Journal of Anatolian Environmental and Animal Sciences
(*Anadolu Çevre ve Hayvancılık Bilimleri Dergisi*)
DOI: https://doi.org/10.35229/jaes.1482999

JAES
Year: 9, No: 4, 2024 (501-507)
AÇEH
Yıl: 9, Sayı: 4, 2024 (501-507)

ARAŞTIRMA MAKALESİ **RESEARCH PAPER**

Import and Export Dynamics of Fishing Hooks and Equipment in Türkiye: A Twenty-Year Analysis

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Received: *13.05.2024* ***Accepted:*** *09.10.2024* ***Published:*** *31.12.2024*

How to cite: **Demirci, S. (2024).** Import and export dynamics of fishing hooks and equipment in Türkiye: A twenty-year analysis. *J. Anatolian Env. and Anim. Sciences*, ***9***(4), 501-507. https://doi.org/10.35229/jaes.1482999

Atıf yapmak için: **Demirci, S. (2024).** Türkiye'de olta iğneleri ve ekipmanları ithalat ve ihracat dinamikleri: Son yirmi yıllık analiz. *Anadolu Çev. ve Hay. Dergisi*, ***9***(4), 501-507. https://doi.org/10.35229/jaes.1482999

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Abstract: This study evaluates the dynamics of fishing hooks trade in Türkiye by analyzing detailed import and export data collected over the last 20 years (2004-2023), focusing on how global events and technological innovations influence these trends. Data were obtained from the Turkish Statistical Institute (TurkStat), encompassing volume and value metrics for various types of fishing equipment, including hooks, rods, and reels. A comprehensive time-series analysis was employed to assess trends, utilizing methodologies such as moving averages and ARIMA modeling to interpret the shifts in trade patterns. During the 2004-2008 period, imports of fishing hooks and equipment increased significantly from USD 316,265 to USD 1,209,804, indicating a growing dependency on foreign products, particularly from China. This surge highlights external pressures on local manufacturing and underscores the strategic need for trade policy adjustments to support domestic production. The COVID-19 pandemic in 2019 temporarily reduced import volumes due to disruptions in global supply chains and decreased consumer demand, but a resurgence was observed in 2023 as markets stabilized. The findings of this study highlight the necessity for Türkiye to enhance its competitive position in the global market by adopting new technologies and reducing dependency on imports, thus ensuring economic resilience and sustainability in its fishing hooks sector.

Keywords: Fishing hooks, trade trends, Türkiye fisheries.

Türkiye'de Olta İğneleri ve Ekipmanları İthalat ve İhracat Dinamikleri: Son Yirmi Yıllık Analiz

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Öz: Bu çalışma, son 20 yılda (2004-2023) toplanan ayrıntılı ithalat ve ihracat verilerini analiz ederek, küresel olayların ve teknolojik yeniliklerin bu eğilimleri nasıl etkilediğine odaklanarak, Türkiye'deki balıkçılık malzemeleri ticaretinin dinamiklerini değerlendirmektedir. Kancalar, kamışlar ve makaralar da dahil olmak üzere çeşitli balıkçılık ekipmanı türleri için hacim ve değer ölçümlerini kapsayan veriler Türkiye İstatistik Kurumu'ndan (TÜİK) elde edildi. Ticaret kalıplarındaki değişimleri yorumlamak için hareketli ortalamalar ve ARIMA modellemesi gibi metodolojiler kullanılarak eğilimleri değerlendirmek amacıyla kapsamlı bir zaman serisi analizi kullanıldı. 2004-2008 döneminde olta kancası ithalatı önemli ölçüde artarak 316.265 ABD Dolarından 1.209.804 ABD Dolarına yükseldi; bu durum, başta Çin olmak üzere yurt dışına bağımlılığın arttığını gösteriyor. Bu artış, yerel imalat üzerindeki dış baskıları vurguluyor ve yerli üretimi desteklemek için ticaret politikası ayarlamalarına yönelik stratejik ihtiyacın altını çiziyor. 2019 yılındaki COVID-19 salgını, küresel tedarik zincirlerindeki aksamalar ve azalan tüketici talebi nedeniyle ithalat hacimlerini geçici olarak azalttı, ancak 2023'te piyasaların istikrara kavuşmasıyla yeniden bir canlanma gözlendi. Bu çalışmanın bulguları, Türkiye'nin yeni teknolojileri benimseyerek ve ithalata bağımlılığı azaltarak küresel pazardaki rekabetçi konumunu güçlendirmesi ve böylece balıkçılık ekipmanları sektöründe ekonomik dayanıklılık ve sürdürülebilirliği sağlamasının gerekliliğini vurgulamaktadır.

Anahtar kelimeler: Oltalar, Ticaret Trendleri, Türkiye Balıkçılık.

INTRODUCTION

Recreational fishing, particularly in developed countries, involves more individuals and often has a higher economic value compared to commercial fishing (Tunca et al., 2016; Soykan & Cerim, 2018). Recreational fishing can create a broad economic impact beyond fish catching, and management approaches in this sector need to differ from commercial fishing. Also, significant global disparities have in access to recreational fishing (Hilborn & Hilborn, 2019). Recent studies asserts that recreational fishing constitutes a significant recreational dimension globally, and sustainable fishing behaviors should be promoted within this sector's management (Arlinghaus et al., 2019). This involves integrating recreational fishers into the decision-making processes and enhancing data collection and monitoring practices. Recreational fishers are becoming the predominant users in inland and coastal waters, reaching impacts comparable to commercial fishing. Recreational fishing is not only for leisure but also serves as a significant source of nutrition. So, need for resource managers and policymakers to better comprehend the contributions of recreational fishing to overall food security and nutrition. Therefore, understanding the impact of fish caught by recreational fishers on food safety and individual nutrition is crucial (Cooke et al., 2018).

The global fishing hooks and equipment market, and other tackle, has been valued at significant outputs with expectations for continued growth. As of 2023, the market size was estimated at approximately USD 13,672 million and is projected to grow at a compound annual growth rate (CAGR) of 4.3%, reaching around USD 17,601 million by 2029 (Market Data Forecast, 2023). This growth is driven by increasing participation in recreational fishing and advancements in fishing gear technology. China is one of the leading producers of fishing equipment, including fishing hooks. For instance, Poyang Chang Ming Fishing Hook Co., Ltd., a prominent manufacturer in Jiangxi, reported an annual production of over 1.22 billion fishing hooks, indicating the extensive scale of operations within the country (Poyang Chang Ming Fishing Hook Co., Ltd.). This volume suggests that China plays a significant role in satisfying global demand for fishing hooks.

The interest in recreational fishing in Türkiye is growing day by day, with significant socio-economic impacts and sustainability issues emerging as important areas of research (Taşkın et al., 2017; Demirci & Arslantaş, 2018; Demirci et al., 2018a; Tunca et al., 2018; Ateşşahin, 2019; Şimşek et al., 2019). Recent studies in Turkiye showed that the economic values and expenditures of amateur fishermen, highlighting the positive regional economic effects of recreational fishing (Ulaş et al., 2019). This detailed examination of the social and economic dimensions of amateur fishing activities also noted significant variations in fishing efforts across different districts. Another study in Ordu province calculated the economic value of recreational fishing activities using Contingent Valuation and Travel Cost Methodologies, reporting a substantial economic impact for the region (Aydın et al., 2013). Such studies help us understand the role of recreational fishing in regional development and shed light on the socio-demographic aspects of fishing activities. Economic and harvest impacts of Marine Recreational Fishing (MRF), revealing that current recreational fishing policies in Türkiye are insufficient for sustainability and preventing fishing conflicts. So, need for more effective policy and enforcement mechanisms to manage fishing activities sustainably (Ünal et al., 2010). It emphasizes the importance of establishing monitoring, control, and surveillance programs to ensure the sustainability of fish resources and fisheries, including MRF. Environmental impacts of local recreational fishing activities and the pressures they place on ecosystems, suggesting that management strategies need to be enhanced (Demirci et al., 2018b; Demirci & Arslantaş, 2018). These recent studies in Türkiye provide a comprehensive evaluation of recreational fishing activities in Türkiye, offering crucial insights for policymakers in the field. Also, the literature serves as valuable resources for understanding the social, economic, and environmental dimensions of recreational fishing in Türkiye.

In this study, the import and export data of fishing hooks and equipment in Türkiye were analyzed over the past 20 years to assessing the economic and environmental dimensions of these trade flows. The aim of this study is to evaluate the dynamics of international trade within Türkiye's fishing industry and its impacts on sustainable fishing practices. After that, second goal is to offer policy and strategy optimization recommendations for Türkiye in this sector. Therefore, the study focused on changes in import and export trends, local production capacities, and Türkiye's competitive position in global markets. This scientific assessment intends to serve as a vital reference for both academic circles and industry policymakers.

MATERIAL AND METHOD

Data Collection: This study utilized comprehensive foreign trade data spanning two decades obtained from the Turkish Statistical Institute (TurkStat). The collected data encompassed both volume and value metrics for imports and exports of various types of fishing equipment. Variables included country of origin, type of equipment, seasonal variations, and trade volumes. All necessary permissions for data access were secured.

Data Analysis; *Data Cleaning:* The initial phase involved rectifying inconsistencies such as duplicate entries and missing values. Criteria for data corrections were established to maintain integrity throughout the dataset.

Data Preparation: The dataset underwent transformations and normalization to render it suitable for analysis, which included converting currencies to a standard unit and standardizing measurements across the dataset.

Trend Analysis: Time-series analyses were conducted using annual data points to assess import and export patterns. These analyses utilized moving averages and time-series decomposition to dissect both annual and cumulative trends comprehensively.

Graphical Representation: The results from the trend analyses were visualized through various graphical representations to facilitate easier interpretation of complex data patterns and trends. Graphs used included line graphs, bar charts, and pie charts. Interactive elements or dashboards were also integrated to allow users to explore the multidimensional nature of the data.

Predictive Modeling: Linear regression modeling was applied for predicting future trends. The selection of this model was justified by testing assumptions such as linearity, homoscedasticity, and the normal distribution of residuals. Alternative models, such as AutoRegressive Integrated Moving Average (ARIMA) models, were also evaluated based on the characteristics of the dataset. The best ARIMA model for the data based on both the lowest AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) values is with the parameters p=0, d=2d=2, and q=1q=1.q=1. This model indicates that a second-order differencing and a first order moving average process are appropriate for this time series.

$$AIC=2k-2\ln(L)$$

$$BIC=k\ln(n)-2\ln(L)$$

where k represents the number of parameters in the model, and L represents the maximum likelihood of the model. Lower AIC and BIC values indicate a better fit to the data.

The graphical and modeling outcomes were interpreted to draw conclusions about the trade dynamics of fishing hooks and equipment in Türkiye. The study correlated the observed trends with economic theories and proposed policy implications based on the findings. Limitations of the study were acknowledged, and recommendations for further research were proposed.

RESULTS

In this study, we analyzed the import and export dynamics of fishing hooks and equipment in Türkiye, categorized into five main types: hooks, rods, reels, ready-to-use setups, and other fishing-related items. The findings are visually represented in two distinct figures within the paper. Import data for fishing hooks and equipment over the study period are comprehensively displayed in Figure 1. This figure categorizes the imported fishing hooks and equipment into hooks, rods, reels, ready-to-use setups, and other related items. The data are presented in a series of graphs, each representing a category with their respective volumes and values over the past two decades. This graphical representation helps in understanding the import trends and identifying peak import periods or significant changes in import behavior over time. Export data are similarly detailed in Figure 2, which is structured to parallel the import data presentation in Figure 1 for direct comparison. It shows the export trends for the same categories of fishing equipment. Each graph within the figure depicts the annual export volumes and values, providing insights into the growth or decline trends in the export of fishing hooks and equipment from Türkiye.

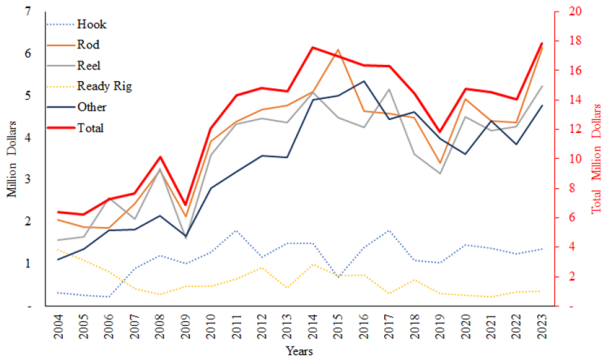

Figure 1. Annual Import Trends of fishing hooks and equipment Categories in Türkiye (2004-2023) by USD.

In Figure 1, the data are segmented into five categories: hooks, rods, reels, ready rigs, and other fishing-related equipment, each represented by a unique line graph with hooks in blue, rods in orange, reels in silver, ready rigs in yellow, and others in navy blue; additionally, the total combined export value for all categories is depicted by a red dashed line, highlighting overall trends and fluctuations in Türkiye's fishing hooks and equipment exports over the observed period, with the Y-axis on the left corresponding to the individual category values, while the right Y-axis shows the total export values, facilitating a comprehensive view of both specific and aggregate trends.

In Figure 2, the data, segmented into five categories-hooks, rods, reels, ready rigs, and other fishing-related equipment are each represented by unique line graphs (hooks in blue, rods in orange, reels in silver, ready rigs in yellow, and others in navy blue); a red dashed line depicts the total combined export value for all categories, highlighting overall trends and fluctuations over the

period, with the left Y-axis indicating the values for individual categories and the right Y-axis showing the total export values, providing a comprehensive view of both specific and aggregate trends.

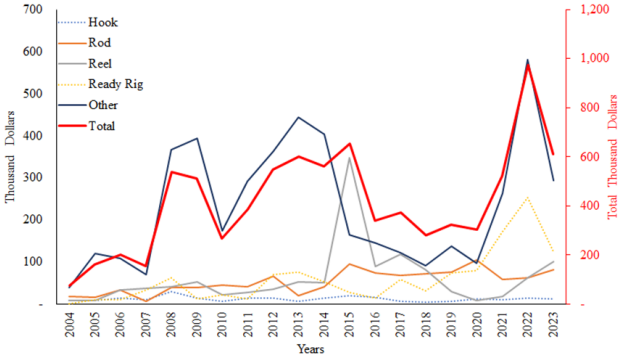

Figure 2. Annual Export Trends of Fishing Hooks and Equipment Categories in Türkiye (2004-2023) by USD

Time series plots reveal a consistent increase in import and export figures across most categories. For example, in the Hook category, imports increased from USD 316,265 in 2004 to USD 1,209,804 in 2008. Similar growth trends are observed in the Rods and Reels categories. Particularly, the 'Other' category exhibits significant fluctuations that closely follow the overall trends observed in the total import and export data. This suggests that this category may encompass a variety of products not strictly falling under traditional fishing hooks and equipment categories such as hooks, rods, or reels. The imports in the 'Other' category rose from USD 1,096,184 in 2004 to USD 2,151,453 in 2008.

The similar trend patterns between the 'Other', 'Ready Rig', and total values indicate that there may be frequent changes in the types of products imported and exported under these categories. The 'Other' category likely functions as a catch-all for new types of products entering the market, which may not yet have been fully categorized or standardized in trade records. The notable variability of this category could reflect the dynamic nature of the market, highlighting rapid introductions of new products and innovations.

Additionally, the data shows a steady increase in the diversity and volume of traded fishing hooks and equipment over the years. The continual upward trend in both imports and exports underscores the robust demand and supply dynamics in the Turkish fishing hooks and equipment sector. However, the significant volume in the 'Other' category suggests that many products do not neatly fit into the existing classification system, which might indicate the need for a more refined categorization system that can better accommodate the evolving landscape of fishing equipment.

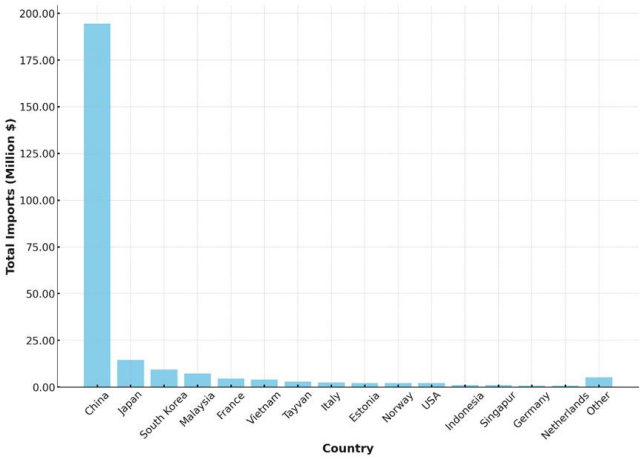

Figure 3. Total Imports of fishing hooks and equipment by Country into Türkiye in two decade year by millions of USD (2003-2023).

It is stated that the best ARIMA model for the dataset, based on both AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) values, is obtained with the parameters p=0p=0, d=2d=2, and q=1q=1. This model indicates that second-order differencing and a first-order moving average process are appropriate for this time series. As a result, using this model, forecasts for Türkiye's fishing hooks and equipment imports and exports over the next 10 years have been made. The predictions suggest that the import trends will continue in the future. These findings provide important insights into how the trajectory of import dynamics and changes in economic policies may unfold in the coming years. Figure 3 showcases Türkiye's fishing rod imports over the past 20 years, highlighting China's predominant position in this market. While China leads significantly due to its vast production capabilities and cost efficiencies, this dominance may not be entirely beneficial for Türkiye. The heavy reliance on Chinese imports, which significantly surpasses imports from other countries, could potentially undermine local manufacturers and affect the competitive balance within Türkiye's domestic market.

Over the 15-year period depicted, imports from China totaled approximately $194.52 million, starkly overshadowing imports from any other country. This data underscores Türkiye's dependence on Chinese fishing rods and suggests a need for strategic considerations regarding trade policies and the support of local industries to enhance economic resilience and sustainability.

Figure 4 displays the historical data and future projections of fishing rod imports from China to Türkiye, expressed in millions of dollars. Historical data, shown in blue, covers the period from 2003 to 2023, while future predictions, shown in green, extend from 2024 to 2033. Imports started at approximately $4.24 million in 2004 and have shown a general upward trend over the years, reaching around $13.79 million in 2023. Using a polynomial regression model, it is forecasted that imports

will continue to increase gradually, potentially reaching around $20 million by 2033. These projections suggest that imports from China will continue to grow in the coming years, potentially increasing Türkiye's dependence on Chinese-made fishing rods. This information should be considered in future trade and industrial policy formulations to address the increasing reliance and its implications.

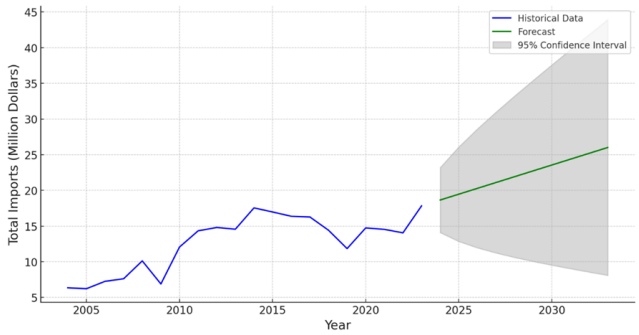

Figure 4. Historical and Forecasted Trends of Fishing hooks and equipment Imports in Türkiye from China (2003-2033).

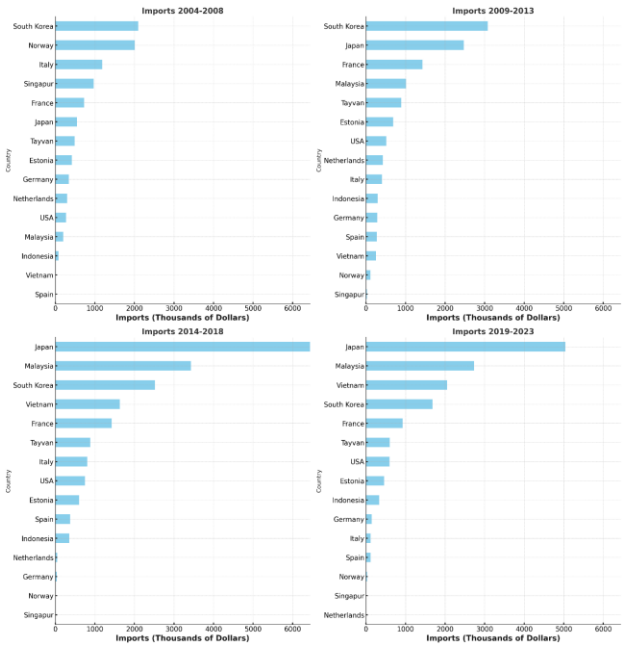

Figure 5. Türkiye's Total Fishing hooks and equipment Imports by Countries in the last 20 years in 5-year periods (2004-2023).

Analyzing the import data across various countries from 2004 to 2023, several trends and shifts emerge. South Korea starts with the highest imports, around 6,000 thousand dollars in 2004-2008, but experiences a gradual decline to about 5,000 thousand dollars by 2019-2023, possibly reflecting changes in domestic production capabilities or shifts in trade policies. Japan, initially at lower import values of around 2,000 thousand dollars in 2004-2008, witnesses a significant rise, reaching approximately 5,500 thousand dollars by 2019-2023, indicating a growing dependence on imports, perhaps due to an increase in consumer demand or a strategic shift in industrial inputs.

Vietnam's imports show robust growth, from about 1,500 thousand dollars in 2004-2008 to around 3,500 thousand dollars in 2019-2023, highlighting its rising role in global trade networks. Malaysia's imports oscillate but trend upwards from 2,000 thousand dollars to nearly 4,000 thousand dollars, reflective of its economic diversification. Indonesia shows modest growth in imports from about 2,500 thousand dollars to 3,000 thousand dollars, possibly influenced by its economic policies and commodity market dependencies. Taiwan exhibits fluctuations in import values, with about 3,000 thousand dollars in 2004-2008, decreasing and then slightly increasing to 3,500 thousand dollars by 2019-2023, a pattern linked to its key industries like electronics. The USA and Singapore show relatively stable import figures, maintaining their positions with slight variations, indicative of their stable economic conditions and consistent trade policies. France and Italy, however, show a decline in import activity, particularly Italy, which drops off the list by 2019-2023, possibly due to economic stagnation or competitive pressures in European markets. Other European countries like Germany, the Netherlands, and Spain exhibit variable import figures, with Germany and the Netherlands showing a general decline, while Spain's imports decrease significantly, reflecting broader economic trends in the Eurozone.

DISCUSSION

The study has comprehensively evaluated the trade dynamics of fishing hooks and equipment in Türkiye over the last two decades, highlighting the significant shift towards the import of new and technologically advanced fishing gear while traditional items like hooks maintained a steady import rate. Yıldırım et al. (2022) supports the finding that technological advancements and market dynamics play a crucial role in shaping the competitiveness of Türkiye's fishing and aquaculture sectors (Yıldırım et al., 2022). Specifically, the observed growth trends among different equipment categories are crucial for understanding Türkiye's competitive position in global markets.

The findings indicate a significant increase in imports of categories such as hooks and rods from 2004 to 2008. This increase can be considered a factor that enhances Türkiye's dependency on these products. Particularly, the concentration of imports from China in these categories increases competitive pressure on local manufacturers, potentially having adverse effects on the sustainability of local production. This situation highlights the economic consequences and strategic policy needs of Türkiye's dependency on the fishing hooks and equipment

market. In this context, strategic policies need to be developed to balance the import and export of recreational fishing hooks' equipment and support local production. Additionally, supporting local manufacturers can help create a more competitive and sustainable structure in Türkiye's fishing hooks and equipment sector. These strategies are important for both economic growth and environmental sustainability.

Moreover, time series analyses of import and export data serve as a guide in identifying long-term trends and potential risks in Türkiye's fishing hooks and equipment sector. These analyses emphasize the need to quickly adapt to new market dynamics. Finally, such analytical studies provide an essential reference point for policymakers in strategic decision-making processes. While the COVID-19 pandemic has affected the fishing industry as a whole in general, it has led to additional complexities in the fishing hooks and equipment trade in particular (Can et al., 2020; Demirci et al., 2020). According to Rajamohan & Kanchana (2021), the fisheries sector worldwide, including Türkiye, experienced disruptions due to government and private sector adjustments to the pandemic, affecting both the supply chain and consumer demand patterns (Rajamohan & Kanchana, 2021). In our analysis, we observed a downturn in import activities during the peak periods of the pandemic, likely due to these disruptions. However, the resurgence in imports by 2023 suggests a recovery aligning with global economic stabilizations post-pandemic.

Furthermore, the diversification in fishing hooks and equipment imports highlights an evolving market responding to global trends and consumer preferences. The increase in the import of innovative fishing gear not traditionally categorized, such as electronic fish finders and specialized baits, points to a market expansion beyond conventional items. This aligns with findings by Guzel et al. (2013), who noted an increased trade between Türkiye and Japan in fish-related commodities, emphasizing the importance of adapting to international standards and consumer preferences in different markets (Guzel et al., 2013).

CONCLUSION

This comprehensive analysis over the past two decades has illuminated the evolving landscape of Türkiye's fishing hook and equipment trade. It is evident that global events and technological innovations have significantly shaped the trade patterns. The increasing dependence on imports, especially from China, underscores a critical vulnerability in Türkiye's economic landscape with respect to the fishing industry. Such dependencies not only challenge the sustainability of local production but also stress the need for strategic trade policies that foster domestic manufacturing resilience. the evolving variety and volume of traded equipment signal a dynamic market ready for innovative products. Türkiye must therefore align its trade and industrial policies to harness these emerging opportunities, ensuring a balanced and sustainable growth in its fishing hooks and equipment sector. Going forward, a continued focus on detailed data collection and analysis will be essential to navigate these complex trade dynamics effectively, ensuring that Türkiye remains agile in a competitive global landscape.

COMPLIANCE WITH ETHICAL STANDARDS

Authors' Contributions

Sevil Demirci: Conceptualization, Data validation, Methodology, Statistical analysis, Discussion of the results, Writing, Reviewing and editing original draft.

Conflict of Interest

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Ethical Approval

The author declares that formal consent is not required for this type of study.

Funding

The author received no funding for this article.

Data availability

The author confirms that data supporting the findings of this study are available within the article.

REFERENCES

Arlinghaus, R., Abbott, J.K., Fenichel, E.P., Carpenter, S.R., Hunt, L.M., Alós, J., Klefoth, T., Cooke, S.J., Hilborn, R., Jensen, O.P., Wilberg, M.J., Post, J.R. & Manfredo, M. J. (2019). Governing the recreational dimension of global fisheries. *Proceedings of the National Academy of Sciences*, ***116***(12), 5209-5213. DOI: 10.1073/pnas.1902796116

Ateşşahin, T. (2019). Bleeding status, handling time and initial mortality of recreational fisheries in chub (*Squalius cephalus*)(Linnaeus 1758). *Fresenius Environmental Bulletin, **28***(4A), 3401-3407.

Aydın, M., Tunca, S., Karadurmuş, U. & Durgun, D. (2013). Valuation of recreational fishing benefits: A snapshot from Ordu, Turkey. *Ege Journal of Fisheries and Aquatic Sciences, **30***(4), 147-154. DOI: 10.12714/egejfas.2013.30.4.01

Can, M.F., Şimşek, E., Demirci, A., Demirci, S. & Akar, Ö. (2020). The evaluation of the early impacts of the COVID-19 pandemic on the export of fishery commodities of Turkey. *Marine and Life Sciences, **2***(1), 18-27.

Cooke, S.J., Twardek, W.M., Lennox, R.J., Zolderdo, A.J., Bower, S.D., Gutowsky, L.F.G., Danylchuk, A.J., Arlinghaus, R. & Beard, D. (2018). The nexus of fun and nutrition: Recreational fishing is also about food. *Fish and fisheries, **19***(2), 201-224. DOI: 10.1111/faf.12246

Demirci, A., Şimşek, E., Can, M.F., Akar, Ö. & Demirci, S. (2020). Has the pandemic (COVID-19) affected the fishery sector in regional scale? A case study on the fishery sector in Hatay province from Turkey. *Marine and Life Sciences, **2***(1), 13-17.

Demirci, A., Şimşek, E., Demirci, S., Akar, Ö. & Bayraktar, O. (2018b). Recreational Fishing Competitions in Turkey. I*nternational Ecology 2018 Symposium Abstract Book* (Vol. 505).

Demirci, S. & Arslantaş, E. (2018). Economic potential and environmental effects of recreational fishing activity in coast of Iskenderun Bay. *Fresenius Environmental Bulletin, **27***(12A), 9352-9356.

Demirci, S., Demirci, A., Arıca, Ş.Ç. & Özyılmaz, A. (2018a). Economical potential of recreational fishing. *International Erdemli Symposium 2018* (pp. 882-885).

Guzel, M.M., Kameda, K. & Yamamoto, N. (2013). Comparison of Fisheries Sectors of Japan and Turkey in Production and Trade Opportunities. *The International Business & Economics Research Journal (Online), **12***(2), 139-150. DOI: 10.19030/iber.v12i2.7626

Hilborn, R. & Hilborn, U. (2019). *Ocean Recovery: A sustainable future for global fisheries?*. Oxford University Press.

Market Data Forecast. (2023). Global fishing equipment market analysis and forecast to 2029. Retrieved from https://www.marketdataforecast.com/

Poyang Chang Ming Fishing Hook Co. Ltd. (n.d.). Annual production report. Retrieved from https://changminghook.en.made-in-china.com/

Rajamohan, S. & Kanchana, S. (2021). Impact of COVID-19 on fisheries sector. *Shanlax International Journal of Management, **9***(1), 25-33. DOI: 10.34293/management.v9i1.3853

Soykan, O. & Cerim, H. (2018). General Aspects of Recreational Angling and Some Estimations on Catch Amounts in Turkey. *Düzce University Journal of Science & Technology, **6***(4), 1441-1452. DOI: 10.29130/dubited.393756

Şimşek, E., Akar, Ö. & Şereflişan, H. (2019). The estimation of economic capacity and ecological effects of recreational fishing activities in the Iskenderun Bay. *1st International Conference on Environment, Technology and Management (ICETEM) Proceedings Book*, 970-973.

Taşkın, E., Yağci, K. & Görkem, O. (2017). Recreational Fishing as a Tourism Event and the Potential of Turkey. *Developments in Social Sciences*, 709.

Tunca, S., Aydın, M., Karapıçak, M. & Lindroos, M. (2018). Recreational fishing along the middle and Eastern Black Sea Turkish coasts: biological, social and economic aspects. *Acta Adriatica, **59***(2), 191-206. DOI: 10.32582/aa.59.2.4

Tunca, S., Ünal, V., Miran, B., Güçlüsoy, H. & Gordoa, A. (2016). Biosocioeconomic analysis of marine recreational fisheries: a comparative case study from the Eastern Mediterranean, Turkey. *Fisheries Research, **174***, 270-279. DOI: 10.1016/j.fishres.2015.10.025

Ulaş, A., Tunca, S. & Aydin, İ. (2019). Recreational Fishing on the Coastal Hot Spots of İzmir Inner Bay (Aegean Sea, Turkey): Socio-economics and Management Implications. *Acta Adriatica, **60***(2), 157-180. DOI: 10.32582/aa.60.2.5

Ünal, V., Acarlı, D. & Gordoa, A. (2010). Characteristics of Marine Recreational Fishing in Çanakkale Strait (Turkey). *Mediterranean Marine Science, **11***(2), 315-330 DOI: 10.12681/mms.79

Yıldırım, Ç., Türkten, H. & Ceyhan, V. (2022). Evaluation of competitiveness power of fishing and aquaculture industry in Turkey. *Ege Journal of Fisheries and Aquatic Sciences, **39***(3), 243-252. DOI: 10.12714/egejfas.39.3.10