

Chestnut as a Non-Wood Forest Product



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# Foreword

This report titled "Chestnut as a Non-Wood Forest Product" has been prepared by the Chamber of Forest Engineers of Turkey (OMO) within the scope of the Letter of Agreement (LoA) namely “Provision of Technical Guidelines on Sustainable Management of Non-Wood Forest Products (NWFPs) and the Status Reports on Specific Selected Products” signed with the Food and Agriculture Organization (FAO) on December 20, 2019.

The report has been prepared in close collaboration with the relevant stakeholders, particularly the Department of Non-Wood Products and Services (DNWPS) of the General Directorate of Forestry (GDF). The results were also discussed with stakeholders during “consultations meetings with three different regions of Turkey, update meetings with responsible national institutions and consultation workshop with respective stakeholders”.

The main findings of chestnut are:

* In Turkey, there are 262 045 hectares of chestnut forests in the state-owned areas.
* Most of the chestnut trees are found in state-owned forests but the nuts are generally harvested in the orchards established in privately-owned agricultural lands.
* In 2019, a total of 72 655 tons of chestnut fruits were harvested. 14 225 tons of chestnut fruits were exported, and in return, approximately 36 million USD export revenue was obtained. On the other hand, approximately 2 tons of chestnut fruits were imported in the same year.

# Acronyms and Abbreviations

OMO Chamber of Forest Engineers of Turkey

Communiqué of NWFPs Communiqué on Inventory and Planning of NWFPs and Production and Sales Principles

DNWFPS Department of Non-Wood Forest Products and Services of GDF

ENDP Eleventh National Development Plan (2019-2023) of Turkey

EuroStat European Statistical Office

FAO Food and Agriculture Organization of the United Nations

FRA 2020 Global Forest Resources Assessment 2020

GDF  General Directorate of Forestry of Turkey

ha hectare(s)

INCREDIBLE Project Innovation Networks of Cork, Resins and Edibles in the Mediterranean Basin Project

LoA Letter of Agreement

MAF Ministry of Agriculture and Forestry of Turkey

MT Ministry of Trade of Turkey

NWFP Non-Wood Forest Product

OWL Other Wooded Land

StarTree A pan-European project to support the sustainable exploitation of forest resources for rural development.

TL Turkish Lira

TSE Turkish Standards Institution

TUIK Turkish Statistical Institute (TurkStat)

USD/TL Rate According to the average dollar rate in 2019 by the Central Bank of the Republic of Turkey which was 5.68 TL

# Introduction

## Distribution of chestnut forests

*Fagaceae* includes eight genera (Castanea, Castanopsis, Fagus, Lithocarpus, Nothofagus, Quercus, Trigonobalanis, Chrysolepis) and about 600–800 species. The genus *Castanea* is widespread in the Northern Hemisphere and includes 12 or 13 species according to classification.

The sweet chestnut (Castanea sativa Mill.) is native to central-southern Europe (the northern Iberian Peninsula, the South of France, central-northern Italy, the southern Balkan Peninsula) and Asia Minor (western and northern Turkey, the Caucasus). It can be found at sea level in its northern range, and at up to 1 400 m above sea level in Greece and 1 700 m in Asia Minor. This tree has been widely planted and cultivated outside its natural range throughout the warm-temperate climate regions, such as South and North America and Australia. (EU, 2020)

|  |  |
| --- | --- |
| Figure 1. Distribution of sweet chestnut in Europe | Figure 2. Distribution of chestnut forests in Turkey  A picture containing text, map  Description automatically generated |

In Turkey, the state-owned forests have 262 045 hectares of chestnut as shown in Table 1 (GDF, 2013).

Table 1. Chestnut forests by region in Turkey (ha)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Regions Name | Pure chestnut forests | | Mixed chestnut forests where chestnut is predominant | | Mixed chestnut forests where other species are predominant | | Total |
|  |
|  |
|  |
| Productive | Degraded | Productive | Degraded | Productive | Degraded |  |
| Adapazarı | 894 | 955 | 11 635 |  | 4 001 | 18 | 17 503 |  |
| Amasya | 452 | 124 | 1 166 | 0 | 2 640 | 0 | 4 382 |  |
| Artvin | 2 659 | 560 | 14 736 | 0 | 9 481 | 84 | 27 520 |  |
| Balıkesir | 998 | 118 | 2 206 | 15 | 12 911 | 31 | 16 278 |  |
| Bolu | 34 | 0 | 1 005 | 0 | 9 174 | 0 | 10 212 |  |
| Bursa | 629 | 169 | 5 025 | 420 | 6 507 | 414 | 13 164 |  |
| Denizli | 76 | 15 | 85 | 0 | 4 | 0 | 180 |  |
| Giresun | 6 021 | 1 572 | 7 238 | 1 178 | 9 618 | 5 075 | 30 702 |  |
| İstanbul | 2 628 | 0 | 1 246 | 0 | 12 234 | 0 | 16 108 |  |
| İzmir | 2 179 | 82 | 31 | 1 257 | 27 | 532 | 4 108 |  |
| Kastamonu | 2 588 | 1 174 | 7 970 | 194 | 11 817 | 92 | 23 833 |  |
| Kütahya | 4 | 77 | 39 | 0 | 246 | 689 | 1 054 |  |
| Muğla | 864 | 24 | 0 | 0 | 22 | 13 | 923 |  |
| Trabzon | 1 322 | 1 795 | 31 469 | 261 | 28 957 | 5 119 | 68 926 |  |
| Zonguldak | 665 | 126 | 5 284 | 0 | 19 838 | 1 240 | 27 151 |  |
| Total | 22 013 | 6 791 | 89 136 | 3 324 | 127 475 | 13 306 | 262 045 |  |

## Chestnut as non-wood forest products

The main provinces having chestnut are in the Black Sea region, where most of the chestnut forests are natural. Chestnut forests subject to nut production in Turkey are 74 897 hectares. Table 2 provides the utilization amount and respective harvested area region by region according to data provided by GDF (GDF, NWFPs Inventories, 2019)

Table 2. Chestnut utilization and areas that chestnuts harvested

|  |  |  |
| --- | --- | --- |
| Regional Directorate of Forests | Utilization (tons) | Area harvested (ha) |
| Artvin | 143 | 1 832 |
| Balıkesir | 752 | 2 844 |
| Bolu | 33 | 848 |
| Bursa | 14 | 912 |
| Çanakkale | 1 448 | 1 340 |
| Denizli | 13 | 69 |
| Eskisehir | 64 | 650 |
| Giresun | 13 766 | 14 600 |
| Istanbul | 58 | 3 654 |
| Izmir | 1 756 | 5 574 |
| Kastamonu | 965 | 2 825 |
| Kutahya | 53 | 382 |
| Sakarya | 98 | 10 127 |
| Trabzon | 2 012 | 20 405 |
| Zonguldak | 3 005 | 8 835 |
| Total | 24 180 | 74 897 |

Picture 1. Natural forests, intensive production areas and chestnut trees in hazelnut groves

|  |  |  |
| --- | --- | --- |
|  | kestane alan köyü - inegöl 21 |  |

Most of the chestnut trees are found in state-owned forests but the nuts are generally produced in the orchards established in privately-owned agricultural lands. In 2019, the total chestnut harvested was 72 655 tons. 24 thousand tons collected from state-owned forests (33 percent), and the remaining 48 thousand tons (67 percent), was collected from private chestnut gardens in agricultural areas.

Figure 3. Ratio of chestnut fruit harvested in 2019

While natural chestnut forests are predominantly located in provinces in the Black Sea Region such as Trabzon, Giresun, Ordu, Sinop and Kastamonu, chestnut fruit is harvested mostly in the Aegean Region provinces such as Aydın and İzmir. The partially intact chestnut forests in the Black Sea Region have a very important potential for future.

Figure 4. The ratio of collection in the provinces to country total in 2019

# Economical Value, Usages and Trade

## 2.1 Economical Value

Regarding the total economic value of chestnut trees and products, a comprehensive study is needed to measure the total annual contribution. For this, it is necessary to know at least the value of wood-based products obtained from chestnuts, animal nutrition made from chestnut leaves, chestnut honey and tea produced by using chestnut flowers, and ultimately the economic value ​​of the chestnut fruit.

There is a total of 262 045 hectares of chestnut forests in Turkey as noted in the relevant section. Only 74 897 hectares of these forests (about 29 percent), are reserved for chestnut fruit harvesting. In the remaining forests, normal silvicultural activities are carried out and wood-based forest products are produced.

Figure 5. Last five years chestnut harvest in Turkey (tons / year)

Table 3. Chestnut collection in Turkey in the last five years (2015-2019)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Provinces | Annual nut collection (Tons) | | | | |
| 2015 | 2016 | 2017 | 2018 | 2019 |
| Afyonkarahisar | 2 | 2 | 12 | 27 | 27 |
| Antalya | 73 | 73 | 73 | 73 | 73 |
| Artvin | 251 | 228 | 207 | 209 | 209 |
| Aydin | 21 215 | 25 423 | 24 304 | 26 248 | 32 232 |
| Balıkesir | 1 033 | 1 217 | 1 118 | 1 117 | 1 159 |
| Bartın | 2 843 | 3 277 | 4 090 | 3 601 | 5 933 |
| Bitlis | 14 | 13 | 12 | 12 | 12 |
| Bursa | 1 943 | 2 134 | 1 990 | 1 822 | 1 820 |
| Denizli | 1 891 | 2 120 | 1 898 | 1 761 | 1 777 |
| Düzce | 547 | 609 | 578 | 598 | 606 |
| Giresun | 148 | 200 | 229 | 228 | 235 |
| Isparta | 12 | 6 | 6 | 5 | 5 |
| Kastamonu | 9 715 | 3 114 | 3 124 | 3 126 | 3 125 |
| Kocaeli | 395 | 459 | 454 | 453 | 396 |
| Kutahya | 2 795 | 2 448 | 2 075 | 1 988 | 1 999 |
| Manisa | 2 482 | 2 502 | 2 354 | 2 309 | 2 333 |
| Muğla | 90 | 105 | 93 | 82 | 85 |
| Ordu | 592 | 652 | 553 | 485 | 469 |
| Rize | 501 | 576 | 549 | 504 | 574 |
| Sakarya | 72 | 56 | 55 | 55 | 55 |
| Samsun | 613 | 624 | 600 | 315 | 307 |
| Sinop | 3 993 | 4 001 | 3 755 | 3 655 | 3 676 |
| Tokat | 1 | 2 | 2 | 2 | 2 |
| Trabzon | 58 | 108 | 107 | 105 | 98 |
| Yalova | 579 | 638 | 725 | 732 | 726 |
| Zonguldak | 1 180 | 1 364 | 1 246 | 1 295 | 1 307 |
| Canakkale | 930 | 1 151 | 1 113 | 1 118 | 1 217 |
| Istanbul | 40 | 45 | 40 | 45 | 30 |
| Izmir | 9 742 | 11 603 | 11 542 | 11 610 | 12 168 |
| Total | 63 750 | 64 750 | 62 904 | 63 580 | 72 655 |

Figure 6. Forest areas where chestnut fruits are harvested

Picture 2. Chestnut flowers for beekeeping

|  |  |
| --- | --- |
|  |  |

Honey produced by bees mainly from chestnut flowers is an important product in terms of both food safety and economics. Recently, teas produced from chestnut flowers are becoming widespread. However, the economic value of these products is difficult to calculate, they are not yet included in the statistics.

The value of the chestnut's ecosystem services should also be included in the calculation of national account. Chestnut trees and fruits are important elements of cultural life. In many places, collecting chestnuts considered as one of the useful and enjoyable activities for children, as mushroom picking.

In the light of these explanations, it can be stated that the most important part of chestnut that can be measured economically is chestnut fruit. However, a significant part of the chestnut fruit is consumed informally/unrecorded. (BELEN, 2001)

Table 4. Total annual income of chestnut fruit, 2000

|  |
| --- |
| The total annual income from chestnuts, including export, internal consumption and unrecorded consumption, can be calculated as follows:   * Export: 6 679 623 USD equivalent to 6 264 tons (average figures of the last ten years). * Internal consumption: 94 774 000 USD equivalent to 47 387 tons product (the average price of the nut has been accepted at a retail price of 2 USD/kg based on market observations. * Unrecorded internal consumption: The export and official internal consumption amount to 53 651 tons, but nut production is 68 652 tons annually. Therefore, the difference between the two figures is unrecorded consumption. If we assume that these products were consumed at a minimum 1 USD/kg, then it is possible to calculate that 14 973 000 USD equivalent to 14 973 tons have been earned.   As a consequence, the total income of chestnut nuts can be calculated:   * Export 6 679 623 USD * Internal consumption recorded 94 774 000 USD * Unrecorded internal consumption 14 973 000 USD * Total income 116 426 623 USD |

## 2.2. Export and Import

Chestnut is one of Turkey's major agricultural export products. The export trend is increasing gradually. For the years of 1990 to 1999, Turkey's annual export was 6 000 tons in average. In 2019 export reached 14 225 tons annually and Turkey earned 35 837 609 USD of income from export. It can be said that, one fifth of the total harvested chestnut is exported. These data are the data of fresh or dried chestnut fruits, and in some cases, the chestnut fruit can be exported by removing the shell. However, since the export of "peeled off chestnut fruit" is very low and negligible, it was not added here.

Table 5. Export and import of chestnut fruit in 2015-2019

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | Export – kg | Export – USD | Import – kg | Import - USD |
| 2015 | 5 528 807 | 14 794 175 | 524 | 518 |
| 2016 | 8 297 416 | 24 993 281 | 75 | 75 |
| 2017 | 9 797 491 | 36 786 802 | 815 | 928 |
| 2018 | 12 957 165 | 43 111 046 | 1 511 050 | 1 437 754 |
| 2019 | 14 225 237 | 35 837 609 | 2 362 020 | 1 687 782 |

Figure 7. Chestnut export and export income for 2015-2019

The main buyer of Turkish chestnuts is Italy. 45 percent of total exports in 2015, 71 percent of total exports in 2017 and 80 percent of 2019 total exports were made to Italy. This situation, being so dependent on a single market, actually poses the danger of fragility for the export market.

Table 6. Top five countries where chestnut is exported to

|  |  |  |  |
| --- | --- | --- | --- |
| Countries | Years | | |
| 2015 | 2017 | 2019 |
| Export (kg) | Export (kg) | Export (kg) |
| Italy | 2 476 430 | 6 907 885 | 11 327 813 |
| Lebanon | 1 912 269 | 1 742 131 | 1 281 545 |
| Jordan | 388 675 | 172 250 | 67 560 |
| Germany | 186 711 | 295 235 | 293 700 |
| Saudi Arabia | 118 835 | 26 265 | 186 375 |

Although Turkey’s chestnut imports are low, imports from China have increased significantly over the past few years, exceeding two thousand tons in 2019.

Table 7. Chestnut import to Turkey (kg/year)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Country | 2015 | 2016 | 2017 | 2018 | 2019 |
| China | 509 | 75 | 749 | 1 489 000 | 2 362 020 |
| Greece | 10 | 0 | 0 | 0 | 0 |
| Uzbekistan | 3 | 0 | 0 | 0 | 0 |
| Bosnia and Herzegovina | 3 | 0 | 0 | 0 | 0 |
| Spain | 0 | 0 | 42 | 0 | 0 |
| Italy | 0 | 0 | 24 | 22 | 0 |

When TUIK records are examined, it is seen that imports have been made from countries such as Greece, Uzbekistan, Bosnia and Herzegovina, Spain and Italy so far. But these numbers are negligible. On the other hand, when unit export and import prices (USD/kg) are analyzed, it is seen that export prices are approximately 2-3 times higher than import prices.

## 2.2 Areas of Usage

Chestnut trees are important for several usage areas. Communities that lived in forested areas in ancient times and did not have enough wheat flour, called the chestnut “bread tree” as it was their major food source.

Chestnut is an economically important forest species due to its precious wood and fruit production. Depending on the development of age, density, and site of the pure forest stand, its annual wood increment is approximately 2-6 m³ per hectare. Its timber is very useful in terms of durability and decorative properties. It is a highly valued resource in the furniture industry as it has long fibers and the ability of easy bending and processing. Since chestnut timber is water-resistant, it is preferred primarily for the construction of wharves and boats, yachts, and ships.

It is used in window joinery, facade cladding, garden tables and chairs (young shoots of chestnut are used instead of bamboo), fence pile, parquet, playgrounds, home, and office decoration. The residues and billet of chestnut wood are used in the production of coal and gunpowder, and their shells are used in the production of plywood. Since the chestnut contains tannins in its branches, leaves and fruits, it is used in the paint industry to create brown color. In addition, edible fruits, chestnut sugar, chestnut honey, chestnut marmalade, hand tools made from shoots, and other products also contribute to local and national economy.

# Challenges and recommendations

## Pests and Diseases

The forest stands of Turkey, have been seriously destroyed by fungal diseases, particularly blight and phytophthora root rot (ink disease). Recently chestnut gall wasps are also found in the chestnut forests of Turkey.

*Table 8. Chestnut diseases*

|  |  |  |
| --- | --- | --- |
| Diseases | Latin names of the agents | Places where damage occurs |
| Chestnut blight (canker) | *Cryphonectria parasitica (Murr.)* | Trunk and Branches |
| Root rot | *Phytophthora cambivora (Petri)* | Roots |
| Chestnut gall wasp | *Dryocosmus kuriphilus* | Bud |
| Chestnut worm | *Laspeyresia spiendana* | Fruits |
| Chestnut moth | *Pammene fasciana (L)* | Fruits |
| Tuber bees | *Dryocosmus kuriphilus* | Buds |

## Recommendations

Chestnut forests have great potential to Turkey's economy in the medium and long term so they should be paid well attention to in policy documents, regional or provincial rural development plans. National and international projects on chestnut to share traditional knowledge and experiences and to benefit from cutting edge innovation in chestnut sector should be initiated. Consultation meetings should be organized at province or regional level with participation of all relevant stakeholders including NGOs in order to have a common vision on chestnut as a whole.

GDF, together with other partners, should increase effectiveness in the combat strategies in the light of the available inventory data for each region to combat diseases. It should be encouraged that the forest villagers living in or next to the chestnut forests should be educated in support the disease-fighting activities. Particular studies and projects should be developed to find out the roots of diseases, impacts on the chestnut forests and dependent communities.

In order to protect chestnut forests more effectively, a close cooperation should be made between Village Legal Entities and Forestry Directorates. In this way, joint protection and utilization protocols will be prepared and chestnut utilization plans will become operational.

Depending on locality, 'Chestnut Seed Gardens' and 'Chestnut Graft Gardens’, completely free from diseases, should be established to maintain healthy and disease resilient chestnut forests by GDF. The new chestnut seedlings and grafts needed by the citizens in the regions should be obtained from the gardens of chestnut seeds and cuttings should be provided.

Taking into consideration the possibility of reaching to international market, more strong partnership between GDF and private sector such as producers of candied chestnuts, furniture, shipbuilding should be promoted.

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