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Economic and Socio-Cultural Importance of Edible Wild Species

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ABSTRACT: *Every goods and service in the world has an economic importance and this importance is often measured by its value. Although this measure is often expressed in terms of money, it is difficult to express many services and resources with money. One of them is biodiversity and its services. There is a need to be aware of the economic value to ensure sustainable maximum benefit from all limited resources of biodiversity. Knowing the economic value of biodiversity is important in terms of sustainable development as well as ensuring sustainable use. Sustainable use is defined as "the use of biodiversity elements in a way of use that does not lead to a decline of biological diversity in the long term and thus biodiversity retains its potential to meet the needs and aspirations of present and future generations". In order to evaluate biodiversity economically, it is necessary to diversify the benefits, the goods and services offered to us, and to carry out an economic evaluation for each of them. Edible wild species are an important part of biological diversity. In addition to the services offered by other species, edible wild species also contribute to human nutrition. Especially in rural areas, edible wild species are among the easily accessible and low-cost foods. In the place where they found their consumption differs by the social and cultural structure of the society. Determining sustainable use and development strategies for a product whose supply and demand quantities and economic value are unknown may cause misapplication. Therefore; to enhance the economic and socio-cultural research and particularly to do the gender-sensitive value chain analysis are needed.*

Keywords: *Biological diversity, edible wild species, economic importance of biodiversity, socio-economy, sustainable use.*

Yenilebilir Yabani Türlerin Ekonomik ve Sosyo-Kültürel Önemi

ÖZ: *Dünyada her mal ve hizmetin ekonomik bir önemi vardır ve bu önem çoğu zaman ona biçilen değerle ölçülmektedir. Bu ölçü genellikle parasal olarak ifade edilmesine rağmen birçok hizmet ve kaynağın parayla ifade edilmesi oldukça zordur. Bunlardan biri de biyoçeşitlilik ve sunduğu hizmetlerdir. Biyoçeşitlilik gibi tüm sınırlı kaynaklardan sürdürülebilir maksimum faydanın sağlanması için ekonomik değerinin bilinmesine ihtiyaç bulunmaktadır. Biyolojik çeşitliliğin ekonomik değerinin bilinmesi, sürdürülebilir kullanımının sağlanmasının yanı sıra sürdürülebilir kalkınma açısından önem taşımaktadır. Sürdürülebilir kullanım, ‘‘biyolojik çeşitlilik unsurlarının, uzun dönemde biyolojik çeşitliliğin azalmasına yol açmayacak şekilde ve oranda kullanımı ve böylece biyolojik çeşitliliğin bugünkü ve gelecekteki nesillerin ihtiyaçlarını ve özlemlerini karşılama potansiyelini muhafaza etmesi anlamındadır’’, şeklinde tanımlanmaktadır. Biyoçeşitliliği ekonomik açıdan değerlendirebilmek için öncelikle sağladığı faydaları, bizlere sunduğu mal ve hizmetleri çeşitlendirmek ve her biri için ayrı ayrı ekonomik değerlendirme yapmak gereklidir. Yenilebilir yabani türler, biyolojik çeşitliliğin önemli bir parçasını oluşturmaktadır. Diğer türlerin sunduğu hizmetlerin yanı sıra insan beslenmesine de katkı sağlamaktadırlar. Özellikle kırsal alanda yaşayan halkın kolay ulaşılabilir, düşük maliyetli gıdaları arasında yer almaktadır. Tüketimleri yetiştikleri yöredeki toplumun sosyal ve kültürel yapısına göre şekillenmektedir. Arz ve talep miktarı ve ekonomik değeri bilinmeyen bir ürün için sürdürülebilir kullanım ve kalkınma stratejileri belirlemek yanlış uygulamalara sebep olabilecektir. Bu nedenle; ekonomik ve sosyo-kültürel araştırmaların arttırılmasına ve özellikle cinsiyete duyarlı değer zinciri analizlerin yapılmasına ihtiyaç bulunmaktadır.*

Anahtar Sözcükler: *Biyolojik çeşitlilik, yenilebilir yabani türler, biyoçeşitliliğin ekonomik önemi, sosyo-ekonomi, sürdürülebilir kullanım.*

INTRODUCTION

All goods and services in the world have an economic importance and this importance generally is expressed with money. The economic importance of biodiversity is measured by the monetary value attached to it, too. However, it is very difficult to measure many services or resources i.e. biodiversity with money. In order to demonstrate the economic importance of biodiversity and edible wild species that have an important place in biodiversity, it is first necessary to define biodiversity and the services that it offers and to show the importance of these goods and services.

Biodiversity is defined as the diversity of plants, animals or other living organism in a specific region or area. It is also described as all living organisms and the diversity of the habitats of these organisms and their relationships with each other and the environments they live in (Wilson, 1988; Primack, 1995; Mayer, 1995).

Biodiversity is divided into four categories as genetics, species, ecosystem, and functional diversity. (Cepel, 1997; Nunes *et al*., 2001a; Ulgen and Zeydanlı, 2008). Genetic diversity means diversity within species; species diversity means number of species; ecosystems diversity means the diversity of all living things and their habitats; and functional diversity means functional dimension of biodiversity (Mayer, 1996; Nunes *et al*., 2003). Functional diversity, biodiversity and genetic diversity have become a genetic resource for countries.

Having drawn attention since the 1980s, the concept of biodiversity, including the diversity of species, genes, ecosystem and ecosystem functions, has begun to develop in a certain social, economic and cultural context. The fact that biodiversity aims to provide more benefits to humans by using modern biotechnology gene resources has maximized the benefits of biodiversity and its components, and this has made it gain popularity (Demir, 2009). The concept of "Biodiversity Conservation", which has been widely used in recent years, should be regarded not only as a popular terminology but as an awareness trend.

When the problems arising from environmental change have been more explicit, we have become aware of how much we depend on the wildlife in a wide range. (Edwards and Abivardi, 1998). And this awareness has led us to conserve the wildlife; search for ways to use the sources sustainably and investigate what measures should be taken.

Although the issue of environmental protection has existed for many years, it has become more popular due to the increasing pressure on the environment. Priority should be given to the re-establishment of biodiversity and solutions to improve the function of ecosystem in seriously damaged areas. Environmental economy plays an important role in accomplishing this task (Edwards and Abivardi, 1998).

Being aware of the economic value of all limited resources such as biodiversity is great importance in terms of sustainable development. The concept of sustainable development has emerged as the expression of a balance intended to be established between society and environment from the 1970s onwards (Evin, 2005). Sustainable development is a model that addresses ecological balance and economic growth together, ensures the efficient use of natural resources gives importance to environmental quality and meets the needs of today's generations without jeopardizing the ability of future generations to meet their own needs. (Alagoz, 2007). Sustainable use comes into prominence in sustainable development. In the Convention on Biological Diversity, sustainable use is defined as follows: "The use of biodiversity components in a way and proportion that will not cause a reduction in the biological diversity in the long run and, thus, maintaining the potential of biodiversity to meet the needs and aspirations of present and future generations". Development efforts focusing on production and economic efficiency have been replaced with a more balanced development model with social objectives such as income distribution and poverty reduction. The environmental disasters that began to show their impact after the 1970s have brought to the world agenda the notion that protecting the environment is an important element of development (Gurluk, 2010).

For all these reasons, it is quite important to know the economic value of biodiversity. The total value of goods and services provided by biodiversity is called "Total Economic Value". There are different approaches and classifications about the goods and services that are the components of total economic value. The general view is that biodiversity needs to be analyzed with an integrated multidisciplinary approach that takes into account the differences between its components. The analysis of biodiversity concerns both environmental and social sciences. To build ecosystem dynamics of the model, human factor, economic activities and the relations between these must be examined.

Alternatives to the methods used in the researches have been offered. The most important reason behind this is the challenges faced in the monetary evaluation of many services and the search for solutions to these challenges. Although monetary value estimates explain the importance of biodiversity and have a social value in the positive direction, the current economic value estimates cannot be used to measure the passive or unknown values in general; therefore, they should be considered only as a perspective and the best lower limit values (Gowdy, 1998; Nunes *et al*., 2001b; Gowdy and Salman, 2010).

Species within biodiversity offer different services for human welfare. Edible wild species, which have an important place among these species, make more contributions to the human and animal nutrition, the income of the rural people and the socio-cultural structure in addition to the services provided by other species.

Today, edible wild species are increasingly becoming more valuable in terms of healthy nutrition. Increase in population, orientation in healthy and natural food, diversity in demand, problems caused by an unbalanced and inadequate nutrition and many health problems such as obesity, chronic common diseases and dieting have led people to feed on different foods. This situation increases the pressure on the species as well as the interest in edible wild species. Furthermore; excessive and unconscious collecting, urbanization, industrialization, chemical use and so on pose a great risk for edible wild species.

Turkey is very rich in terms of edible wild species and these species are extensively consumed in the rural areas of all regions. In this study, the reasons why edible wild species are important in Turkey in terms of economy, what services these species offer us and their relationship with socio-cultural structure have been examined. It is seen that there has been an increase in the researches on the economic importance and evaluation of biodiversity worldwide and Turkey in the recent years. These intensive discussions and researches on biodiversity economics have also entered the literature of environmental economics (Nijkamp *et al*., 2008). In this study, these researches have also been examined in detail and the economic importance of edible wild species has been presented in a holistic approach.

MATERIALS AND METHODS

The materials of this study consist of the observations obtained from scanning of the main sources and the field surveys conducted within the scope of "Biodiversity for Food and Nutrition Project". The sources on the economic assessment of biodiversity, concepts of sustainable development and ethno-botanical researches, socio-cultural structure and its relationship with edible wild plant species have been examined.

Within the framework of "Biodiversity for Food and Nutrition Project" that aims to conserve the appropriate biodiversity and ensure the sustainable use for food and nutrition, it is aimed to contribute to increasing the welfare of the users and improving their safety. Within the scope of the project, the process from the collection to the consumption of 40 edible wild species and 3 local varieties in the Aegean, Black Sea and Mediterranean Region which have been determined as the research area has been examined in detail. Researches have been carried out with the monograph method in order to provide preliminary data for value chain analysis studies. In this study, the data have been compiled by means of surveys.

In this study, some of the results obtained from the project researches have been briefly evaluated. During the observations made in the field and survey researches and the studies on the

sustainability of the species; the goods and services provided by edible wild plant species and the socio-cultural interactions and a set of challenges faced in the economic assessment of biodiversity have been emphasized. The marketing channels of edible wild species have also been determined by evaluating the data obtained from other researches.

RESULTS AND DISCUSSIONS

Goods and services provided by edible wild species

Edible wild species constitute a market value in terms of the goods and services they offer. This value has direct and indirect contributions to the economy. The sum of the values provided by the direct or indirect contributions of the edible wild species in terms of ecological, socio-cultural and economic also shows the total economic value. As many services and contributions cannot be evaluated monetarily, it is quite difficult to calculate the total economic value clearly. This value can offer us only an estimate. The direct or indirect contributions provided by the species are analyzed according to their qualities through different methods after being identified according to their service classes (Adamowicz, 1995; Goulder and Kennedy, 1997; Edwards and Abivardi, 1998; Nunes *et al*., 2001a; Farber *et al*., 2002; Limburg *et al*., 2002; Howarth and Farber, 2002; Wilson and Howarth, 2002; Hawkins, 2003; Pak *et al*., 2010; Mouysset, 2015).

Even though there are different classifications encountered in the researches, biodiversity services are categorized under four sub-headings as production function, habitat function, information function and regulatory service function under the main headings of in-use and out-of-use services (De Groot *et al*., 2002, De Groot, 2006).

According to the use of edible wild plant species, the goods and service value functions are classified as follows (De Groot *et al*., 2002).

Their values in terms of use

- **Direct Use** [Direct consumption (on the market)]
  - ***Production Function Value (Directly consumed)***
    - Commercial use
    - Food resources (for human and animal nutrition)
    - Raw material
    - Use in conventional medicine
    - Medical Resource
    - Use in biotechnology
    - Genetic resources
  - ***Information Function Value (without direct consumption)***
    - Cultural and historical
    - Aesthetic
    - Artistic and spiritual
    - Scientific and educational use
    - Recreation and tourism (eco-tourism and gastronomy tourism)
- **Indirect Use** (the service provided for the functioning, organization and protection of the ecosystem)
  - ***Habitat Value***
    - Shelter function
    - Biodiversity
    - Endemic diversity
    - Protection
  - ***Regulatory Service Value***
    - Contribution to the regulation of atmospheric gases
    - Contribution to the regulation of climate
    - Contribution to food chain
    - Contribution to water supply and resource conservation
    - Contribution to waste control and regulation
    - Contribution to soil formation
    - Contribution to prevention of erosion
    - Contribution to biological control
    - Contribution to pollination

Option value (the value that reflects the anxieties about which purposes these types may be used in the future). Option value is considered both in use and out-of-use value (Atasoy *et al*., 2014).

Out-of-use value (the iconic, cultural or spiritual values that people give themselves even though they are not protected for the use of the future generations and they have no benefits).

- Heritage value
- Existence or inner value

Some of these values are abstract and subjective. However, they are the values that guide people's willingness to protect. The general view is that modeling and multidisciplinary studies are needed since many services or goods cannot be expressed in monetary terms (Turker *et al*., 2001; Demirayak, 2002; Toksoy *et al*., 2003; Erdem, 2004; Erten, 2004; Polasky *et al*., 2005; Nijkampa, 2008; Demir, 2009; Faydaoglu and Surucuoglu, 2011; Mouysset, 2015;).

Why is it important to be aware of the economic value of edible wild species?

In addition to the use of edible wild plant species in human nutrition; the most prominent features that show its importance for the economy are being tradable and a source of income for rural people, its contribution to tourism and socio-cultural structure and being used as low-cost animal feed.

Increasing demand for edible wild species and their increasing value thanks to their commercial place put a great pressure on the species. Also, destruction of the nature by extreme and unconscious collecting, habitat degradation, climate change, invasion of alien species, pollution and so on affect wild species significantly (Hood, 2010; Karagoz *et al*., 2010; Anonymous, 2016; Karagoz *et al*., 2016). A part of edible wild species is close to settlements and easily accessible. For this reason, human factor is the most important risk for edible wild species. Some measures must be taken in order to protect these species, meet the increasing demands and make them sustainable. Becoming aware of the economic value and importance of edible wild species will ensure:

- ✓ protecting them more efficiently in nature
- ✓ the sustainability and development of the businesses that collect, process or trade these species,
- ✓ the determination of more effective policies and strategies,
- ✓ raising consciousness and awareness in the society,
- ✓ the use and sustainability of these limited resources so as to provide the highest benefit

As edible wild species are provided from nature by collecting, it is not known how much it is collected, how much of it is marketed or consumed. Not knowing the amount which is subject to supply, demand and commerce on product basis is the most important problem in the management of their sustainable use as well as the determination of their economic contributions. There are no official statistics on these species in Turkey. There are only statistical data on some tradable species consumed for medical purposes.

Importance of Edible Wild Species for Human Nutrition

Edible wild species constitute a general source of a large part of the species produced today. Wild forms also have an important place in direct consumption. They are important in terms of being low cost food that is easily accessible, having high nutritional value, diversity in diet and nutrition and so on.

They are among low cost and easily accessible foods especially for the people living in rural areas. However; increase in population, diversity in demand such as feeding on healthy and natural food, unbalanced and inadequate nutrition, health problems such as obesity, common chronic diseases and dieting have directed people to the search for different nutrition resources. With this trend and the effect of migration from the rural areas, consumption has now shifted to urban areas, too. We can observe this in the number of edible wild species sold in district markets and the increase in their quantity.

The locals collect the plants primarily from their own gardens or nearby places and consume them as main course or salads at main meals. Among the species that are extensively consumed in every region of Turkey, especially in the Aegean and Black Sea, the traditional species peculiar to that region are consumed more commonly. Frequency, quantity and type of consumption vary according to the social and cultural structure of the society and the habits of the people in the region. They are mostly consumed as cooked, though it varies according to the species. They are also consumed

as raw, dried, salted or pickled (Aktan and Bilgir 1978; Duran, 1998; Simsek *et al*., 2002; Simsek *et al*., 2004; Akan *et al*., 2005; Cakilcioglu and Turkoglu, 2009; Yapici *et al*., 2009; Altay and Celik, 2011; Faydaoglu and Surucuoglu, 2011; Ozturk and Olcucu, 2011; Yaylagul, 2011; Ozgen *et al*., 2012; Akan *et al*., 2015). Commonly consumed species are frozen as raw or boiled, and kept for consumption in the winter months.

Edible wild plant species are rich in fiber, protein, vitamins and minerals as well as being alternative to the species in the cultivated production. (Bilgir and Aktan, 1978; Cook *et al.,* 1998; Yıldırım *et al*., 2001; Alarcón *et al*., 2006; Yang *et al*., 2009; Kim *et al*., 2013). Due to its importance in terms of health, its high nutrient content and its contribution to the Mediterranean diet, the interest in edible wild species in the world is increasing day by day. (Garcia-Herrera *et al*., 2014).

Their importance in terms of the Contribution to Household Income

Edible wild species directly or indirectly contribute to the income of the rural people. They contribute directly to those who collect and sell the species and indirectly to the household income derived from their contribution to eco-tourism or gastronomy tourism. Products with high commercial value are the main source of income for many households and people continue to do this job as a profession. They are one of the major sources of income for subsistence family businesses engaged in farming. They are especially important for women living in the rural area. It is the women who collect, process or market many species. In the pilot areas researched, it has been determined that collectors, mostly women, contribute to the family income by selling the species they collect from the gardens, fields, forests, lake sides, sea sides and even rocky areas within or outside the village in local markets. In the early hours of the morning, they go to the nearby collection areas on foot and to the remote areas by riding animals or motor vehicles. After collecting the species required to be freshly consumed according to the needs of the market and their home in the amount they can carry; they clean, sort, bond and strip them according to their characteristics and then sell in the local market. They sell their products not only in a single market, but also in other markets established in the nearby areas. They go to the markets about 4-5 couples a week.

The situation is slightly different for processed products. After the phases of collection, sorting and processing, they are sold directly or through wholesalers. Furthermore, it has been seen that the collectors or wholesalers send them to the district markets in the cities by bus or cargo in order to meet the demands of the consumers who have migrated to that city or other cities. Due to the gathering of crowded migrant groups in many neighborhoods in the cities, they try to keep the traditions of these people alive in these areas. People can find the products peculiar to their regions in these markets established 1-2 times a week. These products bring revenue to all actors taking place in the chain during the phases of collection, marketing and consumption.

Raising awareness of the people who earn income from these species for the protection and management of biodiversity will increase their income; and taking measures to ensure sustainability is important for rural development. Rural people are the principal key element in protecting these species in the nature. There is a need for precautionary measures to increase their awareness on the benefits of biodiversity, the protection of these species on-site and growing the species that can be cultivated in small areas and, briefly to ensure the sustainable use.

Being tradable

Most edible wild species are sold as unprocessed mostly in local markets and, in small quantities, in district markets. Some of them are traded as processed or unprocessed products in national and international markets. In the local and district markets, many wild species are sold for medical and gastronomic purposes or as tea and spices (Polat *et al*., 2012a, b). International markets mostly consist of species consumed for medical purposes.

The higher the income obtained from the tradable species is, the more the pressure on the species increases. Therefore, some species are at the danger of extinction. For example, the market sale price of "golden thistle" (*Scolymus hispanicus L.*) in the Aegean region, one of the research areas, is higher than other species. Collectors of blessed thistle desire to sell more in order to earn more. It has been observed that the density of the species has decreased in the areas nearby the village; people go to the remote collecting locations by vehicles and collect a higher amount of species. The same applies to the species "eastern borage" [*Trachystemon orientalis* (L.) G. Don] in the Black Sea Region. Therefore, it is necessary to concentrate on the study of cultivation of edible wild species and take measures in order to protect these species in the wild.

Although there are some exceptions, some collectors tend to regard the areas where the species grow as their own as their income from them increases and they try to protect that region.

Some of the wild species are consumed as processed. It has been observed that this sector has also improved today. They are sold as pickled, canned, frozen or raw material. Furthermore, the increase in demand has also improved the e-commerce of these species in the electronic environment. Platforms where collectors, processors, sellers and consumers gather together have been formed. There is a marketing phase for 2-3 months as of the time the species first appear. The consumer can request the product directly from the collector at the desired amount.

Local people constitute the collectors. Some of the sellers in the district markets collect some species by themselves. The mediators / wholesalers are those who sell products to the district markets from the villages; the processors are the people who collect the species or the processing industry for the other people in the village or the species that can be used as food raw material. Although the marketing channels of edible wild species differ according to the regions and species, the majority of them directly reach to the consumers from the collectors. While collectors sell some products in local markets, some of them are sent to the district markets through the mediators/wholesalers (Figure 1). In some areas collectors sell their products on mobile stalls in the street alleys.

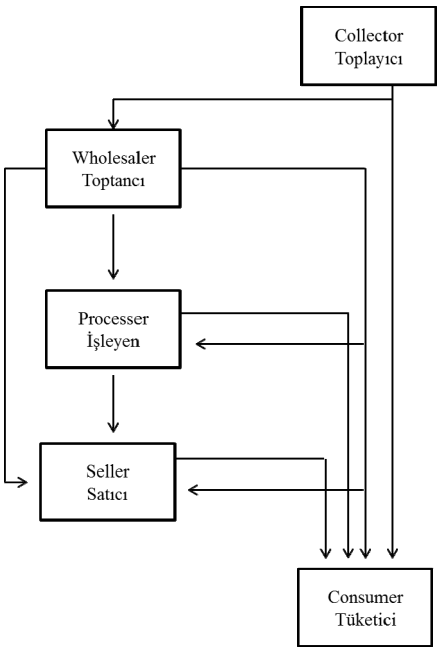

Figure 1. Marketing channels of edible wild species.
Şekil 1. Yenilebilir yabani türlerin pazarlama kanalları.

It has been determined in market surveys that large grocery stores place on their countertops particularly the species with a tendency in a sustainable production or branding, while they prefer to provide the species that can be cultivated through contracted production.

Sale prices of the species vary depending on supply, demand and recognition. Prices are high the first and last time when these species are available in the markets and low during the interim period. Prices in local markets are based on the prices of the previous year, the prices cultivated forms that can be an alternative and consumer demand.

Their importance in Animal Feeding

The collectors of edible wild species in the rural area have a low-income level; the majority of them

do this job as a subsistence family business. They feed a small number of cattle or sheep/goats for domestic needs. These collectors feed the animals with the remaining waste after cleaning and removing the herbs they collect and make use of the waste as a low-cost feed source. Furthermore, most of the edible wild species are used directly in feeding animals. The animals are put out to the grass in the wild or fed with the species collected.

Their importance in terms of contribution to the tourism

Tourism is as a strong sector that can eliminate the regional income imbalances and this sector's share on the economy continues to increase. In the age of information technology, people's passion for travel leads to having more conscious tourists. Food culture that varies form one region to another draws the attention of the visitors and thus gastronomic tourism, which has been formed in this direction, takes its place as an element of touristic attraction among the types of tourism. For the tourism of a country, the cuisine of that country is one of the important criteria in the tourists' selection of place. The wild herbs growing according to the geographical characteristics of the region and the meals made from these wild herbs also have an important place in the culinary culture of a country or a region (Comert and Ozkaya, 2014).

Wild species are one of the focal points of tourism both in terms of visuality, commerce and nutrition. In addition to being a part of the cultural and traditional structure of the regions for centuries, they are also an important part of the regional tourism. For example; Aegean herbs and Alacati Herbs Festival, Black Sea dishes, Mediterranean cuisine offer quite attractive alternatives for tourists. They have also been subject to movies, documentaries, photographs, paintings and folk songs.

Some markets separate from the others in terms of their historical background, spatial size and variety of exhibited products, and become a product of tourism (Ataberk, 2010). Local products are offered to the public in these markets where local producers and local consumers gather together. Alacati, where Aegean herbs which have become a tourism product are exhibited, is the best example for this. The participation in the Alacati Herbs Festival continues to increase every year; local and foreign tourists show a great interest to this festival. It has become a residential area that improves itself in many ways, boost the income of local people and create new jobs. Edible wild herbs are also included in the menus of the restaurants and touristic hotels in this place. They have also started to take part in the menus of touristic hotels in the Mediterranean region.

The participation of individuals in tourism varies according to their income, education level, age, gender, nutrition and health status. Considering that most of the long-time tourists, in particular, eat their meals at these accommodation places or restaurants, it is important to include the meals made from the edible wild herbs in the menus of these places (Kozak, 2014, Karaca *et al*., 2015).

Medical Use

Wild species were used in the treatment of many diseases by many local people for centuries and they are still in use. In addition to being used as a raw material for medicines, it is also densely used in simple treatments in the field of conventional medicine.

However, as a result of the population decrease in the villages due to migration, the information on their use in the field of conventional medicine is facing extinction together with the small number of the elderly population remaining in the village. Furthermore, the young population has no interest in these species. It is very important to record the details of their use in the folk traditions so that this information is not lost (Akan and Bakir Sade, 2015).

Importance of Socio-cultural Structure of Biodiversity

Socio-culture can be expressed as the beliefs, customs, traditions, habits and rules formed by the interaction of people in a community and the

relationships emerging from the effect of this structure on the lives of people. Social and cultural approaches, beliefs, traditions in a society constitute the socio-cultural environment. In short, it is the society and institutions where the individuals interact with the culture they live in.

People in Turkey have been acquainted with many cultures since ancient times, become neighbors and lived with the people from these cultures. Along with these cultural exchanges; factors such as the abundance of food varieties, customs and traditions have helped to create a rich cuisine. Human nutrition patterns are shaped by the cultural, geographical, ecological and economic structure and the historical process. This culture, defined as nutrition culture, includes the subjects of how people choose what to eat, when the selected food is consumed, how the food is prepared and cooked and varies depending on the eating habits of the community in which the individual lives (Kose *et al*., 2010).

The process of the edible wild species from collection to consumption is mostly shaped by the socio-cultural structure. The consumed species and their ways of collection, cooking, and how they are consumed vary among different cultures.

In the Black Sea Region, the majority of those who collect and sell the wild species are women. In the Aegean Region, although female labor force is a little more, the work is carried out in cooperation with men. Species are generally known by the rural people in the area where they grow. A large part of those who consume or collect these species is of middle age. This is a feature of the socio-cultural structure.

When we examine the differences in the consumption patterns, we can see that consumption is more favorable as salad with olive oil or as raw food in the Aegean and Mediterranean regions and as main dish with eggs or plain roasted in the Black Sea region. Although consumption patterns are different according to the species, they vary mostly according to the traditional habits of the people in the region where the species grow.

Interaction between humans also ensures the intercultural interaction. While people migrating to different cities continue their culture, they also introduce their own cultures and learn the culture of the community they are in. This interaction is particularly important in the recognition and ensuring the prevalence of edible wild species. Sale in the Mediterranean region of a species that grows in the Black Sea Region and is a traditional gift of that community is a result of socio-cultural interaction.

Socio-culture also has adverse effects on edible wild species. It is possible to see these effects more clearly in the rural area. Young people who come from other cultures for marriage or different reasons do not know these herbs or consume them because they are not used to, and therefore the nutrition culture in rural areas is gradually changing.

The effect of edible wild species on the socio-cultural structure and the effect of the socio-cultural structure on these species and the value of the benefits derived from this interaction cannot be financially expressed in a clear way. This situation should not be understood as they have no economic value. Knowing the socio-cultural structure helps us evaluate the edible wild species from a socio-economic perspective, determine and implement the right strategies by examining the elements that affect them.

The diversity resulting from the socio-cultural structure and the information obtained from this diversity is a cultural heritage for every country. One of the valuable pieces of this heritage, called traditional knowledge, is the use of traditional wild species. It is of great importance to hand the traditional use down from generation to generation and records it in order to ensure a sustainable consumption.

CONCLUSION AND RECOMMENDATIONS

Biodiversity is a powerful factor and a driving force in sustainable development for countries. Edible wild species have a significant share in the human nutrition within biodiversity, increasing the

welfare of the rural people, ensuring a balanced and healthy nutrition and development of tourism.

The anxieties arising from the increase in population and severe destruction in the nature have brought about the question of how we can benefit from the nature in a more sustainable way. This question has increased the interest in edible wild species, consumption of which is limited in the regions as part of the traditional structure. However; it is necessary to develop policies that will ensure that these species are conserved and harvested, consumed and used in a sustainable manner before bringing them into the use of other people. It is thought that social and economic benefits can be increased in this way (Gul, 2014).

The study shows that environmental, social and economic elements are intertwined in edible wild species, the focal point is the economy and there is a close connection and a great interaction between them. The evaluation to be made regarding the sustainability based on this interaction through socio-economic point of view has two benefits. Firstly, it will reveal the effect of socio-economic factors on the loss and diversity of species. And secondly, it will show the socio-economic contribution provided by the species.

There is a different service and contribution of each species in the nature. A wild species we consume can play an important role in maintaining the existence of another species. A disturbance in the chain can cause the rings of the whole chain to break over time. Regarding the economic value of a species, we can say we may face results that can never be changed. It has been found that the rings of this chain weaken and decrease in the nature as the market value of the tradable species increases. The risk for species, roots or onions of which are consumed, is much greater. While some of them are severely decreasing, some are facing the danger of extinction. Society's awareness and knowledge level must be raised in order to reduce the risk and ensure a sustainable use.

Identification and economic expression of the edible wild species' elements that contribute to human welfare is an important trigger in the development of conservation consciousness. Another important trigger is the emotional (instinctual) factors. The role of emotional factors is much greater than ecological, economic and social factors at the core of conservation, (Martín-López *et al*., 2007). As there is not a monetary criterion, it is very difficult to evaluate these species. However, emotional factors have a significant influence on taking protection measures. Therefore, it will be useful to take into account the other non-monetary criteria derived from social-psychology and human ecology disciplines.

Furthermore, socio-cultural structure is an important issue that needs to be considered in the identification and implementation of sustainable development strategies, even though it cannot be monetarily expressed. Especially when considering the importance of edible wild species in terms of health, it is important to evaluate the nutritional factors in detail in addition to environmental, socio-economic and socio-cultural factors for a sustainable diet.

To summarize the importance of contribution to be made by the evaluation of biodiversity on a micro and macro level; at the micro level, it contributes to revealing the complex role it plays in the process of increasing human welfare while providing information on structure and operation. At the macro level, it enables us to create indicators related to human welfare and sustainability by allowing us to monitor how the change resulting from the human activity is affecting the integrity of human beings and natural environment (Freeman *et al*., 2003; Ozhanci *et al*., 2011).

When the goods and services offered by edible wild species have been examined, it has been determined that a significant portion of the services cannot be expressed in monetary terms and a service or goods emerging from a result of a link and interaction between the services comes into existence with the effect of another service. Therefore, a multidisciplinary approach should be developed to form a common mindset for modeling and evaluation.

The studies on putting forth the economic feasibility of edible wild species are limited even though they are densely used in Turkey. There is a need for multidisciplinary value chain analyses that can increase the economic and socio-cultural researches and analyze the process from environmental value to consumption value well. Regarding the species-based studies of regional and edible wild species, it is useful to conduct gender sensitive value chain analyses by taking into account the socio-cultural structure.

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