

# Scientometric Analysis on Gender in Fisheries and Aquaculture: Global and Indian Trends

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#### Abstract

A scientometric study on usage of gender neutral terms along with trends and patterns followed in literature corresponding to fisheries and aquaculture research, was undertaken, using Web of Science as a tool. It was found that a relatively high percentage (51.03% and 49.09%) of documents mentioned 'fishers' and 'fishermen' respectively. In contrast, in global literatures, individual and multiple mentions were less common for fisherwomen (1.8%) and fisherfolk (2.1%) between 2015 and 2021. In the Indian scenario, from 1990 to 2021, a relatively high percentage (59.6%) of documents that mentioned 'fishermen' also mentioned one of the other terms above, as individual and multiple mentions were less common for 'fishers' (36.6%), 'fisherfolk' (12%), and fisherwomen (7%). Also, the examination of equivalent terms for 'fishers,' 'fisherman,' and 'fisherwoman' revealed patriarchal notions in linguistic differences in how fishers are represented across Indian languages, reflecting deep-rooted societal biases and cultural diversity. Globally, the USA was found to be the main contributor in quantifiable terms (26.7%). Among journals, 'Maritime Studies' has the highest record count for publications (5%), whereas total citations (554) and average citation per paper (55.4) were found to be highest for the 'Fish and Fisheries' journal. In this

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regard, quantifying gender research can be a support and addendum to the present pool of literature and knowledge available in the field of gender in fisheries and aquaculture studies.

**Keywords**: Aquaculture, fisheries, fishermen, fishers, gender, scientometrics

# Introduction

Gender refers to behaviours learned through the socially prescribed roles which are diverse and dynamic. Sex is the biological trait of male and female animals. Gender analysis in natural resource management is often challenging due to the scarcity of gender-disaggregated data and the continuing invisibility of women's contributions. In fisheries, gender may be described as peoples' role in their society and how these interact with activities in fishing, the fishing economy, and fisheries management. Recognising and addressing gender dynamics is vital in the fisheries sector. Yet, there is often a gap in understanding gender and the value of gender research in this sector, according to USAID (2018). This lack of understanding can hinder efforts to promote gender equality and empower women in the fisheries sector, leading to socio-economic disparities and missed development opportunities.

To provide context, the global fish production reached 223.2 mt, with aquaculture contributing 51% of the total production and 52% of fish used for human consumption. India ranks 3rd (4.12 mt) in fisheries and second (12.02 mt) in aquaculture production, with a total production of 16.24 mt in 2022 (FAO, 2024). An estimated 59.51 million people

have been engaged in the primary sector of fisheries and aquaculture globally; of them about 20.53 million people were employed in aquaculture and 38.98 million in fisheries. Overall, the highest numbers of fishers and aquaculture workers are in Asia (85% of the world's total) (FAO, 2020). India alone has 28 million fishermen population engaged as fishers, fish farmers, and processors, of which 57% are full-time fishers (DoF, 2020). However, despite these contributions of the sector to food security and livelihoods, women often face marginalisation and unequal access to resources. Worldwide, women form only 21% of the people engaged in fisheries and aquaculture (FAO, 2024).

Scientometrics, known as the 'science of science' is the field of study that measures and analyses scholarly literature. It can be defined as the "quantitative study of science, communication in science and science policy" (Hess, 1997). Vasily Nalimov first introduced scientometrics under its Russian name 'Naukometriya' in 1969, which translates to 'scientometrics' in English (Rousseau, 2021). Scientometrics is a discipline that involves quantifying the research output of researchers and related aspects (such as trends in research, citation analysis, social network analysis, co-word, and content analysis, etc.). It is the information process that involves applying quantitative methods dealing with the analysis of science. The modern scientometric field of study is mostly based on the work of Derek J.de Solla Price, who is known as the father of scientometrics (Danesh & Mardani-Nejad, 2020) and Eugene Garfield (Wouters, 2017). It focuses on the analysis of scientific publications (Leydesdorff & Milojeviæ, 2012). The distinction among the various related terms of bibliometrics, scientometrics, webometrics/cybermetrics, informetrics, and altmetrics has been discussed by Mingers and Leydesdorff (2015). Scientometrics has been widely used (Van Leeuwen, 2006; Angermuller & van Leeuwen, 2019; Jayasree & Baby, 2019) to evaluate the research efforts of a particular country, organisation etc. in a specific research area, in both quantitative and qualitative manner using various research paper indicators (Swinbanks, Nathan, & Triendl, 1997; Annibaldi, Truzzi, Illuminati, & Scarponi, 2010). Liu (2019) in their study on the Web of Science (WoS) core collection concluded that the Web of Science published by Clarivate Analytics, USA, is the World's leading scientific citation search and analytical information platform that has been widely used in over 200 disciplines for scientometric

analysis. Globally scientometrics studies have been taken up to analyse fisheries research (Alves & Minte-Vera, 2013; Mingers & Leydesdorff, 2015; Teixeira, da Silva, Fabré, & Batista, 2020). Various subjects including medicine (Yeshawant & Ravi, 2016), environment (Amsaveni & Krishnan, 2018), information literacy (Shamili & Esmail, 2019; Verma & Shukla, 2019), social sciences (Dhawan, Gupta, & Jatana, 2016) etc. have been studied so far. Global literature in social science based on bibliometric indicators was analysed and the study revealed that the status of India in social science research in comparison to the rest of the world was not very encouraging. In terms of quality and quantity of publications, India stands low on its global citations share (0.41%), relative citation index (0.44%), global publication share (1.41%), and international collaborative publications share (18.14%).

Branch and Kleiber (2017) in their discussion on the usage of the terms 'fishers' or 'fishermen' concluded that in academic journals, the usage of the term 'fishers' for people who fish over time first exceeded the usage of 'fishermen' in 2014. In India, various studies have been carried out in fisheries and aquaculture scenarios (Jayashree & Arunachalam, 2000; Shamili & Esmail, 2019). Bhoomaiah et al. (2020), Chaman, Dharani, and Biradar (2016) & Kumaresan, Ezhilrani, Vinitha, and Jayaraman (2014) evaluated the research performance of the fisheries sector in India and compared the results within and outside the country using scientometrics. They profiled the Indian research contributions in India's aquaculture sector. The study focused on leading aquaculture researchers, most prolific authors, total number of papers published, journals used for publication, authorship patterns, etc. A scientometric analysis conducted by Singh Datta, and Handa (2019) to determine the dynamics of scientific output in fisheries and aquaculture in India over a decade from 2007 with data that was retrieved from the Scopus database found that scientific literature on fisheries and aquaculture has almost continuously grown over the last decade. Topics such as oceanography/ hydrobiology, fish microbiology and health, fish haematology and carcass composition, fish growth, immunity and immune stimulants, aquatic environment health and biodiversity and integrated systems were the major topics explored by researchers/scientists at both national and international level collaborations. A comparative scientometric assessment of social science research in India and the world during 1996-2014 was carried

out by Dhawan et al. (2016).

Growing evidences (Starbird, Norton, & Marcus, 2016; Agarwal, 2018; Sachs et al., 2019; Lal et al., 2021) hint that gender equality will play a key role in these sectors' contributions towards achieving the Sustainable Development Goals (SDGs) on poverty reduction, food and nutrition security. In particular, addressing gender constraints, inequalities, and their underlying factors will augment the livelihoods of women and benefit households, communities, and the sectors they depend on. When development in fisheries and aquaculture is equitable and supports gender equality, it can lead to more meaningful and sustainable progress. Women have a role in fisheries and aquaculture as fishers, fish farmers, and across the value chain. However, the various gender issues and many challenges pose questions concerning gender equity and women's equitable engagement and benefits. One of the major reasons why gender has been overlooked for long in the marine and inland sector is the stereotype that fishing is a masculine job (Thompson 1985, Oloko, Harper, Fakoya, & Sumaila, 2024). On the other hand, fisheries research has shown that the sector has significant participation of women (Siason, 2001; Williams et al., 2012; Choo & Williams, 2014; Kleiber et al., 2014; Arlene, Truong, Nguyen, Derun, & Gopal, 2016; Gopal et al., 2017; Satapornvanit, 2018). Gender is a topic of importance and increasing interest to those working in fisheries and aquaculture development, including many researchers, fisheries administrators, and students. Various notable organisations such as Gender in Aquaculture and Fisheries Section (GAFS) of the Asian Fisheries Society (AFS), USAID Oceans and Fisheries Partnership (USAID Oceans), WorldFish of Consultative Group on International Agricultural Research (CGIAR) and others were already engaged in capacity building of different stakeholders in fisheries and aquaculture. As gender studies in fisheries have gained pace and its importance has been realized globally, many scholars, academics and practitioners are now associated with this area worldwide. Quantifying research on 'Gender in Fisheries and Aquaculture (GIFA)' can be a valuable addition to the present pool of literature and knowledge available in the field of gender and fisheries studies. Hence, the current study was undertaken to quantify and identify trends and patterns in gender representation within fisheries and aquaculture research, both globally and specifically in the Indian context. This also involved

analysing the frequency of gender-specific terms (e.g., "fishermen," "fisherwomen," "fishers") in academic publications from the Web of Science (WoS) database, to understand how gender is represented and potentially overlooked in this field.

#### Material and Methods

Scientific papers were extracted from the Institute for Scientific Information (ISI) Web of Science (WoS) Core Collection from 01 January 1990 to 01 December 2021 using the Advanced Search option. Following Branch and Kleiber (2017), study of gender-neutral terms in a global context was carried out from 2015 to 2021.

Different search strategies were tried and tested prior to the validity of the search results. For analysing the usage of gender-neutral terms, a search query was applied for papers where the Topic (TS) included terms related to people who fish, using the search phrase (TS = 'fishers' or TS = 'fishermen' or TS = 'fisherwomen' or TS = 'fisherfolk'). To analyse the GIFA research, the search query in advance search was given as ((TS=("fishers" or "fisher man" or "fisherman" or "fisher woman" or "fisherwoman" or "fisherfolk" or "fishing community" or "fishing communities" or "fish vendors" or "fisher folk" or "fish \*farmer" or "fish workers" or "fish farming" or fishing or fisheries or aquaculture or "fish harvesting" or "fish processing" or "fish culture" or "fish capture" or "sea food" or seafood or "seaweed culture" or "seaweed capture" or "seaweed harvesting" or "cage culture" or "pen culture" or "reservoir \*fish" or "lake \*fish" or "river \*fish" or "deep sea \*fish" or mariculture or "brackish water \*fish" or "capture \*fish" or beels or "beel \*fish" or "shrimp culture" or "shrimp capture" "shrimp farming" or "prawn farming" or "prawn culture" or "prawn capture" or "inshore \*fish" or shellfish or "subsistence \*fish" or "coastal \*fish" or "inland \*fish" or "lagoon \*fish" or "small scale \*fish" or "fish farming" or "\*fish cooperatives" or "fish cooperative" or "\*fish hatchery" or "shrimp hatchery" or "prawn hatchery" or "pearl culture" or "pearl farming" or "mussel culture" or gleaning)). AND Boolean operator was used for gender-related terms as AND TS = (\*gender or "gender" or "gendered" or "gender analysis" or "gender assessment" or "gender issues" or "gender perspective" or "gender bias" or "gender perception"). The quotation marks avoided the otherwise automatic inclusion of singular and variant terms (lemmatization). Plurals were used along with the Boolean operator NOT because of the overwhelming number of results returned when searching for the singular 'fisher' and nearly all referring to the 20thcentury statistician R. A. Fisher. (TS=" Fishers exact" or "Fishers test" or "Fishers ratio" or "Kernel Fishers Based Face Recognition" or "Fishers exact probability test" or "Fishers Score" or "Fishers Type Equations" or "Fishers two-tailed t-test" or "Fishers equation" or "Fisher's equation" or "Fishers least significant" or "fishers (Pekania pennanti)" or "Fishers Linear Discriminant Analysis" or "Fishers F test")

The first search query yielded 4957 and 443 references globally and in India, respectively, with the chosen words in the title, abstract, or keywords for analysis of gender-neutral terms.

Further to explore the equivalents of the words 'fishers,' (gender neutral term) 'fisherman,' and 'fisherwoman' in the Indian context, the primary data was collected and verified from scholars who were native speakers of various Indian languages from ICAR-Central Institute of Fisheries Education, a leading institute in fisheries education and research. The list of languages was prepared based on the Census of India 2011. The objective was to gather information on the literal translations of these gender-related terms in different native languages. In cases where ambiguity arose, clarification was sought through triangulation by consulting other participants and senior professionals working in fisheries-related roles in their respective states. Using WoS, a total of 3127 (global), including 75 (India) references, were returned from the second search query for quantifying the literature available on GIFA. Out of 3127, only 553 (17.6%) references were filtered manually and 2574 were excluded for further analysis because of their relevance related to studies on the sex of fishes. As in fisheries research, gender is used incorrectly 99% of the time, instead of sex, to refer to the biological characteristics of fish (Ogle & Schanning, 2012). This otherwise results in erroneously treating mutable gender roles as fixed biological differences. This problem of naturalization has been discussed comprehensively by Branch and Kleiber (2017) & Pauly (1994). The usage of gender instead of sex in fisheries publications may stem from an unintended attempt to avoid the word sex or to introduce variability in writing. Thus, this persistent misuse can create confusions, misperceptions or unnecessary complications. The metadata was downloaded in plain text and BibTex format and further analysis was carried out using MS Excel, Power BI, and 'Word it Out' softwares.

# **Results and Discussion**

# Homonyms of 'fishers' and the use of the 'gender' term

The term 'fishers' was used in multiple ways in scientific papers. Papers containing the term 'fisher' refer to people named R. A. Fisher, medical terms such as Fishers syndrome, Dishers (*Pekania pennanti*), mammal etc. all of which were irrelevant to the present study; hence these papers were excluded, which form 7.2% the literature available on 'fishers' globally (2015-2021) and 22% specifically to Indian context (1990-2021).

# Usage of gender-neutral terms in fisheries

'Fishermen' and 'fishers' were the most common terms used in literature, while 'fisherfolk' and 'fisherwomen' were infrequently used. In most of the cases (92%), only one term was used in the abstract of an article, although 224 papers mentioned two of these terms and five papers mentioned three of these terms (Fig. 1). A relatively high percentage and of documents mentioning 'fishers' (51.03%) and 'fishermen' (49.09%) also mentioned one of the other terms. In contrast, individual and multiple mentions were less common for fisherwomen (1.8%) and fisherfolk (2.1%) between 2015 and 2021 globally. In the Indian scenario from 1990 to 2021, 80% of the total papers (443) use only one term in an article, although 53 papers mentioned two of these terms and seven papers mentioned three of these terms and one paper mentioned all four terms (Fig. 2). A relatively high percentage of documents mentioning 'fishermen' (59.6%) also mentioned one of the other terms, whereas individual and multiple mentions were less common for 'fishers' (36.6%), 'fisherfolk' (12%), and 'fisherwomen' (7%) between 1990 and 2021.

# Usage of 'fishers' and 'fishermen'

The study was further focused on the two of the most common terms, 'fishers' and 'fishermen'. From 2015 to 2021, globally over the 7 years of publications the number of papers using the term 'fishers' has increased to an average of 58% when compared to papers containing 'fishermen' which has decreased to an average of 42% (Fig. 3). In 2021 alone

usage of 'fishers' is higher in papers at 65%, than the papers containing 'fishermen' which has decreased to 35%. In the global context, this shift over time towards increasing usage of 'fishers' was quite dependent on the journal in which the article was published, and it indicates that journal policies have played a role in this shift to the usage of 'fishers' (Branch & Kleiber, 2017). This was as a result of initial efforts taken by FAO, ILO, The Gender in Aquaculture and Fisheries Section (GAFS) of the Asian Fisheries Society (AFS) and civil society organizations in promoting the usage of the term 'fishers' in their reports and advocacy, which has transformed the use of gender-neutral term in present-day academic discourse and advocacy. In India, the increasing use of the term 'fishermen' (59.6%) is evident even today than the use of the more gender-neutral term 'fishers' (36.6%) which can be attributed to the insensitivity of authors towards the usage of gender-specific term - 'fishers' (Fig. 4). This could also be due to limited awareness of global shifts, as gender is not always a priority area of research. Additionally, Indian researchers often have limited global exposure, and may rely on reading others' work for knowledge (Liang, 2018). Often key publications on gender research are not subscribed by institutions, making valuable resources inaccessible. However, results refer to the



Fig. 1. Venn diagram showing the number of papers containing the gender related terms in academic literature globally, (n = 4957), these terms refer to people who fish

positive decadal change in papers mentioning the 'fishers' (Fig. 5) where the number of papers containing the term 'fishers' has increased to about five times from 2011 to 2021. This may have happened as the field of gender has developed over the years and gender-neutral terms have become more widely recognized contributing to the growing trend in research.

# Equivalent of the words 'fishers', 'fisherman' and 'fisherwoman'

The analysis of equivalent terms for 'fishers,' 'fisherman,' and 'fisherwoman' highlight significant linguistic disparities in the representation of fishers across Indian languages, revealing the influence of entrenched societal biases and cultural variations. In central India, where Hindi and its dialects dominate, terms such as 'machwara' for men and 'machwaran' for women explicitly distinguish by gender, with the male term often treated as the default. In some states, there is no specific term for fisherwomen, further marginalizing their role. However, exceptions exist in languages like Odia (matysajiba) and Tamil (meenava makkal), where gender-neutral terms are used, particularly in government schemes. Despite this, contradictions arise, such as in Tamil Nadu, where the term for fishers is gender-neutral in Tamil, but official English translations, like "Department of Fisheries and Fishermen Welfare," revert to male-centric terminology. Interestingly, northeastern states like Mizoram and Nagaland exclusively use gender-neutral terms ('Sanga manmi' and 'Khuo ketemia'), suggesting cultural differences in gender representation. This linguistic disparity reflects entrenched biases, where male-centric terms dominate and limit recognition of women's contributions, influencing policies and perpetuating soci-



Fig. 2. Venn diagram showing the number of papers containing the gender related terms in academic literature in Indian fisheries (n = 443)

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etal norms. For example, McConnell-Ginet and Eckert (2003) discuss how gender distinctions in language vary across cultures, offering insights into analyzing the Indian context. Lund, Kusakabe, Rao, and Weeratunge (2020) explores the sociocultural and gendered aspects of fisherfolk in Cambodia, India and Sri Lanka emphasizing the linguistic and cultural significance of terminology. Similarly, ICSF (2005) highlights the role of women in Indian fisheries, providing context for the term 'fisherwoman' and its usage in Indian languages. Additionally, FAO (2016) underscores the importance of inclusive terminology in fisheries to ensure representation of all stakeholders, including women and gender-neutral terms. Chuenpagdee (2018) further examine how cultural and linguistic nuances affect fisheries governance, emphasizing the critical role of inclusive terminologies in shaping equitable policy frameworks. These studies collectively demonstrate the significant impact of language on gender representation and policy development in fisheries, highlighting the need for more inclusive linguistic practices to address entrenched biases.



Fig. 3. Usage of terms, 'fishers' and 'fishermen' in global context



Fig. 4. Number of publications over years mentioning gender related terms Indian scenario (n=443)



Fig. 5. Usage of terms, 'fishers' and 'fishermen' in Indian context

# Overview of GIFA Research: Global and Indian Scenario

A total of 553 research papers were published worldwide on different aspects of GIFA from 1990-2021. The number of publications has increased over time with a maximum of 74 papers being published during 2020 (Fig. 6). Basic analysis shows the total number of citations (TC) are 7342 (6642 without selfcitations), with Average Citation Per Paper (ACPP) found to be 13.21, and h-index 38. The scientific documents comprised 86.2% research articles, 8.1% papers in proceedings and 6.69% review papers. About 1900 authors, 906 institutions, 100 countries, 276 journals, and 115 publishers were involved in GIFA in 789 research area categories. According to the scientometric results, the highest contribution of publication was from the USA (26.7%) followed by England (13%), Australia (11%), Canada (7%), Malaysia (6.1%) and India (5.6%) during 1990–2021 (Table 1). The publication output analysis indicated that among countries, TC are highest for the USA (2673), whereas highest ACPP was found for Sweden (47.32). Among journals, 'Maritime Studies'



Fig. 6. Publications on GIFA from 1990 to 2021 (n=553)



Fig. 7. Keyword analysis of GIFA research (n=553)

has the highest record count for publications (5%), whereas TC (554) and ACPP (55.4) were found to be highest for the 'Fish and Fisheries' journal. Out of 553 research papers published worldwide between 1990-2021 on GIFA aspects, 31 papers (6.1%) belonged to India. TC and ACPP were 244 and 15.25, respectively. The scientific documents comprised 90.3% of research articles and 6% of review papers and the other categories of book chapters, early access, proceedings papers, and editorial materials contained about 3.2% each. About 149 authors, 115 institutions, 25 country collaborations, and 38 research area categories were involved in GIFA research in the Indian context. According to the scientometric results, the highest country publication collaboration was from England for 6 papers, followed by Malaysia and USA for 4 papers. India, without any country collaboration, has published only 5 articles.

#### Most productive institutions

In terms of research publications, the top 10 productive institutions on GIFA from 1990-2021 were analysed and CGIAR, WorldFish together accounted for 16.2% (90 publications), followed by the University of Washington (26 publications), ICAR (23 publications). Apart from this, James Cook University (20), University of California (16), Rutgers State University (14), Stockholm University (14), University of Tromso (13) and University of British Columbia (12) were also listed in the top 10 institutions. Most productive institutions in India in terms of research publications on GIFA from 1990-2021 were analysed. Different University affiliations were grouped and together constituted the highest number of papers published (30). Indian Council of Agricultural Research (ICAR) published 23 papers and 14 papers were grouped under a single category of medical fields. Affiliations from CGIAR accounted for 9 articles. Institutes of Indian Institute of Technology (IIT) and Indian Institute of Management (IIM) together had 4 papers.

#### Top journals for research on GIFA

The present study showed that the scientific literature regarding gender studies in fisheries and aquaculture globally from 1990 to 2021 has been published in 276 different journals. The top ten journals and their characteristics are given in Table 2. It was found that the journal 'Maritime Studies' (32 papers) published the maximum number of research articles on GIFA with total citations of 250, followed by 'Ocean Coastal Management' (20 papers) with 257 citations, 'PLOS' (19 papers).

Table 1. Publication and citation analysis of top 10 Countries during 1990-2021 (n=553)

| Sl.No. | Countries/Regions | ТР  | % of 553 | TC   | WS   | ACPP  | h-index |
|--------|-------------------|-----|----------|------|------|-------|---------|
| 1      | USA               | 148 | 26.763   | 2673 | 2600 | 18.06 | 27      |
| 2      | England           | 72  | 13.02    | 1856 | 1812 | 25.78 | 22      |
| 3      | Australia         | 61  | 11.031   | 918  | 876  | 15.05 | 16      |
| 4      | Canada            | 39  | 7.052    | 1116 | 1099 | 28.62 | 16      |
| 5      | Malaysia          | 34  | 6.148    | 760  | 716  | 22.35 | 13      |
| 6      | India             | 31  | 5.606    | 244  | 242  | 7.87  | 9       |
| 7      | Brazil            | 27  | 4.882    | 147  | 142  | 5.25  | 7       |
| 8      | Sweden            | 25  | 4.521    | 1183 | 1161 | 47.32 | 13      |
| 9      | Norway            | 24  | 4.34     | 200  | 194  | 8.33  | 8       |
| 10     | Netherlands       | 22  | 3.978    | 347  | 344  | 15.77 | 10      |

| Sl.No | Name of the Journal           | Publications (N | o.) Share % | Total citation | ACPP Impact factor (2021) |      |
|-------|-------------------------------|-----------------|-------------|----------------|---------------------------|------|
| 1     | Maritime Studies              | 32              | 5.787       | 250            | 7.81                      | 1.90 |
| 2     | Ocean Coastal Management      | 20              | 3.617       | 257            | 12.85                     | 3.28 |
| 3     | Plos One                      | 19              | 3.436       | 366            | 19.26                     | 3.24 |
| 4     | Gender Technology Development | 15              | 2.712       | 78             | 5.2                       | 1.97 |
| 5     | Frontiers in Marine Science   | 14              | 2.532       | 100            | 6.67                      | 4.43 |
| 6     | Aquaculture                   | 12              | 2.17        | 163            | 13.58                     | 4.24 |
| 7     | Sustainability                | 12              | 2.17        | 54             | 4.5                       | 3.25 |
| 8     | Fisheries Research            | 11              | 1.989       | 128            | 11.64                     | 1.90 |
| 9     | Fish and Fisheries            | 10              | 1.808       | 554            | 55.4                      | 7.22 |
| 10    | Coastal Management            | 9               | 1.627       | 167            | 18.56                     | 1.92 |

Table 2. Top 10 journals and their characteristics (n=553)

However, 'Fish and Fisheries' at 9th position with only 10 papers has the highest citation of 554 among these top 10 Journals. The impact factor of the top ten journals varied from 1.90 – 7.218 as per the Journal's Impact Factor (IF) during 2020- 21. Among 31 journals in India, 4 papers (12%) were published in the 'Indian Journal of Fisheries', 2 papers each in 'Fishery Technology', 'Gender Technology Development' and 'International Maritime Health' Journals and the remaining 21 (70%) have been published in different journals labelled as 'Others' category.

# Funding sources

A total of 535 funding agencies were listed based on the WoS database, however, around 238 publications (43%) do not mention the details of their funding. Among the top, a major part of the research investigations on this topic were funded by the United States (US) Department of Health & Human Services (24 research articles) followed by the National Institutes of Health, USA (21 research articles) and CGIAR (17 research articles). A total of 36 funding agencies were listed in the Indian context on the Web of Science database. The International Fund for Agricultural Development (IFAD) funded 6 studies, followed by CGIAR (3); and the European Commission, ICAR, the Netherlands Government and the United States Agency for International Development (USAID) funded two studies each.

# Keyword analysis

Keywords of research publications, abstracts, and titles highly facilitate the reader community to identify the main focus of the research. It is recognized as one of the main data analysis tools in measuring scientific productivity (Li et al., 2009). The 'keywords' associated with the global GIFA research were extracted through the WoS database. About 2320 keywords were filtered from the source, and the top 100 words (presented in Fig. 7) were screened based on the frequency of the occurrence in the papers using 'Word It Out' software. Minimum frequency was found to be 12, and maximum was 276 for 'gender', followed by 'fisheries' (232), 'management' (154), 'women' (99), 'fish' (91 times), 'conservation' (88), 'fishing' (78), 'small-scale' (75), 'marine' (68), 'knowledge' (61), 'aquaculture' (47), 'livelihoods' (46) 'communities' (44), 'coastal' (44), 'participation' (41), 'governance' (39), 'community' (36) etc.

Our study found that 'fishermen' and 'fishers' were the most commonly used gender-related terms both in global and Indian contexts. However, usage of the term 'fishermen' hasn't declined in the Indian context, whereas the gender-neutral term 'fishers' has continuously been increasing both globally as well as in the Indian contexts. One significant factor driving this shift is journal policies, such as those of the 'Fish and Fisheries' journal, which explicitly encourage the use of the term 'fishers' during manuscript preparation as this aligns with the growing trend in scientific writing to prioritize inclusive language. The examination of equivalent terms for 'fishers,' 'fisherman,' and 'fisherwoman' revealed patriarchal notions in linguistic differences in how fishers are represented across Indian languages, reflecting deep-rooted societal biases and cultural diversity. This study indicated the significance of gender-related works in the fisheries sector and identified global and Indian trends in GIFA publications. As the present study included only scientific publications (peer-reviewed articles published in journals indexed only in the WoS database), there is a scope and need to expand the coverage by including various reports, policy documents, case studies, non-indexed journals and dissertations published by different institutes on GIFA for a comprehensive understanding. The study underscores the significance of using gendersensitive terms in research publications, particularly in abstracts, keywords, and titles.

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