

Biometric Characteristics of Female Fisherfolks and Their Role in Fisheries Development: A Case Study of Galadima Fish Market, Kano State, Nigeria
Binta Isyaku Usman¹ and Victoria Folakemi Akinjogunla^{1*}
¹ Department of Fisheries and Aquaculture, Bayero University Kano.: *vfakinjogunla.faq@buk.edu.ng;

Abstract

Women play a pivotal yet frequently underappreciated role in the fisheries sector, particularly in Northern Nigeria, where sociocultural and religious norms often obscure their visibility and contributions. This study investigates the involvement of female fisherfolks in fisheries development at Galadima Fish Market in Kano State, Nigeria. A sample of 120 women engaged in fish processing and marketing was surveyed through structured questionnaires and interviews. Data analysis was conducted using descriptive statistics, including frequencies and percentages. The findings revealed that the majority of respondents were above 60 years of age, contrasting with patterns observed in other regions of Nigeria, where women in fisheries are typically between 20 and 50 years old. An overwhelming proportion (93.03%) had no formal education, posing significant barriers to the adoption of improved fish processing practices. While 73.26% were active in fish marketing, none participated in fishing activities, primarily due to cultural constraints. The women traded in multiple fish species, particularly *Oreochromis niloticus*, *Clarias gariepinus*, and *Protopterus annectens*, with species selection influenced by seasonal availability. Economic necessity, particularly the pursuit of financial independence, was the primary motivator for their participation. However, challenges such as limited access to credit, financial exclusion, and low literacy levels were identified. The study underscores the need for inclusive fisheries policies that formally acknowledge and support women's roles in post-harvest activities. Enhancing access to education, credit facilities, and skills development programs is critical to maximizing the contributions of female fisherfolks to sustainable fisheries development in Northern Nigeria.

Keywords: fisher folks, gender, Nigeria, small-scale fisheries, value chains

Introduction: Fish is a vital component of the global food system, serving as a high-quality source of animal protein and essential micronutrients such as omega-3 fatty acids, iodine, iron, and vitamins A and D (Akinjogunla, Lawal-Are & Soyinka, 2017). These nutrients play critical roles in cognitive development, immune function, and overall health, especially in vulnerable populations such as children and pregnant women (Food and Agricultural Organization (FAO), 2022; Golden, Seto, Dey, Chen, Gephart, Myers, ... & Allison, 2021). Globally, fisheries and aquaculture provide employment and livelihoods for approximately 120 million people, with over 45% of these being women, primarily engaged in post-harvest activities (World Bank, 2021). In developing countries, particularly in sub-Saharan Africa, the sector contributes significantly to food security, income generation, and poverty reduction (Bennett, Basurto, Virdin & Allison 2021). Women's participation spans the entire fisheries value chain—including fish farming, harvesting, processing, marketing, and distribution—yet their contributions remain largely invisible in official records and undervalued in policy decisions (Pedroza-Gutiérrez & Hapke, 2021; Siar, Kusakabe & Williams., 2021). The “feminization of post-harvest fisheries” is often characterized by informal, labor-intensive roles with low wages, limited legal protection, and restricted access to decision-making structures (Harper, Adshade, Lam, Pauly & Sumaila, 2020). This gender-based disparity has drawn increasing attention from global development organizations, prompting calls for gender-inclusive approaches in fisheries management and development programs (FAO, 2021).

In Nigeria, the fisheries sector contributes about 4.5% to the national agricultural GDP and serves as a critical source of income and nutrition for rural communities (Federal Ministry of Agriculture and Rural Development [FMARD], 2022). Nigerian women are especially active in artisanal and small-scale fisheries (SSF), where they dominate the processing and trade segments. However, these roles are often carried out under harsh conditions with inadequate infrastructure, limited access to cold storage, water, and sanitation, and susceptibility to post-harvest losses (Alhassan, Osei-Tutu & Amoako, 2021). Furthermore, women face institutional barriers such as exclusion from cooperatives, financial services, and extension programs, which hinders their economic empowerment (Ikeogu, Ogbonnaya, Okpala-Ezennia & Obuakor, 2020). The situation is particularly acute in Northern Nigeria, where socio-cultural and religious norms further restrict women's participation in the formal economy. Practices such as *pardah* (female seclusion) and deep-rooted patriarchal values limit women's mobility, visibility, and access to education and entrepreneurial opportunities (Maihula, 2020; Suleiman & Haruna, 2023). This systemic marginalization often confines women to the household domain, reinforcing stereotypes that deny them equal access to productive resources and public spaces. Nevertheless, evidence suggests that women in this region, particularly in areas like Kano State, are increasingly finding ways to engage in the fisheries value chain, especially through fish marketing and processing. Their resilience in navigating restrictive environments underscores their potential to contribute meaningfully to food security, household welfare, and economic resilience (Abubakar & Ahmad, 2022).

Biometric Characteristics of Female Fisherfolks and Their Role in Fisheries Development: A Case Study of Galadima Fish Market, Kano State, Nigeria

Recognizing and documenting their roles is essential for informing inclusive policies that address gender gaps in the sector. This study, therefore, seeks to explore and document the participation of female fisherfolks in the fisheries value chain in Kano State, Northern Nigeria. By highlighting their contributions and the structural challenges they face, the study aims to inform policy recommendations that enhance gender equity and empower women to contribute more effectively to the development of Nigeria's fisheries sector.

Materials and Methods: Study Area: The study was carried out in a popular fish market called Kasuwar kifi Galadima (Galadima Fish Market) in Fage Local Government Area of Kano State, Nigeria (Figure 1). The Galadima Fish Market is located between Latitude 12.0127° N and longitude 8.5344°E. Galadima fish market is a popular market known for the sales of fish in various forms and in large quantities in Kano State.

Sampling Population and Questionnaire Administration: This study specifically focused on women actively engaged in fisheries-related activities within the Galadima Fish Market, Kano State, Nigeria. A total of 120 female participants were selected as the sample population. The selection process utilized both simple random sampling and purposive sampling techniques to ensure the inclusion of respondents directly involved in various aspects of the fisheries value chain, such as processing and marketing. The purposive approach enabled the researchers to target women with substantial experience and engagement in fisheries activities, while the random sampling component helped reduce selection bias and improve the representativeness of the sample.

Data Collection: Primary data were collected directly from the respondents under conditions of confidentiality to ensure ethical compliance and encourage honest participation. Data were obtained through a combination of structured questionnaires, semi-structured interviews, and field observations at the market site. Careful and systematic surveillance was also employed to document real-time fisheries practices and interactions within the market environment.

The questionnaire was designed to capture relevant demographic information, socio-economic characteristics, and levels of participation in fisheries activities. Supplementary interviews provided deeper insights into the challenges and motivations of the female fisherfolk. All collected data were systematically reviewed and organized for analysis.

Data Analysis: The completed questionnaires and interview responses were subjected to descriptive statistical analysis, including the use of frequencies, percentages, and graphical representations such as bar and pie charts. These tools were employed to illustrate patterns and trends across the variables of interest, thereby offering a comprehensive understanding of the role and participation of women in the fisheries sector within the study area.

Results: Socio-cultural profile of the respondents from Galadima Fish Market: In figure 1, the age bracket of respondents is shown. Majority (46.51%) of the fisherfolks surveyed were aged 60 and above; 32.56% ranged from 41 to 60 years of age, while 20.93% ranged between 26 and 40 years of age. There was no representation for the age bracket of 15 – 25 years of age. In figure 2 below, the marital status of the respondents is displayed. The highest percentage (54.65%) represents the widowed group followed by 29.07%, representing the divorced and 16.28% represents the married.

In this survey, there was no representation for the single female fisherfolks in the market. A greater percentage (63.95%) were in the household size category of 5 to 10 persons while household size of 10 and above have a percentage representation of 36.05%. Small family size of 1 to 4 did not have any representation. Majority (93.02%) of the female fisherfolks from Galadima fish market had no formal education (illiterate and local language education), while 6.98% primary education. There was no representation for secondary or tertiary education. There are Christians (4.65%) and Muslims (95.35%) fisherfolks in Galadima fish market participating in the sales of fish. No other religion is recognized or represented in the survey. The Muslims carried the highest percentage (95.35%) because the North is dominated by people recognized with the Islamic faith.

About 55.81% of fisherfolks interviewed had over 30 years' experience in the fish business, 18.60% and 17.44% of them had between 11 and 20 years, and 21 to 30 years' experience, respectively (Figure 6). Some of them inherited the business from their parents while some were self-taught.

Aquacultural Activities of the respondents from Galadima Fish Market

Fishing as their Primary Source of Income: Based on the survey, all the fisherfolks (91005) used as respondents confirmed that their involvement in the fisheries sector is a full-time business with the sole aim of generating income to sustain livelihood.

Fisheries activity: There was no representation for active fishing as the men in this part of the country are known to dominant this area of the fisheries sector. However, 73.26% represented the group engaged in marketing of the fish only, 18.60% of the respondents were engaged in processing only and 8.14% were engaged in both marketing and processing of fish.

Business Strategy Adoption: Here, assessment was made on how and where the fish were displayed as a form of market strategy. 65.12% picked open market display where they are allocated a shed or space for them to display their wares while 22.09% claimed that they go to the landing sites and jetties and buy directly from the fishermen coming from capturing. They in turn display the fish in baskets and sell to consumers or retailers. 12.79% of the respondents buy the fish from the fishermen and take to joints (Fish and suya joints) where they are sold to the owners of these joints who use them for barbecues. No representation for hawking as a market strategy because the society here does not encourage exposure of the female folks to such occupation, rather the men are the ones hawking produces.

Demand Level of Fish in the Area: 51.16% of the respondents maintained that the demand for their fish was very high, 34.88% picked moderate demand while 13.95% opined low demand and slow market

Number of fish species they dealt with: Eight (8) finfish species were identified at Galadima fish market. They are *Oreochromis niloticus*; *Malapterunes electricus*; *Synodontis nigrita*; *Bagrus bayad macropterus*; *Clarias gariepinus*; *Protopterus annectans*; *Heterotis niloticus* and *Mormyris rume*. All the female fisherfolks deals with more than one (1) species. Respondents with two (2) fish species accounted for 56.98% while respondents that deals with three (3) species accounted for 29.07% and 13.95% represents those who deals with more than three (3) species of the fish in Galadima fish market

Discussion: This study provides insightful data on the socio-demographic characteristics, roles, and challenges of female fisherfolks at Galadima Fish Market in Kano State, Nigeria. The findings offer valuable context when compared to empirical studies across other geopolitical regions of Nigeria.

A striking observation from this study is the dominance of older women (above 60 years) in fisheries activities. This contrasts sharply with findings from Cross River State (Ohara, Ogar, Felix & Okon, 2023), Anambra State (Ikeogu *et al.*, 2020), and Ekiti State (Adekunmi, Kolawole, Owoye & Atere, 2024), where most women engaged in fisheries were between 20–50 years. In these regions, age was shown to correlate with the physical demands of fisheries activities, with younger women more likely to engage in labor-intensive roles such as fishing and gear repair. Conversely, in Northern Nigeria, where cultural and religious norms limit female participation in fieldwork, older women may dominate as they are less constrained by societal expectations regarding female mobility and visibility.

The marital status distribution also deviates from southern trends. In Kano, 54.65% of respondents were divorced, unlike studies in Anambra and Ekiti States where married women dominated (Ikeogu *et al.*, 2020; Adekunmi *et al.*, 2024). This difference may be rooted in cultural expectations. In Southern Nigeria, married women contribute economically through fisheries, supported by relatively liberal socio-cultural environments. In contrast, Northern traditions often view economic participation by married women as inappropriate, especially when husbands are financially capable. Divorced women, lacking such spousal support, are more likely to turn to fisheries for survival and independence.

The household size, predominantly between 5–10 members (63.95%), aligns moderately with findings from Ikeogu *et al.* (2020), who reported 5–8 members in similar households. Larger household sizes in the North may also reflect extended family systems and polygamous settings, further increasing the economic pressure on women to contribute to household welfare through fisheries-related trades.

Educational attainment was markedly low among respondents in this study, with 93.03% lacking formal education, thereby limiting their adoption of improved processing methods and business innovations. In contrast, studies in Ekiti State reported 61.7% of women had formal education (Adekunmi *et al.*, 2024), and Ikeogu *et al.* (2020) found 50% with at least primary education. This underscores the persistent gender-education gap in Northern Nigeria, shaped by socio-cultural and religious norms that deprioritize formal education for girls (Suleiman & Haruna, 2023). Educational disparity affects women's ability to access credit, technology, and training—key components for advancement in the fisheries value chain (Harper *et al.*, 2020). Religion also shapes women's participation. In this study, 95.35% of women were Muslims, consistent with the religious demographics of Northern Nigeria. Religious practices such as *purdah* (female seclusion) may restrict women's physical mobility, limiting their participation to less-visible roles such as marketing rather than fishing or processing (Maihula, 2020; Suleiman & Haruna, 2023). This is in stark contrast to studies in the South, where Christian-dominated communities present fewer restrictions on women's public involvement in fisheries. Years of experience was notably high among Northern women, with 55.81% having over 30 years in the sector, compared to 0–11 years in Anambra (Ikeogu *et al.*, 2020). This longevity suggests generational knowledge transfer and the role of family

legacy in fisheries livelihoods, particularly for women who inherit the trade from parents. Long-term engagement implies not only deep expertise but also a strong cultural attachment to fish marketing as a sustainable livelihood. The scope of women's participation in fisheries across Nigeria varies considerably. In the South, women engage in activities including fish sorting, washing, salting, scaling, gutting, and hot smoking (Adeleke & Fagbenro, 2021; Adekunmi *et al.*, 2024). In contrast, in this Kano-based study, the majority of women were involved solely in fish marketing (73.26%), while 18.6% were engaged in processing, and 8.14% participated in both. This discrepancy reflects the influence of religion, gender roles, and social expectations in limiting Northern women's participation in physically demanding or labor-intensive fisheries activities (Pedroza-Gutiérrez & Hapke, 2021).

Financial independence emerged as a critical motivator for women in Kano's fish market. Similar findings were reported in Cross River State, where factors like education, credit access, and cultural norms influenced women's participation in artisanal fishing (Ohara *et al.*, 2023). In the Niger Delta, women's participation is further constrained by gender-insensitive corporate social responsibility programs, limiting their access to fisheries entrepreneurship (Uduji, Okolo-Obasi & Asongu, 2020). Nevertheless, where women are actively involved, positive outcomes such as increased income, housing development, and community contributions were reported—an indication of fisheries' potential to elevate women's socio-economic status and reduce poverty.

Respondents in this study derived 100% of their income from fisheries, with no side businesses. This complete financial dependence highlights the critical role of fish marketing as both a livelihood and survival mechanism, particularly for divorced or aging women. The open display of fish in markets was also the preferred sales method, as corroborated by Ikeogu *et al.* (2020), who reported 93.33% of women used similar approaches. Demand for fish remains high, consistent with reports across Nigeria. Fish, whether smoked, dried, fried, or fresh, is a cost-effective protein source for low-income households

(Akinjogunla, Mudi, Akinnigbagbe, & Akinnigbagbe, 2021; Akinjogunla and Usman, 2023; Inyang, Essien, Essien, Akinjogunla & Ekpenyong, 2024). It also contains vital micronutrients and omega-3 fatty acids essential for human health (FAO, 2022). This strong demand supports the viability of fisheries as a stable income source for women. Several fish species were identified in the study, including *Oreochromis niloticus*, *Clarias gariepinus*, and *Protopterus annectans*. Despite a rich diversity, most women sold a combination of two species (56.98%), consistent with Ikeogu *et al.* (2020), who recorded 46.67% selling up to three species. Seasonality and consumer preferences influenced sales patterns, as women diversified their offerings to maintain consistent income.

Conclusion: Female fishmongers serve as vital contributors to the fisheries sector, particularly in post-harvest activities such as fish marketing and processing. However, their roles often remain underacknowledged, especially in Northern Nigeria, where entrenched cultural and religious norms restrict women's visibility and participation in public economic activities. This study, conducted at Galadima Fish Market in Kano State, highlights that women in this region are primarily engaged in fish marketing, unlike their counterparts in coastal regions of Nigeria who also participate in fishing and gear maintenance.

Despite their commitment, these women face numerous challenges, including limited access to credit, inadequate training, and pervasive socio-cultural barriers that hinder their full potential and economic empowerment. The findings underscore the need for inclusive policy interventions that recognize and support the specific roles of women in fisheries. Enhancing access to financial services, education, and skill development tailored to their context can significantly improve their livelihoods and contributions to sustainable fisheries development in Nigeria. Bridging these gender-based gaps is essential not only for equity but also for the overall growth and resilience of the fisheries sector.

References

- Abdullahi, Y., Mustapha, Y., Indabawa, I. I. & Sindama, A. (2017). The Relative Abundance, Distribution and Species Diversity of Phytoplanktons in Kanye Dam in Kano, North western-Nigeria. *Journal of Environmental Science, Toxicology and Food Technology*, 11 (4), 20-31
- Abubakar, A., & Ahmad, S. A. (2022). *Exploring the economic activities of rural women in Northern Nigeria: Opportunities and constraints*. *Journal of Gender and Development Studies*, 10(1), 45–58. <https://doi.org/10.1007/s11115-021-00520-1>
- Adekunmi, A. O., Kolawole, A. O., Owoeye, R. S., & Atere, B. O. (2024). Assessment of women's participation in fish processing in Ekiti State, Nigeria. *Asian Journal of Fisheries and Aquatic Research*, 26(5), 71-81. <https://doi.org/10.9734/ajfar/2024/v26i5767>
- Adeleke, M. L. & Fagbenro, O. A. (2021). Gender participation in fisheries for sustainable livelihood in the coastal region of Ondo State, Nigeria. *Nigerian Journal of Technological Research*, 16(2).
- Akinjogunla, V. F. & Usman, B. I. (2023). Biochemical compositions in the carcasses of some indigenous finfishes in Ajiwa Irrigation Dam, Katsina State, Northern Nigeria. *Acta Natura Et Scientia*, 4(2): 216 – 224.
- Akinjogunla, V. F., Lawal-Are, A. O. & Soyinka, O. O. (2017). Proximate composition and mineral contents of the Mangrove oysters (*Crassostrea gasar*) from Lagos Lagoon, Nigeria. *Nigeria Journal of Fisheries and Aquaculture*, 5 (2): 36 – 49
- Akinjogunla, V. F., Mudi, Z. R., Akinnigbagbe, O. R. & Akinnigbagbe, A. E. (2021). Biochemical Profile of the Mangrove Oyster, *Crassostrea gasar* (Adanson, 1757) from the Mangrove Swamps, South-WestNigeria. *Tropical Journal of Natural Products Research*; 5(12):2137-2143
- Alhassan, E. H., Osei-Tutu, B., & Amoako, A. O. (2021). Gender and fisheries value chain: Challenges and prospects for women in West Africa. *African Journal of Rural Development*, 6(2), 55–65.
- Bennett, A., Basurto, X., Virdin, J., & Allison, E. H. (2021). Recognize fish as food in policy discourse and development funding. *Ambio*, 50(6), 981–989. <https://doi.org/10.1007/s13280-020-01451-4>
- FAO. (2021). *Mainstreaming gender in fisheries and aquaculture: A stock-taking and planning exercise*. Food and Agriculture Organization of the United Nations. <https://www.fao.org/documents/card/en/c/cb3353en/>
- FAO. (2022). *The State of World Fisheries and Aquaculture 2022: Towards Blue Transformation*. Food and Agriculture Organization of the United Nations. <https://doi.org/10.4060/cc0461en>
- Federal Ministry of Agriculture and Rural Development [FMARD]. (2022). *National Agricultural Technology and Innovation Policy (NATIP) 2022–2027*. Government of Nigeria.
- Golden, C. D., Seto, K. L., Dey, M. M., Chen, O. L., Gephart, J. A., Myers, S. S., ... & Allison, E. H. (2021). Does aquaculture support the needs of nutritionally vulnerable nations? *Frontiers in Sustainable Food Systems*, 5, 686425. <https://doi.org/10.3389/fsufs.2021.686425>
- Harper, S., Adshade, M., Lam, V. W. Y., Pauly, D., & Sumaila, U. R. (2020). Valuing invisible catches: Estimating the global contribution by women to small-scale marine capture fisheries production. *PLOS ONE*, 15(3), e0228912. <https://doi.org/10.1371/journal.pone.0228912>
- Ikeogu, C. F., Ogbonnaya H. F., Okpala-Ezennia, K. P. & Obuakor, G. T. (2020). Challenges of women involved in fishing activities (a case study of Otucha, Anambra State, Nigeria): A SWOT analysis. *Global Journal of Fisheries Science*, 2(1), 8 – 13
- Inyang, U. A., Essien, E. A., Essien, U. B., Akinjogunla, V. F. & Ekpenyong, E. A. (2024). Comparative Evaluation of the Nutritional Profiles of Wild and Pond Reared Catfish (*Clarias gariepinus*) in Obubra LGA, Cross River State, Nigeria. *Asian Journal of Food Research and Nutrition* 3 (3):731-738.
- Maihula, J. S. (2020). An Islamic Approach on Women in Public Life. *IAR Journal of Humanities and Social Science*, 1(1), 1-7.
- Nunan, F. & Scoones, M. (2017). Women-led fisheries management: A case study from Bangladesh. In: Chao-Liao, N. H., Matics, K., Nandeesh, M. C., Shariff, M., Siason, I., Tech, E., Williams, M. J. (eds.). *Women in Fisheries - Global Symposium*, 216p.
- Ohara, E. E., Ogar, I. F., Felix, A. C., & Okon, I. O. (2023). Effect of women participation in artisanal fishing on their socio-economic well-being in coastal communities in Cross River State, Nigeria. *Global Journal of Agricultural Sciences*, 22(1).
- Pedroza-Gutiérrez, C., & Hapke, H. M. (2021). Women's work in small-scale fisheries: a framework for accounting its value. *Gender, Place & Culture*, 29(12), 1733–1750. <https://doi.org/10.1080/0966369X.2021.1997936>
- Siar, S. V., Kusakabe, K., & Williams, M. J. (2021). Women's empowerment in fisheries and aquaculture: A review of policy and practice. *Fish and Fisheries*, 22(1), 34–53. <https://doi.org/10.1111/faf.12505>
- Suleiman, M., & Haruna, I. M. (2023). Gender roles and socio-cultural constraints affecting rural women's livelihood participation in Northern Nigeria. *Journal of Social Sciences and Humanities Research*, 8(2), 102–110.
- Uduji, J. I., Okolo-Obasi, E. N. & Asongu, S. (2020). Women's participation in the offshore and inshore fisheries entrepreneurship: The role of CSR in Nigeria's oil coastal communities. *Journal of Enterprising Communities: People and Places in the Global Economy*, 14(2), 247-275. <https://doi.org/10.1108/JEC-01-2020-0010>
- World Bank. (2021). *Gender equality in fisheries and aquaculture*. <https://www.worldbank.org/en/topic/agriculture/publication/gender-equality-in-fisheries-and-aquaculture>



Figure 1: Map showing the geographical location of the study site – Galadima Fish Market
Source: Google map (2025).

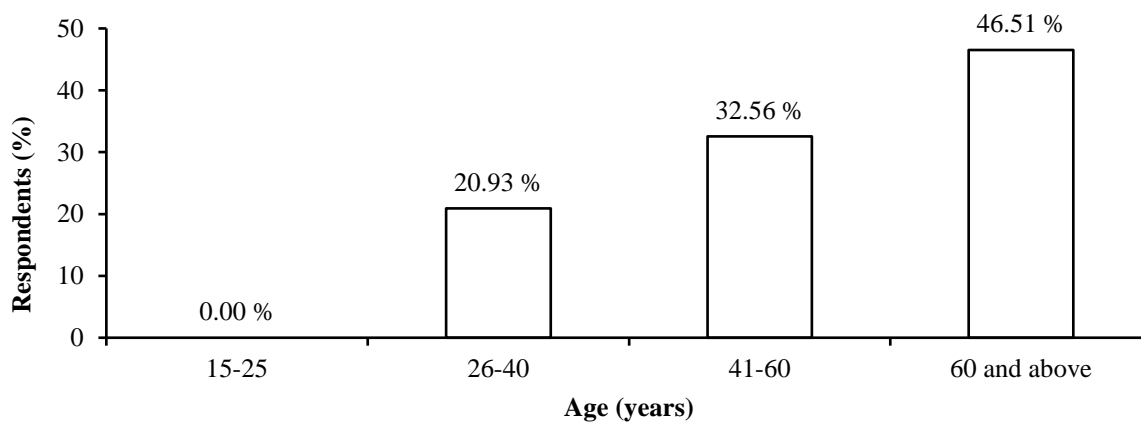


Figure 1: Age bracket of the female respondents from Galadima fish market, Kano State

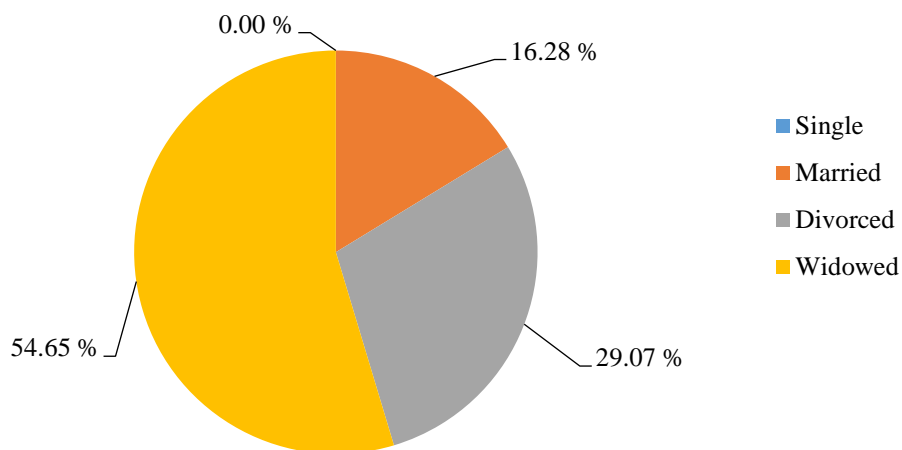


Figure 2: The marital status of the female respondents from Galadima Fish Market, Kano State.

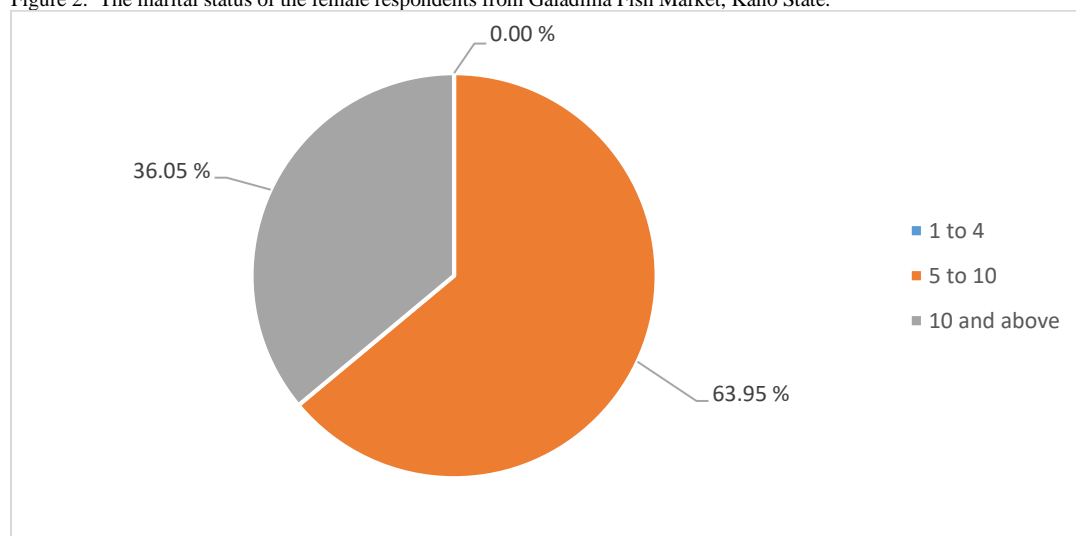


Figure 3: House-hold size of the female respondents from Galadima Fish Market, Kano

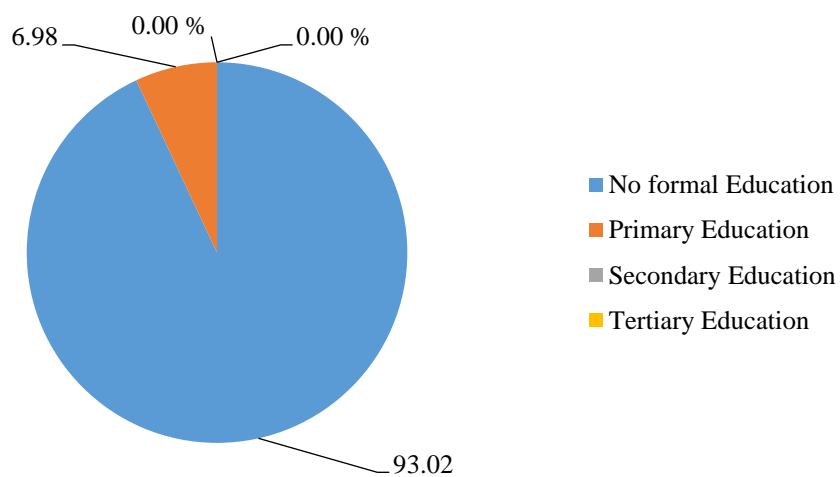


Figure 4: Educational level of the female respondents from Galadima Fish Market, Kano State

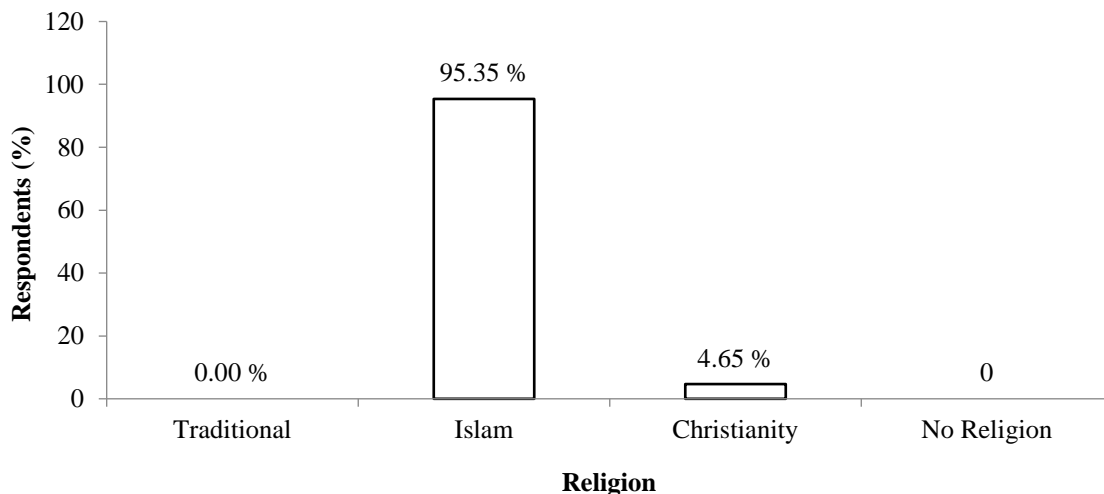


Figure 5: Religion status of the respondents from Galadima fish market

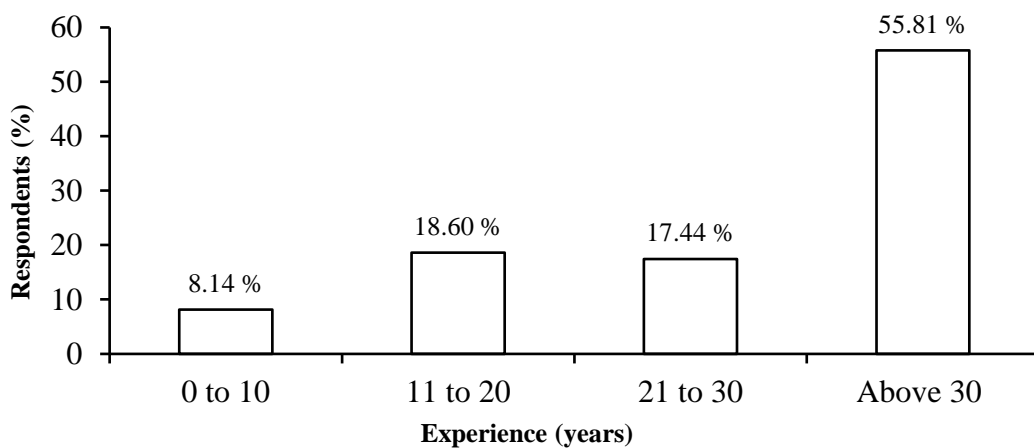


Figure 6: Years of experience of the fisherfolks from Galadima fish market, Kano.

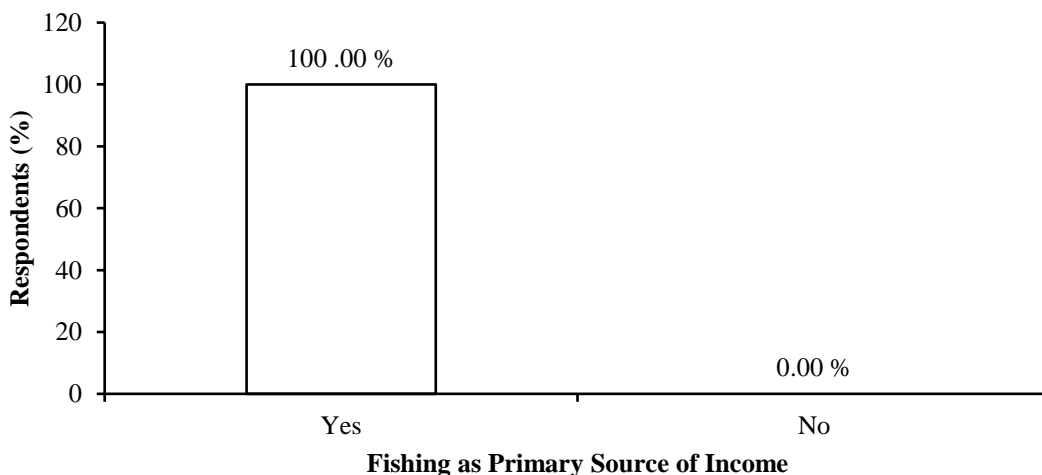
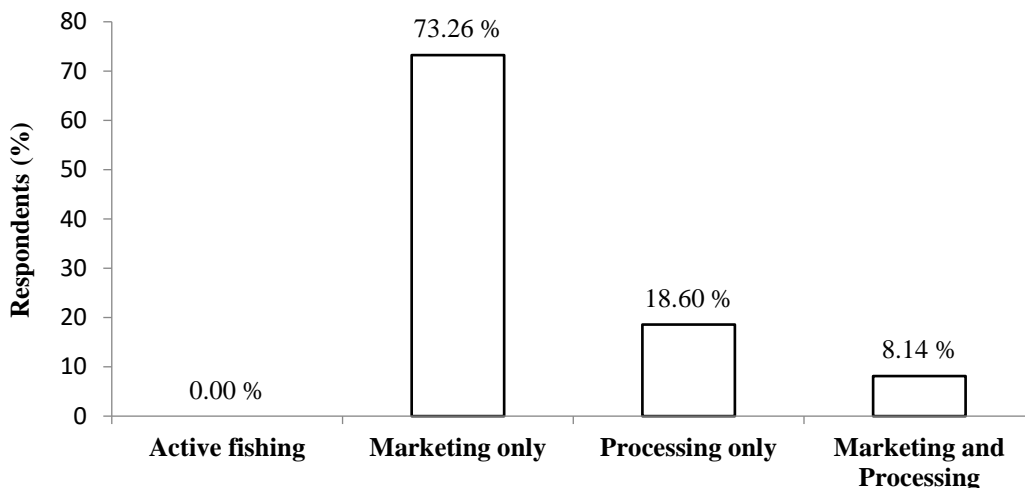
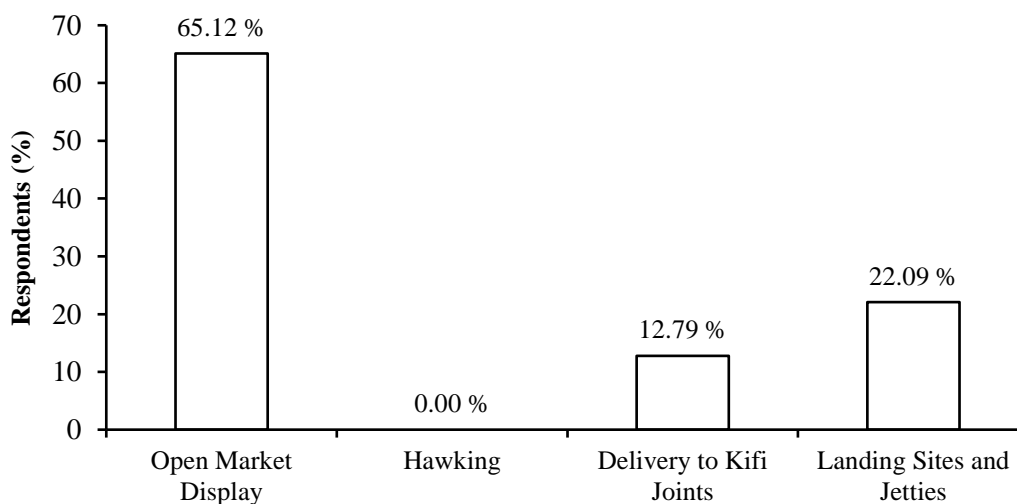


Figure 7: Percentage of Respondents in fishing business as a main source of livelihood



Fisheries Activity

Figure 8: Aspect of Participation of the Respondents in the Fisheries Sector



Market Strategy

Figure 9: Market strategy of the respondents at Galadima Fish Market, Kano

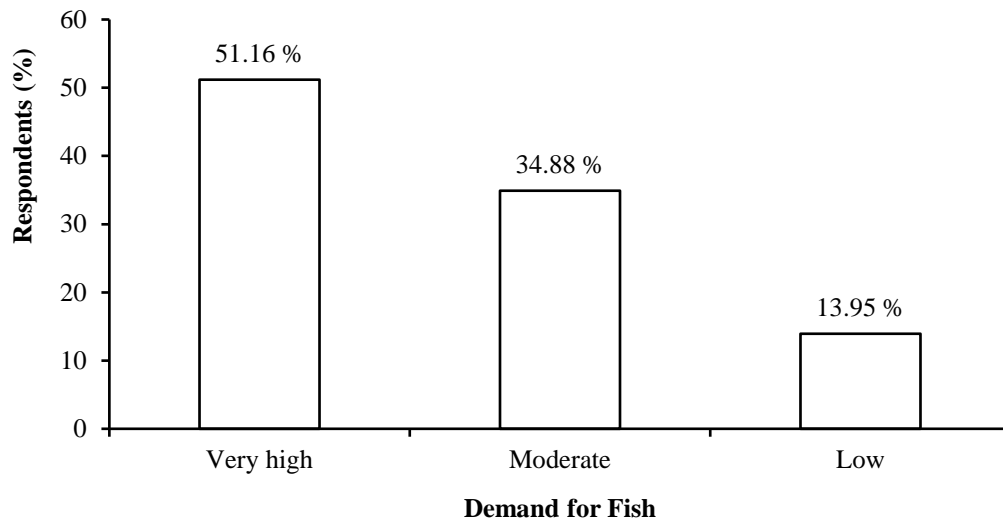


Figure 10: Rate of demand of fish in Galadima Fish Market, Kano

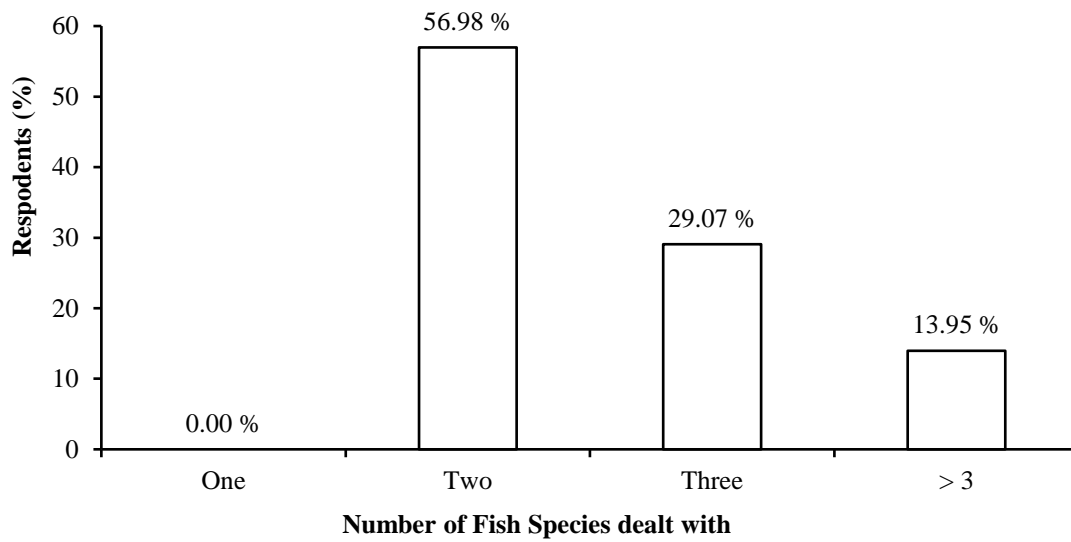


Figure 11: Percentage of Respondents and the number of fish species they market