

**NON-WOOD
FOREST
PRODUCTS**

DAPHNE

VALUE CHAIN





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Non-Wood Forest Products: Daphne Value Chain Research Report was published for the Nature Conservation Centre (DKM) by Yaşama Dair Vakfı under the project "Integrated Approach to Management of Forests in Turkey, with Demonstration in High Conservation Value Forests in the Mediterranean Region" which is conducted by the Ministry Of Agriculture And Forestry, General Directorate of Forestry in cooperation with the United Nations Development Programme (UNDP) with the financial support of the Global Environment Facility (GEF).



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TAG METHOD

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70 interviews were conducted under the research between October and December 2016 in Kahramanmaraş, Adana, Mersin, Antalya, Muğla, Hatay, İzmir, and İstanbul.

The interviews were respectively conducted with Regional Directorate of Forestry’s Non-Wood Products and Services Sections, Regional Directorates of Forestry, forest villagers, gatherers, mukhtars, middlemen, daphne traders and the managers of drying – processing plants. Also, in-depth interviews were conducted with tradesmen in Antakya Uzun Çarşı (Spice Bazaar) and local producers in Samandra. Following the interviews at local level, in-depth interviews were conducted with the Aegean Exporters’ Association in order to understand daphne export process and with the spice sellers at İstanbul Spice Bazaar to track the end product that is offered to the end consumer at the domestic market. At the final stage, interviews were conducted with the spice sector representatives.

Finally, official statistics of the Ministry of Agriculture and Forestry and the Ministry of Customs and Trade were analyzed to compile the macro data related to daphne products in Turkey and the world and a daphne value map was created.

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EXECUTIVE SUMMARY

Non-Wood Forest Products: Daphne Value Chain Research Report was conducted for the Nature Conservation Centre (DKM) which is one of the project partners by Yaşama Dair Vakfı in order to provide an overview of production process of daphne from shoot to market at the Köyceğiz, Gazipaşa, Gülnar, Pos and Andırın Regional Directorates of Forestry under the project on “Integrated Approach to Management of Forests in the Mediterranean Region” which is conducted by the General Directorate of Forestry in cooperation with the United Nations Development Programme (UNDP) with the financial support of the Global Environment Facility (GEF).

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the interviews at local level, in-depth interviews were conducted with the Aegean Exporters’ Association in order to understand daphne export process and with the spice sellers at Spice Bazaar in İstanbul to track the end product that is offered to the end consumer at the domestic market. At the final stage, interviews were conducted with the spice sector representatives. Official statistics of the Ministry of Agriculture and Forestry and the Ministry of Customs and Trade were analyzed to compile the macro data related to daphne products in Turkey and the world and a daphne value chain was created.

Turkey has a daphne inventory of 298,948,953 kg and supplies about 90% for the daphne need of the world. As for the surface area, there is a daphne-growing area of above 130.000 hectares in Turkey. The provinces with the largest distribution of Daphne in terms of the surface area are Adana, Muğla, Mersin, Bursa and Kahramanmaraş, respectively. It is understood from the foreign trade figures related to daphne that its overall export increased by about 3 times from 2005 to 2015. Today the dried daphne export amounts to about 40 million USD. Added the daphne by-products subject to export to that, its economic value is estimated to be more than 100 million USD.

A major part of daphne is collected from forest lands by forest villagers while a very little portion of it is collected by land owners at their private lands. Although land owners do not need to obtain any permit to pick fruit and leaves of daphne, they need to file a petition to the respective district directorate concerning the collecting of daphne at their own land.

It is very difficult to access Daphne for villagers in some regions. The collected daphne needs to be back carried for a long time. Middlemen/ mukhtars and villagers hardly reach an agreement on pricing. This prolongs the supply process. Therefore, drying and picking cannot be made on site. Operating facilities cannot work at full capacity due to the shortage of supply. Since villagers do not cut trees according to applicable rules, it causes trees to get tired earlier and interrupts the rehabilitation efforts of the regional directorates of forestry. The industry wants GDF to put more focus on non-wood forest products. Besides, villagers who consider daphne a source of income often demand that trees are conserved. Goat pasture is also an important problem threatening daphne areas.

The recommendations offered in the report on the daphne value chain are stated below:

- To consider villagers’ requests about transportation.
- To offer incentives to local private enterprises to prevent any interruption to the supply process and reinforce their organizational capacities. To monitor the pricing process between villagers and the middlemen.
- To encourage on-site drying and picking to increase producers’ profit, reduce logistics expenses and reduce environmental impacts caused by the logistics.
- To increase the number and enhance the quality of trainings given to villagers to improve the quality of leaves and the efficiency and to improve and on-site monitor the quality of trainings.
- Sale of products such as daphne soap, cream, or shampoo etc. produced by individual efforts should be supported not only at local level but also at other provinces. To increase domestic consumption by advertising those products across the country.
- To offer grant / loan support to facilities that could produce high added value and high-quality products and to enterprises that have the potential to increase the export.
- To determine grazing areas.

DAPHNE INVENTORY IN TURKEY

The type of daphne gathered in Turkey both for purposes of the domestic market and export is "Lauris Nobilis", also known as Mediterranean Daphne. Mediterranean Daphne is a species of shrubs of Lauracearea family with evergreen and fragrant leaves which find a wide range of use. Turkey has a daphne inventory of 298,948,953 kg as of 2015 and supplies about 90% for the daphne need of the world. As for the surface area, there is a daphne-growing area of above 130.000 hectares in Turkey with the largest ones located in the provinces of Adana, Muğla, Mersin, Bursa and Kahramanmaraş, respectively. According to the 2015 data, the daphne areas in Adana, Muğla, Mersin, Bursa and Kahramanmaraş are of 22.239, 15.796, 15.581, 15.396 and 13.893 hectares, respectively (see Map 1) [1].



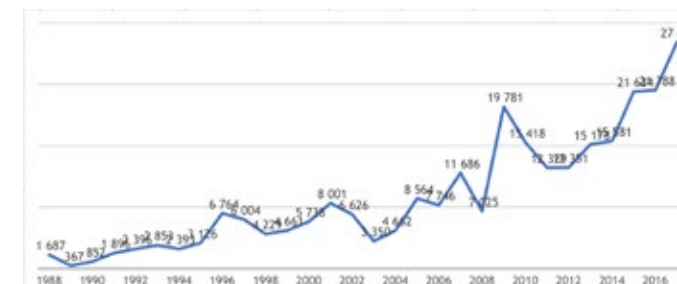
Map 1. Daphne Areas at the Provinces

As for the daphne inventory on a ton basis, it is seen that Zonguldak has the largest daphne inventory. It can be said that with an inventory of 101.288.917 kg, Zonguldak holds more than one third of the total daphne inventory in Turkey, which is of 298.948.953 kg. Accordingly, Zonguldak is followed by Bursa (53,492,019), Mersin (34,379,228), Adana (26,309,022) and Kahramanmaraş (22,430,933), respectively (see Map 2). Considering the 5 regions under the present research, it is seen that the provinces of Mersin (11%), Adana (9%), Kahramanmaraş (8%), Antalya (5%) and Muğla (1%) which are the pilot areas under GEF-5 supply about one third (34%) of the total daphne asset [2]. From this aspect, it can be said that this value chain study represents the journey of the daphne produced at the southern Turkey but may not represent the daphne at the northern areas, namely Zonguldak and Bursa.



Map 2. Daphne Production Amount by Province

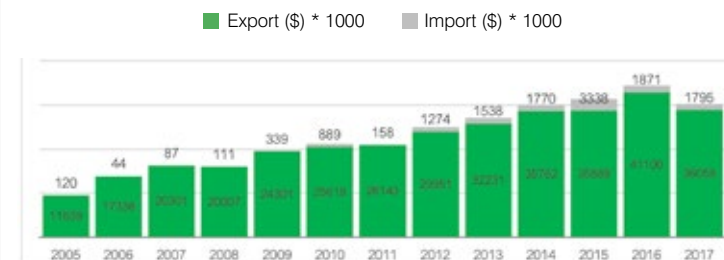
Considering the course of the daphne production in Turkey by year, it is seen that the amount of daphne included in daphne value chain has increased by 3 times after 2010 compared to before. Since the actors in the region have become aware of the economic value of daphne and the demand for daphne has increased across the world, it results in the acceleration of the supply process and the emergence of new actors in daphne regions. The tendency to increase continues today: the amount of daphne has been nearly 30 thousand tons as of 2017 (see Graphic 1) [3,4].



Graphic 1. Amount of Daphne by Year (Ton)

DAPHNE EXPORT

It is understood from the foreign trade figures related to daphne that its overall export increased by more than 3 times from 2005 to 2017. As of 2017 the dried daphne export amounts to about 40 million USD (\$36.058749). Added the daphne by-products subject to export to that, its economic value is estimated to be more than 100 million USD (see Graphic 2) [5-6].



Graphic 2. Import/Export by Year

To discuss the value change of daphne based on a comparison, 5.557 tons of daphne was exported in 2005 and it was sold at 2.130 USD per ton whereas 12.741 tons was exported at 2.817 USD in 2015. Over the 10-year course, the exported amount increased by two times while the sales cost per ton increased by 32%. In total, the export size increased by about 3 times (see Table 1).

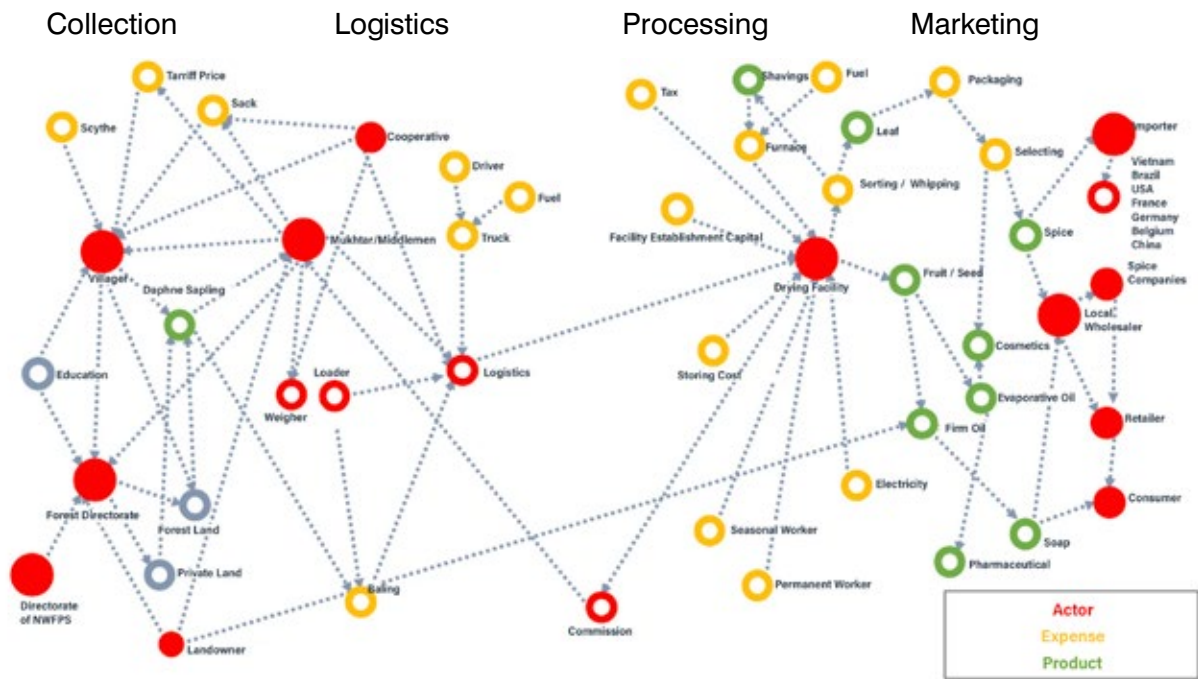
Table 1. Value Change in Daphne per Ton

	2005	2015	Change
Ton	5557	12741	32%
USD	11838907	35889541	
Per Ton USD	2130	2817	

Considering the current production amount and export figures of 2017 together (27.678-ton production, 12.708-ton export in 2015), it is understood that a major part of the daphne cut was exported. Additionally, given that a green branch yields about one fifth, it is understood

that there might have been unregistered cutting. Considering the current inventory and export data together, it can be said that daphne is an increasingly-demanded product across the world when the wide range of its by-products with a high potential of export is taken into consideration.

DAPHNE
VALUE MAP



MAJOR ACTORS OF
DAPHNE VALUE CHAIN

General Directorate of Forestry:

Approves the daphne utilization plan delivered by the Regional Directorate of Forestry NWFPS (Non-Wood Forest Products and Services) Section.

Regional Directorate of Forestry, Non-Wood Products and Services Section:

The exploitation plan that is prepared following the forest management plans by the Regional Directorate of Forestry's Non-Wood Products and Services Section is submitted for approval to the General Directorate of Forestry in Ankara.

Forest District Directorate: It is in charge of forest management and implements forest management plans. The Regional Directorate divides the forest land into sections following the approval from the GDF and posts announcements for the section where daphne will be collected. It has a more direct interaction with villagers. The district directorates collect the tariff amount determined for respective year and provide trainings on how to cut daphne shoots to villagers.

District Chief / Forest Protection

Officers: Train villagers on how to cut daphne shoots. Relevant management offices in villages where daphne shoot cutting will take place are in face-to-face contact with traders/middlemen and mukhtars.

Forest Villagers: They collect daphne in their private lands or areas identified by the Forest District Directorate. They pay tariff value to the Forest District Directorate before collection. These are the individuals receiving the lowest income in the process of daphne collection, processing and export chain. The higher the knowledge about how to cut daphne, the higher the long-term productivity and quality of daphne is. Not considering daphne as a source of income and the lack of a control mechanism in cutting/sale processes etc. causes daphne to be cut so as to reduce its productivity in future years.

Mukhtars: Mukhtars are the middlemen for daphne in some regions; they are the people that organize the first step of the supply process, i.e. collecting. They have a tense relationship with business owners. Since the Regional Directorates of Forestry have recently started to take inventory of daphne, the daphne collecting has turned into a process where the district directorates are involved, and now mukhtars are not the only people in villages who are in contact with the outside world, it has reduced the impact of mukhtars compared to before.

FROM FOREST TO MARKET: DAPHNE VALUE CHAIN

Trader/Intermediary: Individuals who contact forest villages who collect daphne and load and transport daphne in vehicles following the cutting of their shoots. They may work directly with export companies or may work with drying facilities to transport the products to the facilities. They also determine to whom villagers will give daphne as they make the agreement with villagers as intermediary. They have a forced, tense relationship with drying facilities just like mukhtars do.

Cooperatives: Their impact is weaker in value chain compared to the other actors; the inside conflicts they had remained short-lived experiences. The cooperatives at Andırın, Gazipaşa, Gülnar, and Köyceğiz are not engaged in the daphne shoot cutting process.

Drying Facilities: They act mainly on demands of export companies. These facilities access daphne through traders or mukhtars or buy it directly from villagers. Daphne shoots are dried and categorized depending on their leaf quality first and then put into sacks and transported to related companies by these facilities. Not all provinces where Daphne shoot cutting takes place have drying facilities.

Commissioner: An individual who knows about traders/middlemen, mukhtars or producers in respective areas at the provinces where there are export companies and enables these actors to meet such companies.

Export companies: They contact producers, traders or drying facilities for related products based on international demand. When such companies have the capacity or facilities to process the raw material, they process the product bought from producers or traders themselves. If not, they have other companies with required facilities located at the same province process that product bought from producers or traders.

Buyer: Actors who are in contact with export companies and demand daphne leaves. The countries that demand daphne of different qualities include mainly the USA and China as well as Belgium, France, and Italy. China buys the lowest quality with the highest volume via Vietnam.

Daphne Production Planning and Organization

A major part of daphne is collected from forest lands by forest villagers while a very little portion of it is collected by land owners at their private lands. Although land owners do not need to obtain any permit to pick fruit and leaves of daphne, they need to file a petition to the respective district directorate concerning the collecting of daphne at their own land. Following such petition, daphne contained in such private-registered land will be registered by respective directorate. In case of a forest land, permit is required from the General Directorate of Forestry. Villagers of the village where respective forest land is located have the priority in collecting daphne.

“Daphne is collected by forest villagers. They visit sub-district directorates. They pay the tariff value. Which is very little. They pay 0.07 TRY per kilogram. We have some middlemen dealing with this. They direct and organize it somehow. They come to sub-district directorates. They buy it from villagers.”

(Forest District, Gazipaşa)

Although not seen often, when villagers refuse collecting as they find the price

offered by a middleman/trader low, daphne is collected by outsider villagers. Drying facilities procure the daphne they need by organizing villagers from nearby villages via a middleman/trader.

“The production has not started. The businesses have difficulties about finding raw material at the moment. The production in Kadirli is at the discretion of two mukhtars. They show the low prices as reason.”

(Drying Facility Operator, Kadirli)

Daphne harvested by villagers is delivered to drying facilities in three ways including through a middleman/trader, a cooperative, or individually. Such middleman sometimes cooperates with mukhtar or sometimes not or sometimes mukhtar acts on their own. When it is supplied to a drying facility individually without any intermediary, the price that villagers get is higher. There is no cooperative that cuts daphne shoots in Andırın, Gülnar, Köyceğiz or Gazipaşa. Although there had been some cooperatives at the places where these operations are located, it is speculated that the villagers had negative experiences with those cooperatives after the internal conflicts and borrowings. Villagers get a payment of 0.45-0.60 KR₺ per kg of daphne depending on its quality.

“Village mukhtars come into play and submit a petition to the forest management. Daphne saplings are planted, and those saplings are distributed to villagers free of charge, and also there is daphne at the already-existing land. They form a team. The people who are engaged in this work have already learned what to do by trial and error. Everybody here does this at their own village. There are some traders at district level. 2-3 people.”

(NGO Worker, Andırın)

Daphne utilization plan prepared based on forest management plans are issued by the Regional Directorate of Forestry NWFPS Section and then submitted to GDF in Ankara for approval. In those plans, forest land is divided into sections and each section is assigned a number. The Forest District Directorate posts announcements for sections where daphne will be gathered in the forest land according to the utilization plans approved. Those sections do not remain unchanged, they are subject to change once every three years to allow daphne to renew itself.

Sections are assigned a post. Villagers who will gather daphne from the forest land apply to the Forest District Directorate

through individuals called post head in teams of 10 people (usually 10 but sometimes the number increases or decreases) instead of individual applications. Such post head is selected from forest villagers and do not receive any additional fee. This practice is preferred by GDF due to having fewer individuals involved. The tariff value is TRY 0.07 per kg and the amount required to be paid is given to the post head by the intermediary/trader for the post head to pay it to the district directorate.

“We usually improve, rehabilitate and preserve these daphne fields. We plant those fields. We have villagers rehabilitate, plant and protect the area. Guarding, fencing etc. are already their legal rights. Villagers pay the tariff value, gather the daphne, then sell it. No one else can do it, it is the right of the villagers of respective village. We do not know how much they are paid by traders. Presumably, it is KRS 0.50. And they pay a small fee to GDF.”

(Regional Directorate of Forestry, Adana)

“We pay this tariff value. In fact, villagers should pay it as they are the gatherers but we pay it. All of it is gathered by the villagers. No outsider comes to gather it. They bring some of it to us. We go to get the load in case they do not have a vehicle. They put them in sacks. This is applicable for all.”

(Gazipaşa, Facility Operator)

Applications to collect daphne may not be submitted on each day of a month; application submission dates are pre-determined. Numbered sections are distributed to applicant villagers by the forest district directorate by drawing of lots. If an applicant villager subsequently gives up collecting daphne, there are no sanctions imposed about it. Each daphne tree in a section is distributed to other sections so as to have one tree in each.

The regional directorates of forestry provide training on how to prune daphne to villagers; forest protection officers and chiefs are the trainers. These trainings are intended to teach how to prune daphne without damaging it. Although the rehabilitation of forest is the priority of the district directorates, another purpose of these trainings is to raise consciousness and awareness about daphne among villagers.

“The main purpose there is not only about daphne leaves production. The main purpose is to rehabilitate and make daphne forests fertile. They, of course, tell about where to cut. Collective trainings are organized at certain periods. A small stand is installed to provide information before starting harvesting in Kadirli. Institutions, villagers, cooperatives are informed about the process and about the industries that use daphne gathered from there.”

(Forest District Directorate, Gazipaşa)

“The main purpose is not the daphne production. It is to rehabilitate the forest there. Since daphne forests are usually impaired, degenerated forests, the aim is to rehabilitate and make a fertile forest out of them. These plans are made to make the forest structure more fertile and obtain higher-quality daphne leaves from there.

(Forest District, Pos)

CUTTING DAPHNE

The vegetative growth of daphne leaves ceases from July to October and daphne branches are pruned during those months. Daphne is harvested in September-October. Although it seems to be a family work, the collection of daphne is mainly performed by men while women can actively participate only if there are not any children or old people at home who need care. It is understood that women go collecting daphne within the time remaining from the housework and the care for children and old family members.

"When the school is off, I go for daphne, and the girl takes care of a sick family member at home."

(Female, Villager, Andırın)

"We need a path to the mountains to be able carry out standard work. There is no access to the mountains. Daphne is plenty but there is no road. It is always on our back, women, men, usually women. Women carry daphne with a rope tied over their shoulders, which is called "har çekmek". And men do the cutting. Children do not work, they are not strong enough."

(Female, Villager, Gökçeli)

In each section, daphne-collecting villagers usually divide labor as cutting, collecting, bunching, and carrying. Daphne shoots are pruned by scythe. At this point,

it is important that trees are not harmed because incorrect pruning shortens the lifetime of trees. One of the main complaints at district directorates and drying facilities is the incorrect cutting of daphne.

"Incorrect cutting causes splits on trees. They start drying. Fertility reduces. This is very important. Here there are also villagers who do the cutting well, who think of their future. We should mention of them too. For example, Yoğunoluk, Tahta and Koşlu villages are good in this respect. Villagers protect daphne as they know they make money out of it."

(Kadirli, Drying Facility Operator)

On the other hand, villagers who consider daphne a source of income often make demands about the protection of daphne trees.

"The fields in the village of Yoğunoluk are put under protection. Protection by fencing is important because it keeps goats out and so they cannot eat them. When they are not eaten, the subsequent daphne growing becomes more fertile. Yoğunoluk is the second village with the largest amount of daphne in Kadirli. One of the reasons is that they do the cutting correctly. Their product is of higher quality."

(Kadirli, Drying Facility Operator)

When doing the cutting, those shoots cut are collected and tied at the same time. After the tying process, they are carried to the weighing machine. The rope used for tying the daphne costs TRY 1 per each ton. Weighers receive a daily wage of about TRY 100. Vehicles cannot be kept close to the cutting area due to the geographical features. Therefore, villagers carry the daphne on their back. They also use horses. In case of carrying with horses, the quality of leaves reduces. Accessing daphne trees is a problem itself. Some daphne trees cannot be pruned although identified on the field due to the lack of a proper road. Not all the daphne grown can be collected. Even if those trees are pruned, it is late usually for them. A late-pruned daphne tree gives low-quality leaves. Thickened, wooden branches also weigh heavy. This reduces the number of high-quality leaves, which is targeted to be one fourth of a branch and increases costs for facilities.

"It is not enough that villagers carry branches on their back a few km. Roads should be built here. The

district directorates have decided where to cut and talked with villagers, but the cutting could not be done due to the road problem or severe geographical conditions. So, what can villagers do... Some carry branches on their back a few kilometers and it is a heavy load. And also, I showed you the leaves. Do you know why they are like that? Because of the road."

(Kadirli, Drying Facility Operator)

"For example, we have daphne areas in Marmaris but we grow on road sides. At places easy to access. You cannot go deep inside where the forest gets dense."

(Forest District, Gazipaşa)



LOGISTICS OF DAPHNE

After the cutting of daphne, branches are flattened and bunched. Villagers supply rope and sacks from drying facilities through intermediaries/traders. A roll/bunch of daphne carried on the back amounts to 30-50 kg. Villagers come to the weigher to weigh their bunch and weigher notes down respective kg and receives the payment from intermediary/trader/mukhtar. If an agreement is reached with middleman/trader, the price of daphne is KRS 0,50-0,55 per kg. This is not a fixed price and varies from one village to another.

When the season for daphne shoot cutting is over, a forest villager earns about TRY 10-12 thousand, sometimes up to TRY 20 thousand. Based on the price negotiation between the middlemen and villagers, villagers can choose not to collect daphne or start collecting late, risking the ton targeted by trader. Middlemen/traders sell a kg of daphne at TRY 0,70-0,85 to facilities and make a profit of about TRY 100 per ton.

Weigher and loader works for trader/intermediary. Bunches received are carried to trucks by loader. Those who do the loading make an agreement with the middlemen/trader per ton and earn about TRY 100-150 per day. 3-5 tons are needed for a vehicle to hit the road. Forest

protection officers get a transport fee for daphne loaded on vehicles. Rent, fuel and driver expenses of vehicles are covered by drying facilities.

Villagers can sell it to businesses themselves to get paid more per kg. Such villagers deliver daphne to the drying facility with other individually selling villagers if they have a vehicle. If not, drying facilities might supply it. In that case, KRS 5-10 per kg to be paid to intermediary/trader/mukhtar is reduced from expense items of the facility as intermediary/trader is substituted by the drying facility. All expense items including weigher, loader, vehicle, driver, and fuel as well as the tariff value are directly covered by drying facilities.

"Villagers do it by their hand, they make effort, they use animals on steeps, they carry them on their back."

(NGO Worker, Andırın)

"It is carried to the place where the vehicle will receive it. There is a weigh and it is weighed there. If there is an intermediary, he loads it to the vehicle; if not, villager loads it directly to the vehicle."

(Kadirli, Drying Facility Operator)

DAPHNE DRYING/ PROCESSING

"They are stacked at the places where they are loaded onto vehicles. They are weighed by a weigh. People who will sell daphne take care of that stuff. These take place without our intervention. We only deal with cutting and measuring of daphne branches as per the proper technique, and issuing of the shipping documents. Of course, the tariff value is required to be pre-paid depending on the amount they will produce."

(Forest District, Pos)

Daphne is loaded onto vehicles and then delivered to facilities. In drying/processing facilities, daphne is unloaded from vehicles, put into ovens, filtered in front of a fan, turned into powder, put into sacks, and reloaded onto vehicles to be sent to export companies or directly exported, respectively.

Not all businesses that cut daphne shoots have drying-processing facilities. For example, daphne leaves are dried at the two facilities in Kadirli at about 40 km distance as there is no industrial zone in Andırın. There are no drying facilities in Pos and Gülnar as well. Kadirli in Osmaniye and Tarsus in Mersin are the regions which have drying facilities.

If a drying facility receives a sufficient amount of daphne, it is put into oven whereas if it does not reach an adequate kilogram, it is stocked in stores. It is important for the leaves to be dried slowly; if dried fast, leaves get bent and then broken. The fuel need of the ovens is supplied from the shavings of daphne branches.



Turning daphne branches with leaves stripped off into shavings is an input which reduces the heating costs of the facilities. The highest cost item for the facilities is the drying equipment. Ovens have similar features and cost between 80-120 thousand TRY whereas boilers vary from one facility to another.

"Daphne is delivered to facility by vehicles. After they are unloaded from vehicles they are put into ovens if ovens are empty. We have six ovens. They all have the same system. Ours always dry in 32 to 36 hours."

(Kadirli, Drying Facility Operator)

"If ovens are empty, we put daphne into them in bunches as received."



We put all of them upright and then fire the oven. We proceed to the drying process. We put 8.5-9 ton of green daphne (with branches) in an 110m² oven. The ovens meet our current needs. However, we have difficulties about finding raw material, so we do not work at full capacity currently. We receive raw material below our capacity."

(Kadirli, Drying Facility Operator)

At drying facilities, ovens are usually placed outside the facility and the room heated by those ovens is usually inside. Facilities are usually single-floor buildings while the heated rooms are placed at 30-50 cm above the ground and have a perforated metal or wooden flooring that covers the entire room.



Another drying method is to hang daphne shoots on hangers instead of placing them upright on the floor.



It is stated that the installation cost for a four-oven facility is about 500.000 TRY except for the land cost.

1 oven: 30.000 – 120.000 TRY
1 press: 120.000 TRY
1 winnowing machine: 140.000 TRY
1 fan: 230 TRY
1 m band: 1200 TRY (Usually a 10-meter band is used to choose to-be-boxed [kutuluk] products)

In a facility with three actively operated ovens, monthly electricity bill costs about 4000 TRY. Facility workers receive minimum wage and a daily food allowance of about 7-8 TRY. It is also observed that there are other drying alternatives than solid fuel such as heat pump and solar-powered drying.

The heat required for the daphne drying process is 50-55 degrees. Solar panels can provide those temperatures even in winter days in the Mediterranean and Aegean Regions. A 1x2 unit solar panel costs from EURO 20 per square meter and a facility requires about 150 square meters of solar panel. Solar panel systems with the capacity to dry 3 tons of daphne cost about TRY 20.000 to the facility owner.

As the result, a facility which have 6 ovens including 3 actively operated ones had a turnover of about TRY 2.500.000 in 2015 while it makes an annual profit of about TRY 300.00 with expenses subtracted.

Leaves on dried branches are roughly segregated paying attention to their quality. High-quality branches with unbroken leaves are winnowed more carefully. There are only a few facilities that carry out the winnowing process carefully. Since most of the branches received are of low quality and that makes the segregation process challenging and increases costs, careful winnowing is not preferred. If the facilities do not roughly winnow daphne, the export companies distribute the sacks delivered to them to the surrounding villages for women to segregate them. The exporter pays for that segregation process. Following that segregation process, the amount of high- and low-quality leaves is identified and the payment to be paid to respective drying facility is determined.

Low-quality branches with broken leaves are beat. Branches are strongly pounded onto a surface (tezgah) by paying attention for leaves not to hit the surface. There is another surface on top of that lower surface which has square spaces made of rebars. Leaves falling through those rebars accumulate on the lower surface and that lower surface moves to shed leaves onto the ground. Leaves are cleaned off of their waste while passing by a fan.

"We send it to a company in Mersin. They distribute the sacks to the houses at nearby villages in Mersin. They have them pick the whole ones by hand. They get all, those picked and not picked, making a payment accordingly. The payment for this process is made by exporter."

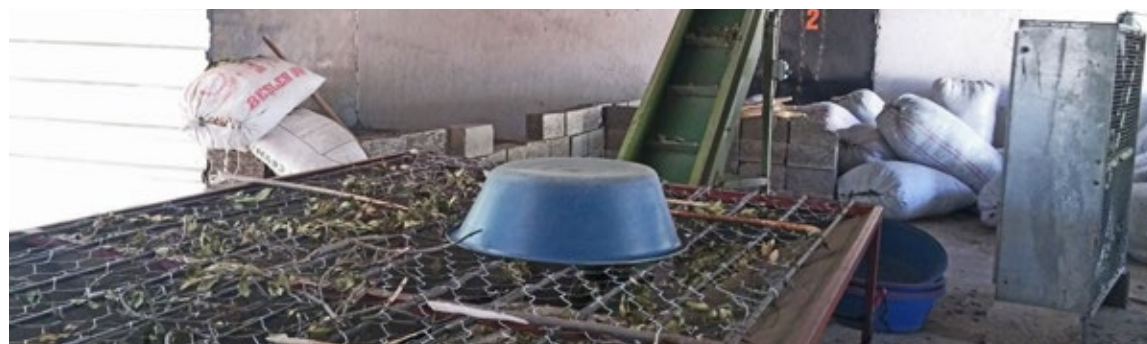
(Kadirli, Drying Facility Operator)

Villagers can supply not only fresh daphne but dried daphne as well to the

facilities. A kg of dried daphne is sold at KRS 20 higher than fresh daphne. When the climate allows, drying daphne cut and stripped out of its branches takes 10-15 days in a shady, ventilated, dry environment and leaves dried so are delivered to a drying facility through a middleman / trader.

"Some villagers supply it dried. Villagers who dry it themselves give it to an intermediary as well. Intermediaries collect it from villagers. Middlemen who do not have an oven dry it by their own methods. They dry it on a stove. Villagers usually dry it under the sun. This kind of plants needs to be dried in the shade. It is not good to dry it in the sun. They send it after drying. I do not think they send it fresh."

(Male, Public sector, Gazipaşa)



The main factors affecting the quality of leaves include the method of drying, having a green color, having no rust or stains, humidity, and waste ratio. The leaves which are of such quality that comply with the agreement made with the export company are sacked, and afterwards pressed by the export company. Broken leaves and leaves that relatively preserve their integrity are put into separate sacks.

The order of daphne leaves in terms of quality is as follows:

To-Be-Boxed – Manually categorized:

Unbroken, evenly-colored, unperforated leaves of 4-7 cm (TRY 20 per kg)

Hand-pick selected: Evenly-colored, unperforated/unbroken (TRY 18 per kg)

Half-selected: Cleaned off of waste and unhealthy leaves on a band conveyor (TRY 12-13 per kg)

Ordinary: Beated, baled or pressed (TRY 8-9 per kg)

Undersize: Powdered and pressed (Below TRY 8 per kg)

Facilities sell one-kg ordinary or undersized daphne at TRY 4,5-5,5 to

export companies. High-quality leaves called "to-be-boxed" are also sold at varying prices: TRY 6.5; 8.5; or 15 per kg. Daphne sold at TRY 15 per kg requires natural drying. Its high cost and challenging nature impede the production of high-quality "to-be-boxed" leaves.

"Those who cannot pack them in their own factory deliver them to İzmir in big sacks. They deliver them to exporters. There are these unbroken, to-be-packed daphne leaves of 3-5 cm which we call "to-be-boxed." Exporters buy them at TRY 12-13. Those with long and big or broken leaves are of 2nd quality. If they are bigger than 7 cm, it is of 2nd quality."

(Kadirli, Drying Facility Operator)

"We do not have leaves picked. Altıntaş, Kütaş and Çalışkan Tarım in İzmir pack them. They process and then send them. They deliver them to abroad. I do not know to which countries."

(Gazipaşa, Facility Operator)



Female workers are preferred at drying facilities except for the jobs that require more of physical strength. It is observed that most of the workers of drying facilities are female.

At facilities, males are assigned for daphne handling, cleaning daphne in front of a fan, feeding shavings into ovens and putting them into sacks while females are assigned for winnowing, beating, and selecting daphne. However, it is seen that female workers could also handle daphne and put them into sacks.

“Only the carrying of branches on the back. Women do not do that. But this is not a fixed practice, this only applicable for this workplace. I do not have women carry branches on their back here, maybe because I am educated. We carry out other works all together, regardless of male or female. There is no difference, we only practice this positive discrimination there. There are usually very few male workers at workplaces. You will see when you visit the other places. They usually have female workers who both work inside and carry branches on their back. All women.”

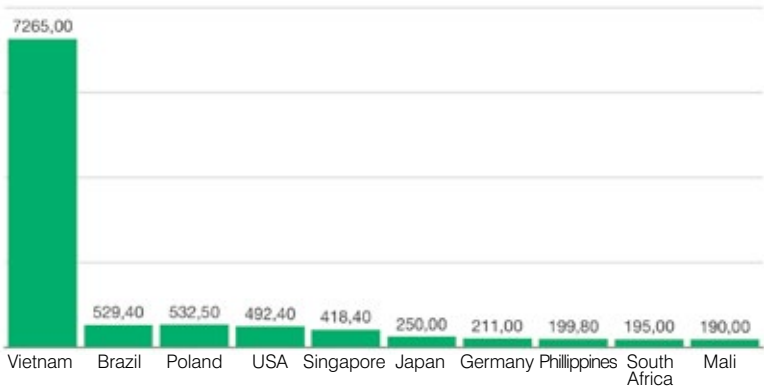
(Kadirli, Drying Facility Operator)

DAPHNE EXPORT

Turkey is the biggest actor in the production and supply of daphne and meets more than 90% of the daphne demand of the world on its own. However, intermediaries complain about failing to meet the demand due to the shortage of raw material and the problems in the supply process.

Historically, the countries which have been importing the largest volume of daphne from Turkey since 1950 include England, Switzerland, Romania, USA, Russia, Canada, Germany, the Netherlands, Syria, and Austria. As of 2015, it is seen that the major part of the daphne is exported

to Vietnam for purposes of delivery to China (see Graphic 3) [7]. As for the export amount and value, daphne is sold to Vietnam at USD 2.15 per kg, to the Russian Federation at USD 2.21 and to Singapore at USD 2.23 whereas the price per kg is higher in case of export to the west; daphne is purchased by Canada at USD 4.75 per kg, Spain at 4.47, England at 4.19, USA at 3.93 and Germany at 3.78 per kg. The reason of this difference is that the quality of daphne exported to the west is high (hand pick selected, unbroken) while the quality of daphne exported to the east is low (ordinary, undersized).



Graphic 3. Daphne Export in 2015 (Ton)

Daphne gathered in the region is exported via İzmir and Mersin. Export companies supply daphne based on demands from foreign countries. Demands vary concerning leaf length, thinness, color, and oil concentration of daphne. The type of daphne exported varies from hand pick selected to broken low-quality leaves not winnowed or cleaned off of its waste. 10 leaves (6 g) are sold at USD/EUR 3 in EU and USA.



Expenses of export companies include packaging, customs (20' standard containers), logistics costs as well as costs of microbiological tests and pesticide standards.

“There are laboratories here, but these come at a certain cost. We usually do this on a container basis. It costs a lot to have each producer’s goods analyzed individually each time. I mean everything that

buyers ask for, pesticide residue or microbiological analyses etc. because each producer has maximum 1-2-ton product so we have to buy 10 tons from 8-10 companies. If we have all required analyses conducted it costs TRY 8-10 thousand. We have these goods analyzed after collecting and processing them. If we buy a bulk of 10 tons or 3-5 tons, we sometimes have it analyzed too. They are inspected abroad and there is a risk that they are returned.”

(İzmir, Export Company)

It is a common practice to deliver goods to a port at buyer’s country, but buyers can also accept the delivery of goods in Turkey. When goods are to be delivered to buyer’s port, ship agents of respective port are contacted. Containers are fumigated to get rid of pests when delivering products. Transport and insurance expenses are determined according to applicable agreement; they can be covered by export company or buyer.

"For example, if I am selling to Geneva / Italy, I get price offers for containers for Port of Geneva from ship agents. They say it is Euro 350 plus local expenses. Regarding local expenses, it includes some other expenses such as the receipt and loading of containers and bill of lading etc. they cost about USD 400. When you add all up, it makes, let's say Euro 700. This is the cost of one container. You load about 6 tons in a container. It costs Euro 110 per ton. You add this to the cost. You also include insurance expenses if you are responsible for covering them."

(Izmir, Export Company)

Powdered dried daphne leaves are used in the paint industry, leather industry, and the making of henna. Unbroken leaves can be used in sauces after grinding.

"Whether the product in a container is pressed or boxed determines transport cost. When you put it in box or press it, the cost differs. When sending abroad, you can send 2800-3000 kg in box in a container of 20. You can send 8 tons if baled. Consequently, it has an impact on the transport cost of goods per ton. In one way you pay USD 300, other way you pay USD 100 per ton."

(Izmir, Export Company)

Daphne leaves are delivered to export companies in various ways. They can be received directly from drying facilities or middlemen in the area are contacted through commissioners until it reaches the amount desired and those middlemen collect and deliver them from drying facilities. When export companies are not in direct contact with drying facilities, they proceed through commissioners or middlemen in respective area.

"Sometimes when you contact producers as an exporter, you buy it at a higher cost. Because when you go there, their expectations get higher. They think they have not come here for nothing. But it does not mean that you can buy goods more easily, at a cheaper price. Therefore, traders in the area can supply it at more convenient conditions. I mean that is the way we usually prefer."

(Izmir, Export Company)

Buyers sometimes demand "hand pick selected". In this case, they have women pick them at places where daphne leaves are collected or at provinces where export companies are located. Of 100 kg daphne leaves, 4-5 kg is obtained in that long, unperforated, unbroken manner as requested by buyer. At the end of this process which is time consuming and cost increasing, hand pick selected daphne leaves are sold at TRY 25-30 per kg.

"It takes time to produce 1-ton product. And it costs much higher. An ordinary or carefully hand-pick selected product which is sold at TRY 7 today can go up to TRY 25-30. Because when a woman picks well, she can pick maximum 4-5 kg. Costs increase. They are delivered in cardboard boxes. This increases costs. "

(Izmir, Export Company)

Finding and supplying leaves worth of hand pick selecting consumes time and spending such a short time period when daphne leaves are collected to obtain high-quality full leaves is not possible most of the time. Therefore, this demand of buyer cannot be always met quickly.

"It cannot always be realized. A German customer asked for price."

I said it could not be done. Could be done only after September. First, you need to find the leaves suitable for such picking. It is not possible now. Only after September. If time is given, October, November."

(Male, Izmir, Export Company)

Especially the low-quality daphne leaves purchased at a low cost by the Far East countries determine the quality of daphne to be collected in general. Meeting the demand is considered enough by villagers, drying facilities and export companies; they do not aim for higher quality. Since a major part of daphne is exported to the Far East, it has become a product where standards are either not set or set by buyers.

DAPHNE AND ITS BY-PRODUCTS ON THE DOMESTIC MARKET

The consumer market purchases small amounts of daphne while a major part of it is used as an input to another production in various operations in the industrial market. Villagers' use of daphne for their own needs is low. Daphne, which is consumed quite little in big cities as well, is mostly exported to foreign countries."

"Our people unfortunately do not benefit from daphne. We produce but do not use it. We do not know how to use it."

(Regional Directorate of Forestry, Antalya)

"Local people do not use or buy it much; mostly the tourists from other cities buy daphne soup. There is daphne in the shop, but we need to keep it present on the booth. Daphne is essential for this place."

(Spice Seller, Hatay)

Daphne is not on high demand at the Spice Bazaar in İstanbul nor is it one of the favorite products of spice sellers. They are not exhibited on booths and taken out of the cabinets in the shops if asked for. They have it at symbolic amounts just to be able to offer it if asked for. 3-4 kg are sold a month in the shops selling it. It is not among the favorite products of spice sellers. Daphne is sold from TRY 40 to 120 per kg at the consumer market. A 100 g pack of daphne with unbroken and unperforated leaves of up to 2.5 cm and broken, perforated, and longer leaves is sold at TRY 20. A small part of daphne leaves of 4 cm and above are unbroken and unperforated. Daphne is mainly purchased by tourists at the Spice Bazaar in İstanbul.

"It is not on high demand, people do not ask for it much. Only the Arab tourists buy it."

(İstanbul, Spice Bazaar trader)

It is hard to find daphne soap in the Spice Bazaar and the few shops selling it on the

alleys out of the bazaar sell 100 g bars at TRY 2,5-7,5. However, it is not one of the favorite products of those shops.

"The one you are holding in your hand contains both olive oil and daphne, its price is 2.5 liras. I also have a soap that is cut in pieces at TRY 30 per kg. It mainly contains daphne."

(İstanbul, Soap Shop)

The domestic daphne consumption is higher at villages which extract oil from the fruit of daphne and produce by-products. Especially the historical value of daphne and the relationship of villagers with daphne in Antakya are different than other places.

"There are people who produce shampoo. They, of course, put certain chemicals in it. It is used in meat dishes. Its oil is used for certain health problems."

(Forest District, Antakya)

Neighborhood bazaars and partially herb sellers make it possible for daphne to directly reach consumers. Villagers rarely directly sell it consumers. Soaps made of the fixed oil extracted from its fruit are sold by villagers to middlemen at TRY 40-60 per kg.

Essential oils (essences) are extracted not from the fruit of daphne but from its leaves and sold at TRY 200-300 per liter. Essential oils extracted by distillation from daphne leaves and containing water-soluble components, vitamins, and minerals are usually used for medical purposes and in the cosmetics industry.

"In our country, it is only used as leaves, oil, or soap, nothing else. A pure bar of daphne soap costed 11 lira 72 kurus last year, only a bar of soap. A small one, like, maximum 50 g. If you calculate its cost per kg, there is no place to sell it. If you put that price you can't find a single person to buy it in Turkey. So what will you do? There are 3

main elements to it: foaming agent, lubricant, and hardener, they put these in it. How many kg have they put in it? 80 kg. They add 20 kg daphne oil in it; here you get daphne soap but not that pure. As daphne essence is really expensive and they cannot find customer to it, it is produced impurely in the country."

(Kadirli, Drying Facility Operator)

"We collect and deliver them to a facility, we extract oil from its fruit and meet our need. The oil is currently sold at TRY 60 per kg; we sell it to everyone. Some come from Hatay. A large can is equal to five kg. We feed wood. We stir it all day. We sell it to everyone at TRY 60, even to traders."

(Hatay, Land Owner)



Broken leaves are used in the cosmetics and pharmaceutical industry. It is seen that powdered daphne leaves are used in the food industry. China had been one of the countries that make the largest purchase of daphne until recently but its purchase has decreased in the last one-two years. The largest daphne buyers include Israel, Poland, Japan, and America.

“Oil can get extracted from daphne leaves. It is used in food, especially in pickling in the Balkan countries. The oil extracted from its leaves is used in cosmetics. Its seeds are mostly used in the healthcare industry.”

(Regional Directorate of Forestry, Antalya)

“As for cosmetics, France and Israel are main players, but the center is İzmir. Oil, soap, shampoo, spice by-products, perfumes, for example Vicks...”

(Regional Directorate of Forestry, Adana)

“We send the goods to Mersin. Then they are exported to abroad, mainly China. We do not know what happens in China. China must be

sending it to Europe. No one has the chance to figure out what happens. Two third of the daphne produced is purchased by China. It goes to various countries. It goes to Poland. To America. To Dubai. To Japan.”

(Kadirli, Facility Operator)

High cost of factories still impedes the production of daphne by-products. When it comes to daphne, the raw material is supplied by value-added products are not produced. Small enterprises owned by people with a more entrepreneurial spirit produce shampoo, cream etc. by traditional methods. However, these products are sold at local level (barber shops, herb sellers etc.).

“Daphne is important to us; non-wood forest products have a wide range of use, are on high demand across the world and provide high profit but it should be stated that we sell it as raw material and unfortunately import by-products at a 20-time, 100-time higher price. This is another issue.”

(Forest District Directorate, Mersin)

FACTORS IMPACTING THE QUALITY OF DAPHNE LEAVES

Essential Oil Concentration (Essence):

Daphne with dark-colored leaves has a higher concentration of essential oils while that concentration reduces as the color gets lighter.

Integrity of Leaves:

The higher the integrity of leaves is, the higher the value daphne has. Broken leaves reduce daphne's value to ordinary or undersize.

Wet Leaves:

Wet leaves getting stained during the drying process reduce the value of daphne.

Stripping and Drying:

Careless stripping and drying of daphne leaves causes the leaves to get broken and stained.

Late Picking:

Aged and deformed leaves due to late picking because of transportation issues reduce the value.

Transportation:

Carrying branches on horseback causes harm to leaves on the road.



MAJOR CHALLENGES IN DAPHNE VALUE CHAIN

- Villagers do not have easy access to daphne at some regions. The collected daphne needs to be carried on the back for a long time.
- Middlemen/mukhtars and villagers hardly reach an agreement on pricing. This prolongs the supply process.
- Drying and picking cannot be made on site.
- Operating facilities cannot work at full capacity due to the shortage of supply.
- Since villagers do not cut trees according to applicable rules, it causes trees to get tired earlier and interrupts the rehabilitation efforts of the regional directorates of forestry.
- The industry wants GDF to put more focus on non-wood forest products.
- Goat grazing.

RECOMMENDATIONS ON DAPHNE PRODUCTION

- To consider villagers' requests about transportation.
- To offer incentives to local private enterprises to prevent any interruption to the supply process and reinforce their organizational capacities. To monitor the pricing process between villagers and the middlemen.
- To encourage on-site drying and picking to increase producers' profit, reduce logistics expenses and reduce environmental impacts caused by the logistics.
- To increase the number and enhance the quality of trainings given to villagers to improve the quality of leaves and the efficiency and to improve and on-site monitor the quality of trainings.
- Sale of products such as daphne soap, cream, or shampoo etc. produced by individual efforts should be supported not only at local level but also at other provinces. To increase domestic consumption by advertising those products across the country.
- To offer grant / loan support to facilities that could produce high added value and high-quality products and to enterprises that have the potential to increase the export.
- To determine grazing areas.

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NON-WOOD
FOREST
PRODUCTS

DAPHNE
VALUE CHAIN