

Assessment of global competitiveness of non-wood forest products: the case of Turkey

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Abstract

Non-wood forest products (NWFPs) contribute economically to all countries of the world and they are an important source of income, especially for people living in or near the forest. They are also used in many sectors such as medicine, chemistry and paint industry. In this respect, the importance of NWFPs is increasing day by day. In this research, the comparative advantage of NWFPs of Turkey was analyzed. In the analysis of research, it was used the revealed comparative advantage, relative trade advantage, and revealed competitiveness. The research is based on secondary data pertaining to the period 2008–2019. Moreover, in order to determine periodic trends, the determined period was evaluated in two sections covering the periods of 2008–2013 and 2014–2019. It has been found that Turkey had a strong competitiveness in NWFPs between years 2008 and 2019. When NWFPs were examined at subgroup level, Turkey has a comparative advantage in the subgroups 8. Furthermore, it was revealed that the competitive advantage of the period 2008–2013 is higher than of the period 2014–2019.

Keywords: non-wood forest products, comparative advantage, trade, exports

Introduction

There are many definitions of non-wood forest products (NWFPs). At a FAO (Food and Agriculture Organization) meeting in Indonesia in 1995, NWFPs was defined as “goods of biological origin, other wooded land and trees outside forests” (Iqbal 1995). When countries report to the Global Forest Resources Assessment (FRA), they define NWFPs as follows: “goods derived from forests that are tangible and physical objects of biological origin other than wood” (Sorrenti 2017). NWFPs are also called “minor forest products”, “other forest products”, “secondary products”, “special forest products”, “natural products”, “non-timber forest and grassland products”, “forest garden products”, “wild products”, “sustainably produced wood products”, “forest biological resources”, and “other economic forest products” (Belcher and Vantomme 2003). NWFPs, which used in different terms, include products (seeds, roots, tubers, stems, leaves, fruits, nuts, vegetables, beverages, spices, etc.) used as food and food additives, products (bamboo, rattan, small wood, fibres, cork, etc.) used as construction material, plant and animal products (leaves, barks, pharmaceuticals extracted from mammals, fishes and reptiles, etc.) used for medicinal, essential oils employed for cosmetics and perfumes, biochemicals (non-edible fats and oils, waxes, gums, latex, dyes, tannins, etc.) (Ros-Tonen 2000, FAO 2014a).

The importance of NWFPs is increasing day by day as the demand for chemical products is diminishing and people are increasing their demand for natural products. NWFPs are used in food, medicine, tea, paint, textile, carpet, cosmetics, leather industry, etc. In developed countries, about 25% of prescription drugs are active substances of plant origin (vinblastine, reserpine, quinine, aspirin, etc.) (Oruç et al. 2019). According to FAO, 30% of the drugs sold worldwide contain compounds derived from plant materials (FAO 2005). Moreover, in developing countries, 80% of the population uses NWFPs for therapeutic purposes. According to the World Health Organization (WHO), the number of NWFPs used for therapeutic purposes in the world is around 20,000 (Kıncı 2015, Kurt et al. 2016b). For example, the leaves, berries and flowers of hawthorn (*Crataegus* spp.) are used to treat heart disease; cranberry juice (*Vaccinium oxycoccos*) is thought to be beneficial for maintaining urinary tract health; and docetaxel derived from yew leaves (*Taxus baccata*) is a chemotherapy drug (Wong and Wiersum 2019).

NWFPs represent an important source of income to both countries and rural people. NWFPs provided 800 million Turkish liras contribute to Turkey’s economy according to the data of 2016 and they also provided income to 220 million Turkish liras to 7 million forest villagers, who live close to the forest or in the forest (Turkiye Gazetesi 2019).

Some NWFPs are also important export commodities. At present, at least 150 NWFPs are significant in terms of international trade and the annual foreign trade volume is around 1.1 billion dollars. Moreover, the 2015 report on the State of Europe's Forests estimated that the total value of NWFPs in the FOREST EUROPE region reached EUR 2.28 billion. Some of them are honey, gum arabic, rattan, cork, nuts, mushrooms, resins, essential oils, and plant and animal products used for pharmaceutical (FAO 2014, Forest Europe 2015, Kurt et al. 2016a). China and India are the world's largest producers and consumers of NWFPs. They are followed by Indonesia, Vietnam, Malaysia, the Philippines and Thailand (Vantomme et al. 2002). The EU is the leader in the supply of products such as mushroom and cork-based products and chestnuts and in processing and exporting some other NWFPs, namely refined vegetable tannins and wild mushrooms. In the remaining other NWFPs, the EU accounts for almost half of total global NWFP imports (Pettenella et al. 2019).

Non-wood forest products are of great importance from a socio-economic point of view. This is because they are among the important sources of income in foreign trade and make important contributions especially in terms of reducing rural poverty and providing local economic development. Furthermore, especially the health and food needs of the vast majority of the world population are met by NWFPs. As a result, NWFPs has the potential to reduce Turkey's dependence on foreign entities. For this, how much NWFPs contribute to the country's economy and the export potential of the products is to be known. However, this is a difficult problem that should be solved by decision makers. For this reason, determining competitiveness of NWFPs has been chosen as the research subject of this paper.

There is no general definition in the literature about what the concept of competitiveness means. The concept of competitiveness, which does not have a full consensus, is a concept that includes phenomena such as continuity in production, increase in value added, sustainable income increase, and production in compliance with standards.

Fagerberg (1988) defined competitiveness as the ability of a country to increase its income and employment level. According to another definition, it is the ability of a country to increase its share in international markets (Hatsopoulos 1988). Michael Porter state that concept of competitiveness at national level is productivity (Porter 1990). According to Krugman (2001), trade competitiveness is ability to produce goods and services meeting the test of international competition. According to the definition of the Organisation for Economic Co-operation and Development (OECD), competitiveness in international trade is a measure of a country's advantage or disadvantage in selling its products in international markets (OECD 2014).

Many indices have been developed to measure competition and competitiveness in the literature with changing definitions in the historical process. The most used indices are the Revealed Comparative Advantage (RCA)

developed by Balassa (1965) and Vollrath (1991), which has been made more useful with the changes made on the RCA. In the literature, there are a few studies on the competitiveness of non-wood forest products. Li and Xu (2008) aimed to determine the competitiveness of NWFPs such as citrus, bamboo shoots, waxberry, and green tea in Zhejiang using the productivity advantage index (EAI), the scale advantage index (SAI), and the aggregated index of advantage (AAI). It was concluded that many counties in Zhejiang province of China have a clear comparative advantage. Yung and Lee (2009) tried to compare and analyze Korea's international competitiveness in terms of non-wood forest products. They used the analyses of revealed comparative advantage, market comparative advantage, and constant market share. As a result, according to the result of data analysis from 2002 to 2006, most products lost their international competitiveness. However, chestnut has a comparative advantage. Costa et al. (2019) analyzed the Brazilian competitiveness in the world market of the main non-wood forest products. It was determined that Brazil is competitive in exports of honey and mate, it has been losing competitiveness in exports of cashew nuts and is in decline as regards natural rubber exports. In the other study, it was aimed to gain a better understanding of the full value of NWFPs using service dominant logic and a value-based approach. For this, actor networks that co-create value in different institutional, social and cultural environments with the help of case studies in Europe and North America were examined. The main network of actors used in the study includes: (a) forests, forest plants, and fungi; (b) family forest owners; (c) forest managers; (d) foragers; and (e) foragers' personal, professional and business social networks. As a result, it has been found that value creation can only be understood by looking at the process and a multi-layered network as a whole. Moreover, NWFPs can increase the competitiveness of rural economies, particularly, through a better study of their full potential (Weiss et al. 2020).

In this study, it was aimed to reveal the comparative advantages of non-wood forest products in Turkey based on sub-product groups by using revealed comparative advantage (RCA), relative trade advantage (RTA), and revealed competitiveness (RC). Moreover, the period from 2008 to 2019 was examined in two parts. With this study, it can be determined how periodic trends change at subgroups level.

Material and methods

Non-wood forest products (NWFPs)

In this study, the Harmonized Commodity Description and Coding System (HS code) was used. The export and import data used for analysis were obtained from Trade Statistic for International Business Development (Trade-Map 2020). The research covers the period of 2008–2019. Moreover, these periods were divided into two sub-groups (2008–2013 and 2014–2019). Therefore, it was aimed to determine the differences in terms of the competitive char-

Table 1. Non-wood forest products used in the study and their codes (TradeMap 2020)

Codes	Definitions
0604	Foliage, branches and other parts of plants, without flowers or flower buds, and grasses, mosses and lichens, of a kind suitable for bouquets or for ornamental purposes, fresh, dried, dyed, bleached, impregnated or otherwise prepared
070951	Fresh or chilled mushrooms of the genus <i>Agaricus</i>
070959	Fresh or chilled edible mushrooms and truffles (excluding mushrooms of the genus <i>Agaricus</i>)
1301	Lac, natural gums, resins, gum-resins, balsams and other natural oleoresins
1401	Vegetable materials of a kind used primarily for plaiting, e.g. bamboos, rattans, reeds, rushes, osier, raffia, cleaned, bleached, or dyed cereal straw, and lime bark
400130	Balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip
121190	Plants, parts of plants, incl. seeds and fruits, used primarily in perfumery, in pharmacy or for insecticidal, fungicidal or similar purposes, fresh or dried, whether or not cut, crushed or powdered (excluding ginseng roots, coca leaf and poppy straw)
140490	Raw materials (bark, roots, stems, stalks, leaves and flower, gall nuts) for colorants and dyes
4501	Natural cork, raw or merely surface-worked or otherwise cleaned; cork waste; crushed, powdered or ground cork
0811	Fruit and nuts, uncooked or cooked by steaming or boiling in water, frozen, whether containing added sugar or other sweetening matter
410120	Whole raw hides and skins of bovine "incl. buffalo" or equine animals, whether dehaired, unsplit, of a weight per skin ≤ 8 kg when simply dried, ≤ 10 kg when dry-salted, or ≤ 16 kg when fresh, wet-salted, or otherwise preserved (excluding tanned, parchment-dressed, or further prepared)
410150	Whole raw hides and skins of bovine "incl. buffalo" or equine animals, whether dehaired or split, of a weight per skin > 16 kg, fresh, or salted, dried, limed, pickled, or otherwise preserved (excluding tanned, parchment-dressed, or further prepared)
410190	Butts, bends, bellies and split raw hides and skins of bovine "incl. buffalo" or equine animals, whether dehaired, fresh, or salted, dried, limed, pickled, or otherwise preserved, and whole raw hides and skins of a weight per skin > 8 kg but < 16 kg when simply dried and > 10 kg but < 16 kg when dry-salted (excluding tanned, parchment-dressed, or further prepared)
4102	Raw skins of sheep or lambs, fresh, or salted, dried, limed, pickled, or otherwise preserved, whether dehaired or split (excluding those with wool on, fleeces of Astrakhan, Caracul, Persian, Broadtail, or similar lambs, or of Indian, Chinese, Mongolian or Tibetan lambs and tanned, parchment-dressed or further prepared)
0409	Natural honey
152190	Beeswax, other insect waxes and spermaceti, whether refined or colored
0802	Other nuts, fresh or dried, whether shelled or peeled (excluding coconuts, Brazil nuts and cashew nuts)
120799	Oil seeds and oleaginous fruits, whether broken (excluding edible nuts, olives, soya beans, groundnuts, copra, linseed, rape or colza seeds, sunflower seeds, palm nuts and kernels, cotton, castor oil, sesamum, mustard, safflower, melon and poppy seeds)
200190	Vegetables, fruit, nuts and other edible parts of plants, prepared or preserved by vinegar or acetic acid (excluding cucumbers and gherkins)
0909	Seeds of anis, badian, fennel, coriander, cumin or caraway; juniper berries
0910	Ginger, saffron, turmeric "curcuma", thyme, bay leaves, curry and other spices (excluding pepper of the genus <i>Piper</i> , fruit of the genus <i>Capsicum</i> or of the genus <i>Pimenta</i> , vanilla, cinnamon, cinnamontree flowers, cloves [wholefruit], clove stems, nutmeg, mace, cardamoms, seeds of anise, badian, fennel, coriander, cumin and caraway, and juniper berries)
0810	Fresh strawberries, raspberries, blackberries, back, white or red currants, gooseberries and other edible fruits (excluding nuts, bananas, kiwifruit, dates, figs, pineapples, avocados, guavas, mangoes, mangosteens, papaws "papayas", citrus fruit, grapes, melons, apples, pears, quinces, apricots, cherries, peaches, plums and sloes)

acteristics of the periodic changes. The NWFPs used in this study and their codes were given in Table 1.

Revealed comparative advantage (RCA)

The RCA was first introduced by Liesner (1958) and then developed by Bela Balassa (1965). RCA is an indicator of a country's level of specialization for the sector and a particular group of commodities compared to the world and a different country group (Peker 2015). The equation (1) for the RCA is below:

$$RCA_{ij} = \frac{\frac{X_{ij}}{X_{it}}}{\frac{X_{wj}}{X_{wt}}}, \quad (1)$$

where:

X_{ij} is country i 's exports of goods j ,

X_{it} is country i 's total exports,

X_{wj} is the world's exports of goods j ,

X_{wt} is the world's total exports.

If $RCA < 1$, it indicates that the sector or commodity has a comparative advantage of the trade. If $RCA < 1$, it indicates that the sector or commodity has a comparative disadvantage (Fertö and Hubbard 2003, Mushanyuri and Mzumara 2013).

To demonstrate the power of comparative advantage, Hiploopen and Van Marrewijk (2001) also divided the RCA in 4 classes:

Class a $0 < RCA \leq 1$; no comparative advantage,

Class b $1 < RCA \leq 2$; weak comparative advantage,

Class c $2 < RCA \leq 4$; medium comparative advantage,

Class d $4 < RCA$; strong comparative advantage.

Relative trade advantage (RTA)

The RTA is the difference between relative export advantage (RXA) and relative import advantage (RMA) (Scott and Vollrath 1992). The RTA accounts for imports as well as exports (Fertö and Hubbard 2003).

The equations of RTA, RXA and RMA are as follows:

$$RTA_{ij} = RXA_{ij} - RMA_{ij} \quad (2)$$

$$RXA_{ij} = \frac{\frac{X_{ij}}{(X_{it} - X_{ij})}}{(X_{wj} - X_{ij})} \cdot \frac{(X_{wt} - X_{it})}{M_{ij}} \quad (3)$$

$$RMA_{ij} = \frac{\frac{M_{ij}}{(M_{wj} - M_{ij})}}{(M_{wt} - M_{it})} \quad (4)$$

where

M_{ij} is country i 's imports of goods j ,

M_{it} is country i 's total imports,

M_{wj} is the world's imports of goods j , and

M_{wt} is the world's total imports.

Revealed competitiveness (RC)

The RC consists of logarithmic forms of the RXA and RMA. A positive value obtained for the RC shows that there is a competitive advantage, and a negative value shows that there is a competitive disadvantage (Fertö and Hubbard 2003, Sarıçoban and Kösekahyaoglu 2017, Madiyarova et al. 2018). The equation of RC is the following:

$$RC_{ij} = \ln RXA_{ij} - \ln RMA_{ij} \quad (5)$$

Results

Foreign trade of NWFPs of Turkey

According to Table 2, NWFPs' export share within the global market has reached nearly USD 58.4 billion. Global NWFPs export constitutes nearly 2 per thousand in overall global export items. NWFPs have an export share of nearly 1% in Turkey. According to 2008, Turkey's NWFPs export

Table 2. Export values and export shares of NWFPs in Turkey and Global Market (TradeMap 2020)

Years	Total Global Export (USD millions)	Total Global NWFPs Export (USD millions)	Total Export of Turkey (USD millions)	Turkey's Total NWFPs Export (USD millions)	Export Share of NWFPs in Turkey (%)	Export Share of NWFPs in Global (%)
2008	15967493	32336	132027	1257	0.95	0.20
2009	12345155	30135	102143	1186	1.16	0.24
2010	15094271	36612	113883	1423	1.25	0.24
2011	18103447	43690	134907	1591	1.18	0.24
2012	18396799	45843	152462	1668	1.09	0.25
2013	18875062	51507	151803	1773	1.17	0.27
2014	18843963	54705	157610	2090	1.33	0.29
2015	16530691	53249	143844	2389	1.66	0.32
2016	16033127	53219	142606	1901	1.33	0.33
2017	17694952	56617	156993	1824	1.16	0.32
2018	19460171	58215	167924	1773	1.06	0.30
2019	18754622	58391	171098	2044	1.19	0.31
2008–2019	17174979	47816	143942	1743	1.21	0.28

reached USD 2.39 billion with rate of 90% in 2015, and according to 2015, NWFPs export declined USD 2.04 billion in 2019. The export values of NWFPs of Turkey tend to increase by years until 2015, and then they tend to decrease.

As can be seen in Table 3, NWFPs' import share within the global market has reached nearly USD 61.1 billion. Global NWFPs import constitutes nearly 3 per thousand in overall global import items. NWFPs have an import share of nearly 2 per thousand in Turkey. In 2012, Turkey achieved the highest import in the NWFPs. According to 2008, Turkey's NWFPs import reached USD 423 million with the rate of 6% in 2019. The import values of NWFPs of Turkey tend to down and up.

The trade balance values of Turkey were given in Table 4. According to the table, the trade balance of NWFPs of Turkey in all years shows a positive trend. Turkey has the highest trade balance for NWFPs in 2015.

Table 3. Import values and import shares of NWFPs in Turkey and Global Market (TradeMap 2020)

Years	Total Global Export (USD millions)	Total Global NWFPs Export (USD millions)	Total Export of Turkey (USD millions)	Turkey's Total NWFPs Export (USD millions)	Export Share of NWFPs in Turkey (%)	Export Share of NWFPs in Global (%)
2008	16337032	34031	201964	399	0.20	0.21
2009	12621698	30969	140928	298	0.21	0.25
2010	15318589	37158	185544	399	0.21	0.24
2011	18335689	44427	240842	600	0.25	0.24
2012	18498877	45826	236545	679	0.29	0.25
2013	18876800	51583	251661	640	0.25	0.27
2014	18892710	54835	242177	516	0.21	0.29
2015	16676011	54974	207236	398	0.19	0.33
2016	16176533	53045	198602	439	0.22	0.33
2017	17918821	55689	233800	488	0.21	0.31
2018	19815055	59233	223047	516	0.23	0.30
2019	19065268	61131	200659	423	0.21	0.32
2008–2019	17377757	48575	213584	483	0.22	0.28

Table 4. Turkey's NWFP trade balance (TradeMap 2020)

Years	Turkey's Total NWFPs Export (USD millions)	Turkey's Total NWFPs Import (USD millions)	Trade Balance of Turkey (USD millions)
2008	1257	399	858
2009	1186	298	888
2010	1423	399	1024
2011	1591	600	991
2012	1668	679	989
2013	1773	640	1133
2014	2090	516	1574
2015	2389	398	1991
2016	1901	439	1462
2017	1824	488	1336
2018	1773	516	1257
2019	2044	423	1621
2008–2019	1743	483	1260

Competitiveness of NWFPs of Turkey

To reveal competitiveness of Turkey in the NWFP trade, the RCA, RTA, and RC indices were used. The mean RCA, RTA, and RC values of Turkey are presented in Table 5. As seen in Table 5, the RCA value of Turkey for the NWFPs (total of 22 subgroups) is about 4.53 between 2008 and 2019. It indicated a revealed comparative advantage. When the NWFPs are analyzed at subgroup level, Turkey has a strong comparative advantage in subgroups 0802, 200190, 0910, and 0909, whilst it has weak spots in the subgroups 0810, 070959, 1401, and 0811. Turkey has a competitive disadvantage in other subgroups. The NWFP, which has the highest competitive advantage, is the subgroup 200190. It is accepted that the higher the RCA coefficient, the higher the competitiveness and competitive advantage.

The RTA value refers to the difference between RXA and RMA values. When examining RTA values, Turkey's RTA values become negative in the ten subgroups, viz. 1301, 400130, 140490, 4102, 4501, 410120, 410150, 410190, 152190, and 120799. The product with the highest competitive disadvantage is subgroup 4102. Subgroups 0604, 070951, 070959, 1401, 121190, 0811, 0409, 0802, 200190, 0910, 0909 and 0810 have positive RTA values. Although the RTA value of subgroup 0709591 is positive, this value is rather low. The positive value of RTA define that the country has a relative trade advantage in the product group.

Table 5. Mean RCA, RTA, and RC values of Turkey in the NWFP trade (TradeMap 2020)

Products codes	RCA	RTA	RC
0604	0.64	0.59	2.72
070951	0.01	0.01	-5.62
070959	1.55	1.56	5.53
1301	0.08	-0.45	-1.88
1401	1.49	1.09	1.19
400130	0.19	-0.12	-1.12
121190	0.81	0.59	1.31
140490	0.55	-0.33	-0.54
4501	0.02	-0.08	-2.08
0811	1.54	1.46	2.95
410120	0.03	-1.35	-4.51
410150	0.01	-0.64	-4.17
410190	0.02	-1.62	-4.39
4102	0.46	-14.15	-3.68
0409	0.76	0.74	5.42
152190	0.07	-1.36	-3.06
0802	10.78	10.52	2.14
120799	0.07	-0.66	-1.77
200190	13.30	14.79	6.16
0910	4.80	4.59	2.59
0909	4.43	3.88	1.92
0810	1.57	1.58	5.40
Total of 22 subgroups	4.53	3.90	1.73

Note: RCA – revealed comparative advantage, RTA – relative trade advantage, RC – revealed competitiveness.

The RC value indicates whether a country has a revealed competitiveness in a product or industry. Turkey has a revealed competitiveness in subgroups 0604, 070959, 1401, 121190, 0811, 0409, 0802, 200190, 0910, 0909 and 0810, whilst it has not a revealed competitiveness in the other subgroups. The calculated RTA and RC values are like the RCA values.

When the RCA, RTA, and RC values of NWFPs are examined in two periods (2008–2013 and 2014–2019), according to Table 6, the RCA index value for non-wood forest products was at average of 2.30 within 2008–2013. It had a medium comparative advantage during this period. With an average of 1.63 between 2014 and 2019, it had a weak comparative advantage. In other words, the competitiveness of non-wood forest products decreases in the period of 2014–2019 compared to the period of 2008–2013. The identification of the sub-products that caused this change will contribute to a realistic discussion of the competitive advantage of the sector. As a result of the evaluations, it was seen that 8 sub-products (070959, 1401, 0811, 0802, 200190, 0910, 0909, and 0810) had a revealed comparative advantage between 2008 and 2013. As a result of the calculation made by taking the average values of the period of 2014–2019, the sub-products with comparative advantage are numerically the same number. Although the RCA values of the products coded 070959, 0811, 0802, 200190, 0910, 0909, 0810 are higher than 1 in both peri-

Table 6. Periodic RCA, RTA, and RC values of NWFPs (TradeMap 2020)

Products codes	2008–2013			2014–2019		
	RCA	RTA	RC	RCA	RTA	RC
0604	0.66	0.62	2.97	0.63	0.57	2.48
070951	0.01	0.01	-4.19	0.00	0.00	-7.04
070959	2.08	2.10	5.70	1.03	1.02	5.36
1301	0.08	-0.29	-1.54	0.08	-0.61	-2.22
1401	2.07	1.74	1.79	0.92	0.43	0.60
400130	0.17	-0.05	-0.30	0.22	-0.19	-1.94
121190	0.93	0.76	1.65	0.68	0.42	0.96
140490	0.58	-0.24	-0.49	0.52	-0.42	-0.60
4501	0.02	-0.07	-2.02	0.02	-0.08	-2.14
0811	1.60	1.55	3.36	1.48	1.37	2.55
410120	0.01	-1.53	-5.35	0.04	-1.17	-3.67
410150	0.02	-0.62	-4.06	0.00	-0.66	-4.29
410190	0.01	-2.17	-4.60	0.03	-1.07	-4.18
4102	0.69	-18.33	-3.58	0.23	-9.98	-3.78
0409	0.49	0.45	3.47	1.04	1.04	7.38
152190	0.06	-2.05	-3.61	0.08	-0.68	-2.52
0802	13.15	13.22	2.38	8.42	7.82	1.89
120799	0.06	-0.38	-1.49	0.08	-0.94	-2.05
200190	15.24	16.99	6.31	11.35	12.59	6.02
0910	5.13	4.99	2.85	4.48	4.19	2.33
0909	5.58	5.35	2.62	3.28	2.40	1.23
0810	1.98	1.99	5.92	1.17	1.17	4.88
Mean	2.30	1.09	0.35	1.63	0.78	0.06

Note: RCA – revealed comparative advantage, RTA – relative trade advantage, RC – revealed competitiveness.

ods, the RCA values for the period of 2008–2013 are higher than the RCA values of the period of 2014–2019. It is noteworthy that the product coded by 0409, which did not have a comparative advantage in the period of 2008–2013, had a comparative advantage in the period of 2014–2019. Another remarkable result is that while the RCA value of the product coded 1401 was above 1 in the period of 2008–2013, its RCA value was below 1 in the period of 2014–2019. Furthermore, it was determined that only six subgroups (400130, 410120, 410190, 0409, 152190, and 120799) showed an upward trend in the product subgroup comparisons, while all the other subgroups showed a downward trend. The values observed demonstrated that the disadvantageous situation was increased.

When the RC values for two periods were analyzed, it was seen that there was a competitive advantage in 11 sub-products (0604, 070959, 1401, 121190, 0811, 0409, 0802, 200190, 0910, 0909, and 0810) in both periods (2008–2013 and 2014–2019). In other words, the export value of 11 products is more than the import value and it means that Turkey is not dependent on these products from outside. As with the RCA value, the RC value of 0409 product is higher in the 2014–2019 period compared to the 2008–2013 period. In the period of 2014–2019, the product with code 200190 still has the highest RC value, although it experienced a decline compared to the previous period (2008–2013). Within the RC index value, products that negatively affected the competitive average of the NWFPs were the products 070951, 1301, 400130, 140490, 450, 410120, 410150, 410190, 4102, 152190, and 120799 in both periods. The RTA values of NWFPs in both periods are like the RCA values.

Discussion

When the results obtained are evaluated in general, NWFPs contribute to an important degree to Turkey's economy. NWFPs contributed TRY 800 million to Turkey's economy (Türkiye Gazetesi 2019). Export has a great importance for the growth and development of the country's economy (Bedük and Ince 2005). In Turkey, various steps are taken to increase exports, such as creating regional export associations, informing the sectors by generating export-oriented reports through Chambers of Commerce and Industry, and providing incentives to businesses engaged in export, etc. (Çoşkun 2019). In order to ensure stability and increase in exports, the export should also diversify on the basis of the product and country where it exports (Acaravcı and Kargı 2015).

When NWFPs are investigated in terms of subgroups, in this study, Turkey are competitive in the products coded by 0802 (other nuts), 200190 (vegetables, fruit, nuts and other edible parts of plants), 0910 (ginger, saffron, turmeric "curcuma", thyme, bay leaves, curry and other spices), 0909 (seeds of anis, badian, fennel, coriander, cumin or caraway; juniper berries), 0810 (fresh strawberries, rasp-

berries, blackberries, back, white or red currants, gooseberries and other edible fruits), 070959 (mushrooms and truffles), 1401 (vegetable materials of a kind used primarily for plaiting), and 0811 (fruit and nuts) and it does not have a competitive advantage in other NWFPs within the scope of the study. In the EU expertise thesis by Erol (2015), it was found that Turkey has high competitiveness in the product group coded by 0752 (seeds of anis, badian, fennel, coriander, cumin or caraway; juniper berries). Ak et al. (2016) stated that *Morchella* spp., *Amanita caesarea*, *Boletus* spp., *Terfezia* spp., *Calocybe gombosa* (St. George's mushrooms) and other fungal species provide foreign exchange to Turkey. In another study, it was found that laurel, pine nuts, thyme, chestnuts, cumin, anise, sage and lime are some of the featured products in Turkey's exports (Kurt et al. 2016b). In a study by Bashimov (2017), it was determined that while Turkey's competitiveness is high in the product groups coded by HS 08 (edible fruit and nuts), HS 14 (vegetable plaiting materials), and HS 20 (preparations of vegetables, fruit, nuts or other parts of plants), it has a comparative disadvantage in the products coded by HS 12 (oil seeds and oleaginous fruits), and HS 13 (lac, gums, resins and other vegetable saps and extracts). In another study, while Turkey's competitiveness in walnuts, which are dried fruits with hard shell, was moderate during the period 2012–2015, it has been determined not to have an advantage in 2016 (Güvenç and Kazankaya 2019). According to *StarTree* web-panel survey, it was determined that most of the households in Turkey (more than 60% of those surveyed) consume wild edible and medicinal plants, wild berries, forest foliage and greenery, wild nuts, and wild mushrooms (Pettenella et al. 2019).

Conclusions

In this study, Turkey's competitiveness in NWFPs trade were evaluated and made some suggestions. Three indices (RCA, RTA, and RC) were used for this purpose. Moreover, the determined periods were evaluated in two sections covering the periods of 2008–2013 and 2014–2019 to determine periodic trends. At the end of the study, the following results were found which are based on the results obtained; the following suggestions can be made:

It was determined that the export and import share of NWFPs of Turkey are quite low.

When the foreign trade balance of NWFPs is examined, Turkey has a positive trend and the highest trade balance for NWFPs in 2015.

A total of 22 NWFPs was also examined and it was determined that Turkey has also highly competitiveness.

It was determined that the NWFP, which has the highest competitive advantage, is the product coded by 200190 (vegetables, fruit, nuts and other edible parts of plants), whilst the product with the highest competitive disadvantage is the subgroup 4102 (raw skins of sheep or lambs).

When the competitive advantage of NWFPs was examined in two periods, it was found that the competitive advantage of the 2008–2013 period is higher than the 2014–2019 period.

Countries should pay more attention to products that are especially important in foreign trade and necessary precautions should be taken. In the case of low-competitive products, extensive foreign market research should be conducted to reduce dependence on foreign markets.

The output of the products with low production amount and high foreign trade value should be increased and supported more. Trainings should be given to the people who collect non-wood forest products. The measures should be taken to prevent informality in NWFPs.

Just as innovation is required in every sector to keep up with social and economic changes, innovation is also required in the field of NWFPs. Innovative products or processes in the NWFP field will support rural economies, provide job opportunities, generate income, bring valuable and competitive products to the market (Weiss et al. 2019).

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