shallow coastal waters. In this case they documented all their catches during one year, marked the different species on a map, and then calculated the risks of getting by-catches of the endangered brown trout. This project produced a map to show the authorities where fishing could be continued and where it is advisable not to fish for conservation purposes (Kvarnström & Boström 2018). This example was about fishing, but it could be developed for most subjects, e.g. harvest of berries, mushrooms, or medicinal plants.

Such participatory activities have also resulted in the inclusion of local people as co-authors, e.g. key informants. We will highlight one case in which prior studies and discussions have led to joint ideas to highlight particular issues of importance for the local communities and consequently co-authorship with locals (Tunón et al. 2019). The writing process departed from a joint idea that was sketched out by the researchers, and then developed by the local representatives. Joint discussion led to a draft structure that was adapted with input from all. Experience-based comments from the local perspective were braided with reflections from the scientific literature. Data were evaluated and scrutinized jointly to produce a picture that was equally correct from both sides. Interestingly enough, the referees on the paper saw a problem in the fact that we didn't have any literature references to rely on when it came to the local representatives' experience-based data. This highlights the need in co-authored publications, to develop acceptance that both researchers and local experts have equally

valid knowledge and perspectives. Both contribute with important pieces to the puzzle for the completion of the picture. The importance of being humble and responsive is valid for both sides.

Ethnobotanical research in literature and archives

In the Northern parts of Scandinavia reside the Saami people, Europe's only indigenous people. Scholars have repeatedly studied and documented their customs and practices through the centuries with different purposes and methods. In one study, a compilation of the documentation of Saami use of medical cures was needed (Tunón 2000). When comparing information in older literature you may get the impression that some cures were more common than they probably were, since the authors have "borrowed" information from each other, rewritten and without citations. Repeated reports in the literature, when investigated further, might in fact have originated from one particular case. We have also experienced that scholars documenting local traditions often seems to have a bias towards describing the more uncommon, "exotic" practices. For instance, when looking at the archives with ethnological records of folk medicine in Southern Lappland, you easily get the impression that one of the most common medicinal plants was mezereon or february daphne (*Daphne mezereum*), a very poisonous plant. In the ethnological material, it is one of the most abundant medicinal plants where it is described for a variety of uses. We find it most likely that treatments with less conspicuous plants have made less impression on the informants and consequently that they are underrepresented in the material. It may be that the informants have focused on more severe illnesses and, hence, many informants mention mezereon.

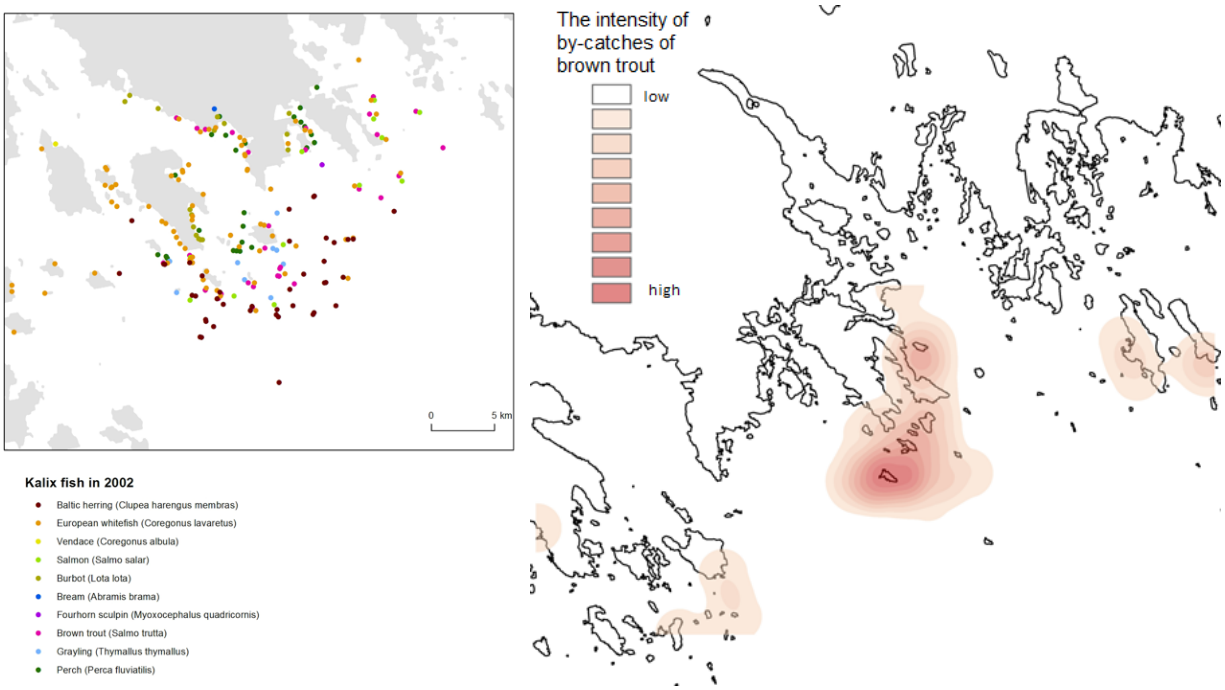

Figure 7.9. Two maps from the archipelago south of Kalix, (left) a map with colored dots depending on the different fish species caught while fishing, and (right) an intensity map over the likelihood to catch the endangered brown trout.

Local reflections on photographs

We have also used historical photographs as a focus of discussion with local people, as a way to acquire knowledge deriving from local traditions that otherwise would not have been known to us (Figure 7.10). This can be done from only a few photographs or by applying systematic methods using several photographs,

showing similar or different motives. People with local knowledge can usually add something to each photograph, but it is difficult to predict how much information they have.

Figure 7.10. Left: Hay harvest in Funäsdalen, mountainous parts of west-central Sweden, 1928. Due to geographical and climatological conditions here, most of the fields were used for hay. Normally the farmer continued the harvest from one field to another and brought home the hay when it was dry enough. In this picture we can see that most meadows are still filled with hay racks, which tells us that the hay was still not dry enough to be stored. An interpretation is that this must have been a wet summer. Right: A farm at Visingsö, Sweden, in late summer, 1933. The harvested cereals were stored in different stacks. Later in the autumn, after the threshing, the straw was kept in new stacks in case the fodder the following year would be scarce.

Plant names, historical habitats and plant use

Plant names can be a gateway into past landscapes, plant use and traditional systems. Names can be descriptive to the plant's characteristics such as taste (acris – bitter), color (album – white), or size (major – large). Many names inform about the main growth places such as "sylvaticum", meaning forest, "pratensis" or "pratense" meaning open land (meadow), and "montanum" for growing in mountains. Species names can also inform about historical plant uses. For example, "tinctoria" signifies plants used to dye textiles, and "officinale", shows that the plants have been used for medicinal purposes (Figure 7.11). This information may also be given in the common names, such as Swedish plant names containing colour "färg-"; färgkulla – *Anthemis tinctoria*, and färgmåra – *Asperula tinctoria.*

Plant names may lead to insight into past times religious beliefs and practices. In Sweden, and internationally, Virgin Mary has been important for the local naming of plants. In German speaking countries there are over 180 different plant species named after her, in Sweden around 60 species are known to have carried names related to Virgin Mary. Plant names including Virgin Mary remind us about folk religion in past times and how important she was for people in their daily lives. It was common to include Mary in prayers and ask for her help, not the least during childbirth (Herjulfsdotter 2013).

Common plant names have often been chosen from the richness of traditional local names and may be very informative. In Sweden, where the traditional landscape has lost most of its traditional land use and habitats, many plants have been forced to survive in other, perhaps less optimal habitats. The names may still inform us about where they used to be common (Figure 7.12). There are a great number of plant names including äng- or slåtter- (hay meadow or mowing), such as ängsskallra – *Rhinanthus minor,* ängskovall – *Melampyrum pratense*, slåttergubbe – *Arnica montana,* and slåtterfibbla - *Hypochaeris maculata.* It may indicate that hay meadows used to

be the main habitat for these species. Another interesting group of species include åker- (arable), which may be a clue that these used to be weeds in arable fields.

Figure 7.11. The plant *Peucedanum ostruthium* has been considered a powerful plant, revealed by its common names in several European languages referring to "master" (English masterwort, Swedish mästerrot). Today, a more or less forgotten plant but historically a commonly cultivated plant which may survive and spread in light conditions to cover large surfaces around old farms and summer farms (as a biological cultural heritage). It has been used in various cures for humans and livestock (hence the Swedish local name "kobot" [cows cure]. Modern research has revealed that the constituents in its root indeed have inhibiting effects on infections, fever and mycobacterial growth. Photo: Anna Westin.

Contributions to Historical Ecology

The wild plant use in the last centuries or even decades might have been more detailed, complex and more general compared to the current use in many of the world's indigenous and especially rural European communities. During the last decades, the erosion of traditional knowledge has accelerated, and especially in our modern technological society where people have lost contact with nature. In many countries, traditional ethnobotanical knowledge is forgotten among most people. It may therefore be difficult for us today to understand the great historical importance of plants for people. Ethnobotanical research, in the past and present, has the capacity to help us better understand historical people and communities through their relations to plants.

Ethnobotanical information can give us details on how different plants were used, including plant taxa that were not subject to documentation in most other sources. An important characteristic of ethnobotany is that it focuses on how ordinary people, including locally consulted experts, have actually used, and related to plants in their everyday lives. This information comes directly from the people using plants themselves, or via another person who met the plant users, through interviews and written documentation. The richness of interactions between humans and the plant world offers insights into the great importance of plants for people. Through research about plant practices and beliefs, ethnobotany gives more life to Historical Ecology than many other sources of knowledge. Having at least some information on the extent and numbers of species of wild plants that a community used in the past, for medicine, food, to organize herding and agricultural practices, construction etc. is highly important, in order to understand the connection and influence ecosystems have played on humans through the centuries.

Figure 7.12. *Rhinanthus angustifolius*, greater yellow rattle, in Swedish called höskallra (hay rattle) which indicates its close connection to hay meadows. The name rattle (also in the Romanian common name clocotici) comes from the rattling sound of the mature seeds, which has been a common indication for the right time to start mowing. This species is one of many phenological indicators for mowing time. Photo: Anna Westin.

Plants have been the most important basis for material culture and used in building constructions, tools, clothes and much more. For example, reed (*Phragmites australis*) has been important for the construction of household parts and covering the roofs of many houses in European countries which had wetlands areas. In Sweden, the bark of birch (*Betula* spp.*)* was also used both for roofing and making baskets, shoes, bowls and other household containers. Willow (*Salix* spp.*)* was used for basketry production and fences. In the past, whole communities specialized in making baskets and other kinds of crafts.

Foraging edible wild plants played an important role in the not-so-distant past for supplementing domestic food resources. In Romania, wild fruit trees such as wild apple trees (*Malus sylvaticus*) and wild pear trees (*Pyrus pyraster*) were important in the past for producing cider-like drinks, or dried and used for human consumption. Other plants that were introduced from the New World like the Jerusalem artichoke (*Helianthus tuberosus*) were semi-cultivated (planted in certain spots and only harvested in autumn) and used for preparing dishes. The slightly toxic plant meadow buttercup (*Ranunculus acris*) was used in some areas of Romania as fresh green soup in spring, the toxins being neutralized during cooking. The list of edible and medicinal wild plants can be extensive. These plants had a significant but varying degree of importance in different communities (see bibliographic resources cited in this chapter).

Another interesting type of knowledge is the linkages between the phenophase of certain plant species and the start of specific agricultural or pastoral practices. This topic shows the importance of wild plants as natural indicators for human activities. In many regions of Romania, the flowering of blackthorn (*Prunus spinosa*) most commonly called spin or porumb (meaning corn), signaled that the cultivation of corn (*Zea mays*) can start. When the hay rattle (*Rhinathus minor, Rhinanthus spp.),* has mature seeds that sound like a rattle, has been an indicator for the start of mowing season in Romania (Figure 7.12.). This indicator is still used in many rural communities from Romania (Ivaşcu et al. 2016, Iuga 2016). The sounds of hay rattle have indicated the start of mowing also in other countries like Sweden (Tunón et al. 2015) and England (Burton & Riley 2018). There are many other practices relating to plant phenotypes, showing examples of the seasonality of traditional human economic activities known from history and current rural communities.

Plants have also had an important role for decoration in houses and in customs (Figure 7.13). Magic and divination were important in people's everyday lives, and plants have been important in foretelling or affecting the future. Ethnobotanical knowledge still known in Sweden today is the practice of getting information about a future husband by placing seven or nine kinds of flowers under the pillow during Midsummer night. The girl had to follow certain procedures in order for the divination to work, for example picking the flowers in silence, climbing seven fences, and speaking to no one during the entire evening.

Figure 7.13. Left: Wreath of flowers, predominantly made of yellow bedstraw (*Galium verum*) called sânziana in Romanian, affixed to a gate for protection in Banat on the eve of Saint John's Day (24 June). The yellow bedstraw is usually collected on the 23 June, mostly by women and children who also make the wreaths. The wreaths and braidings are used in different apotropaic and divinatory practices around Romania on the Day of Saint John. Photo Cosmin Ivaşcu. Right: A silver fir tree (*Abies alba*) adorned with flowers and round bread is an important symbol of the milk measurement custom in Maramureş. This custom marks the advent of summer grazing and the movement of sheep herds to the summer pastures. The fir tree symbolizes the tree of life in Romanian culture. Photo Cosmin Ivaşcu.

Do's and don'ts, benefits and shortcomings in ethnobotany

Ethnobotanical studies can provide unique insights into how people relate to plants, whether it's about practical usage or beliefs. The interdisciplinary approach provides knowledge about both the plants, the people, and their lives, both today and in the past. However, like for all subjects, there are limitations. The strengths and weaknesses of the different methods have been described above. Similarly, it is important to recognize that knowledge, both found in books and in people's own understanding, is a mixture of local and imported, historical and newly acquired knowledge. It is important to be aware that different people possess different depths of knowledge. People who have practical experience, for example, in making baskets from spruce roots, have a completely different understanding of the craft than those who have only observed the process or maybe only have used the baskets. There may also be informants who pass on stories about the craft, but without having either made or used the baskets themselves. Therefore, it is crucial to be informed about the informants' level of knowledge in order to assess their answers. When it comes to practical, experience-based knowledge, it is also important to acknowledge that different people experience and remember situations differently and will describe them differently. Also, we need to acknowledge that remembering is a process, not an objective recall of events that is stored in the brain. In fact, memory research shows that memory is not something we have, rather something we do (Hilding-Rydevik et al. 2018).

> "The indigenous people, or the farmer, knowing their environment, appear to employ traditional techniques that harmonize the need for management and conservation of resources. However, this is not always true. It is a mistake to sustain the belief that all the so-called traditional cultures have harmonious relationships with nature, because there are studies that definitely suggest the opposite," (Albuquerque et al. 2016 p. 20)

It is easy to fall into the belief that the locals always have a good and environmentally friendly relationship with all other species in nature, when in fact traditional communities have also contributed with negative impacts such as over-harvesting, local soil depletion or pollution. We suggest having an open mind and a non-value-approach to all kinds of information that is collected during research, and to be highly aware of this aspect during research analyses, discussion, and the possible use of the results.

Necessary training

Basic knowledge in botanical and social science methods are equally important for ethnobotanical studies based on archival knowledge, literature, or field interviews. In order to communicate with and understand local experts, it is mandatory to have some sort of training in botany, even if the researcher's background is in social science. Without botanical knowledge it will be impossible to understand which plants people are talking about. It is also necessary to be able to identify plants in the field, to understand when different names are used for one plant and in general to be able to ask relevant questions. It is equally important that the researcher, if they have a background solely in natural sciences, learn basic skills and techniques of social sciences. For example, being able to conduct high quality interviews with individuals or groups of local people, or spending prolonged periods of time within a local community (e.g. participant observation), and invaluable to gather data on plant use in certain areas.

Conclusions

Ethnobotany is a multifaceted research field, deeply interdisciplinary and often transdisciplinary involving local experts in rural communities. The researcher conducting ethnobotanical research will develop skills about humans, nature and their relationships through time, which is a very rewarding, however complex field of knowledge. Ethnobotany is an important part of Historical Ecology, where it can contribute with research methods and human-nature insights on a level of detail that few other disciplines work with. The use of plants by indigenous and rural communities for food production, medicine or other economic and cultural activities can show the extent to which these societies depended on natural resources for their development and at the same time how they have influenced nature. Ethnobotany can be an invitation to a more intimate relationship between people and species other than humans, which is not the least important both for sustainable development, nature conservation and cultural heritage. Simultaneously, the information recorded by ethnobotanical research can be considered as historical documents telling us about the knowledge of certain communities in the present and/or the past.

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