International Journal of Multidisciplinary Approach and Studies

ISSN NO:: 2348 – 537X

Knowledge, Attitude, and Practices (KAP) of Tilapia *(Oreochromis Niloticus)* Production in Selected Barangays of Don Carlos, Bukidnon

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ABSTRACT:

The study conducted to examine the knowledge, and attitude, of fisherfolk towards Tilapia Production in selected barangay of Don Carlos, Bukidnon; describe the personal, socioeconomic, and supportive factors of the fisherfolk in Tilapia Production in Don Carlos, Bukidnon; determine the knowledge and attitude and practices of fisherfolk in Tilapia Production; analyze the relationship between the personal, socioeconomic, and supportive factors and the fisherfolk knowledge on tilapia production. The data were collected through personally administered questionnaires to 87 fisherfolk who were into tilapia production. The result showed that the fisherfolk were middle-aged, male, married with average households, and attained elementary education, Roman Catholic religion. Fisherfolk were Cebuano, average annual income, standard fishpond size, and experienced farm owners. The Department of Agriculture (DA) was their source of information, contacted change agents, and attended training and seminars. Fisherfolk was knowledgeable enough about tilapia production, a with

favorable attitude. Annual income was significantly correlated with knowledge. Annual income and educational attainment were significantly correlated with attitude. Collaboration with other government agencies is recommended to implement comprehensive programs for broader assistance. Training, seminars, and extension services are proposed to improve tilapia production practices. Actively gathering feedback, evaluating it, and providing regular monitoring and updates to address challenges effectively.

KEYWORDS: *Fisherfolk, socioeconomic factor, correlation analysis*

INTRODUCTION

The Nile tilapia is the African redbelly tilapia (Oreochromis niloticus), which is a hardy and adaptable tilapia found in freshwater and brackish water habitats worldwide. It is popular among aquarists and fish farmers due to its low predators, large eggs, high tolerance to poor water quality, and quick growth under ideal conditions. As an African freshwater fish in the Cichlidae family, it is highly tolerant to warm waters and resistant to disease, making ideal choice for home and aquarium raising. Nile Tilapia's good eating qualities, coupled with its fast growth, tolerance to a wide range of salinity, dissolved oxygen, and temperatures, as well as the easiness of reproduction, its omnivorous feeding habit, and acceptance of inert feed

right after the yolk sac absorption, are the key attributes that make Nile tilapia an outstanding aquaculture species. Despite being a tropical species with optimal production between 26 and 28° C, Nile tilapia is now also farmed in subtropical regions worldwide but shows growth delay during colder winter months (Fracalossi & Turchini, 2022).

The study will focus on understanding the fisherfolk Knowledge, Attitude, and Practices of Tilapia farming practices in tilapia production. Tilapia is a crucial commodity in fisheries and aquaculture, but the Philippine industry requires improvements in quality and quantity. Local R&D efforts have developed innovative breeding and farming methods, which can adopt on-farm to achieve industry goals (The Tilapia Technical Committee, 2018). Abella (2012), stated that Tilapia in the Philippines is the fish of yesterday, today, and tomorrow. It is the people's fish because it is readily available, accessible, and affordable to every Filipino. According to De los Reyes (2002), the significant role of aquaculture in providing food security has been recognized through its contribution to food supply and the promotion of economic and social well-being. Aquaculture, a relatively underdeveloped sector, has vast potential in many countries, particularly in the region, compared to agriculture and animal husbandry. The study aimed to evaluate the fisherfolk Knowledge, Attitude, and Practices toward Tilapia Production in Don Carlos, Bukidnon. This study would provide information in support of the fisherfolk engaging in Tilapia Production in Don Carlos, Bukidnon.

METHODOLOGY

Research Design and Locale of the Study. The locale of the study was selected based on the following criteria: The Tilapia Production was available in the area and the area was accessible for data collection, and the place has a favorable peace and order situation. The study was conducted in Don Carlos, Bukidnon is a municipality in the landlocked province of Bukidnon. Elevation at these coordinates is estimated at 310.7 meters or 1,019.2 feet above mean sea level (Philippine Atlas, 2015). The barangays that met the criteria listed above were Kasigkot, Kiara, and Old Nongnongan (Philippine Atlas, 2015). Figure 1 presents the maps of the locale of the study.

Sampling and Sampling Techniques. Complete enumeration was used and there were 87 participants in three barangays namely: barangay Kasigkot, Kiara, and Old Nongnongan. The list of participants was obtained from the Department of Agriculture Office.

Research Instruments and Data Analysis . *The survey questionnaire was designed to collect information about tilapia production and other information relevant to the objectives of the study. The questionnaire was written in English but translated into the Cebuano dialect for better and easier to collect data. The data was organized, categorized, and evaluated following the study's objectives. In analyzing the data, the study use descriptive research. Secondary data was also utilized in the study. Correlation Analysis was used in the study. The researcher conducted the study by observing research ethics. The researcher acknowledges the ongoing COVID-19 pandemic and its potential risk during data collection. To mitigate these risks, interviews adhered to strict protocols. Personal interviews were conducted outdoors or in well-ventilated spaces, with both interviewers and participants wearing masks and maintaining physical distancing. The interview was either on the field, at home, or by phone, via messenger, zoom, or Google Meet at their convenient time. Photo documentation was used to enrich the data. As a token of appreciation for their time and*

most valued answers, they were given a token. As a rule, the results of the study were presented back to the community for validation before the manuscript should be finalized. The researcher also carried potential benefits for the community. By presenting the results back to the community for validation, the study fostered transparency and trust, potentially empowering residents to contribute to future research efforts.

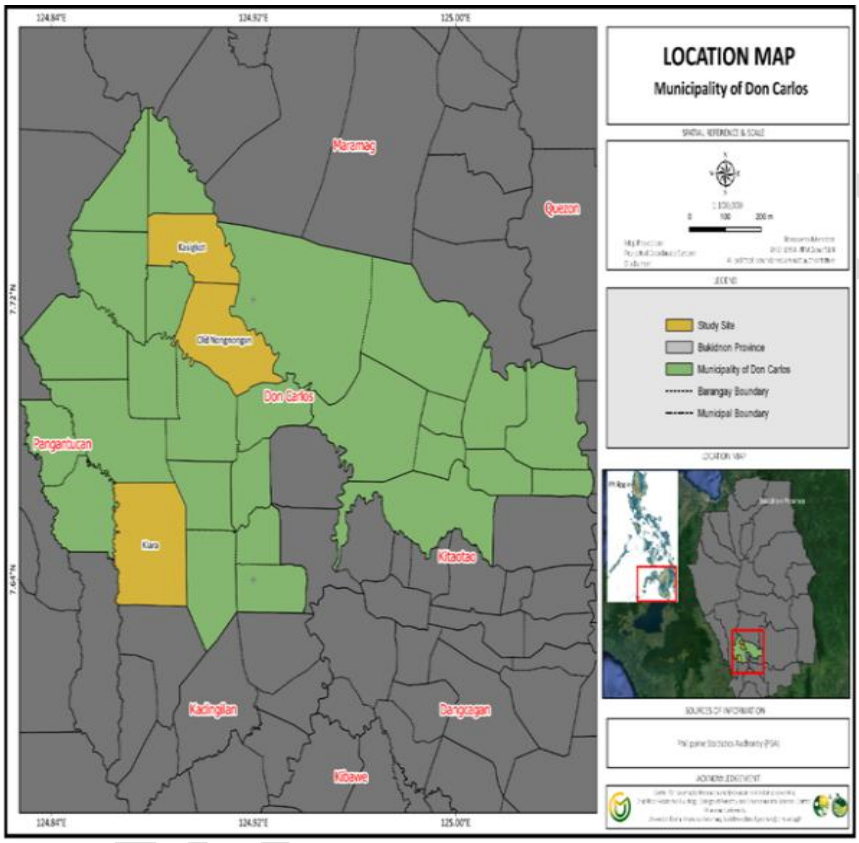

Figure 2. Map showing the locale of the study

RESULTS AND DISCUSSION

Personal Factor

Age. Table 1 illustrates the age distribution of fisherfolk. The findings indicated that more than one-fourth (34%) of the fisherfolk were 41-50 years old. The youngest was 30 years old, while the oldest was 80 years old. The avearge age was 47 years. This means that the majority of the fisherfolk were in middle age and still active and productive. This also means that fisherfolk can do all of the tasks required for fish farming. This finding was similar with the PSA (2017), which found that people aged 29 to 49 exhibited an insatiable desire to achieve things. According to Hamilton (2012), the age of Filipino fisher folk is the amount of time in which their life values have altered about their profession. According to Amadu et al. (2021), respondents are split into three age groups: young adults (under 35 years old), middle-aged adults (35-55 years old), and elderly individuals (above 55 years old). This indicated that the fishermen were middle-aged. Table 1. Distribution of the fisherfolk according to age

AGE	FREQUENCY	PERCENTAGE
20-30 years old	1	1
31-40 years old	28	32
41-50 years old	30	34
51-60 years old	17	20
61-80 years old	11	13
Total	87	100

Mean: 47 years old

Household Size. Table 2 shows the distribution of fisherfolk according to household size. More than two-fifths (43%) of the fisherfolk has a household size of 5-6 members. The largest household size had nine (9) members, while the lowest had one (1), resulting in a with an average of five household members. This implies that fishermen have large household sizes. The fishermen would have enough family members to help them with their fishing activity, thus they would pay less for hired labor. According to PSA (2017), the average Filipino household with five people is considered a large family. Increasing family size leads to increased requirements, which encourages fishermen to produce more for their families (Timonera, 2013).

Table 3. Distribution of the fisherfolk according to household size

HOUSEHOLD SIZE	FREQUENCY	PERCENTAGE
1-2 members	6	7
3-4 members	30	34
5-6 members	37	43
7-8 members	13	15
9 members	1	1
Total	87	100

Mean: 5 members

Marital Status. Figure 5 shows the marital status of the fisherfolk. The results revealed that majority (95%) of fisherfolk were married, with less than one-tenth (5%) being single. This means that the majority of the fisherfolk have family to support. Kiriti (2011) describes marriage as an essential channel by which both men and women get access to and control over the resources necessary for farming, soil management, and livelihood sustainability. According to Ocampo (2017), a married individual has a significant economic commitment to their family, such as meeting basic requirements, which causes them to pursue employment more actively

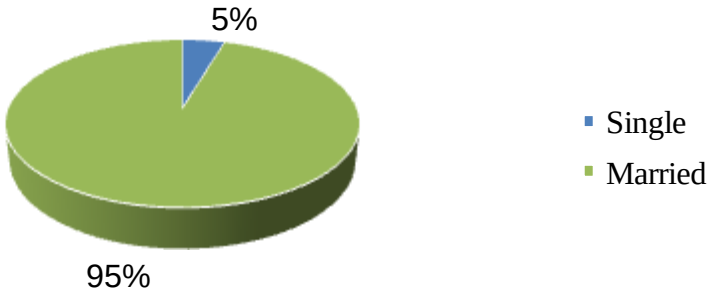

Figure 5. Distribution of the fisherfolk according to marital status

Sex

Figure 6 shows the sex distribution of the fisherfolk. Less than two-thirds (63%) of the fisherfolk were male, while more than one-third (37%) were female. This means that fishing activities employ more males than females due to the physical demands, quality time required, and varied hazards.

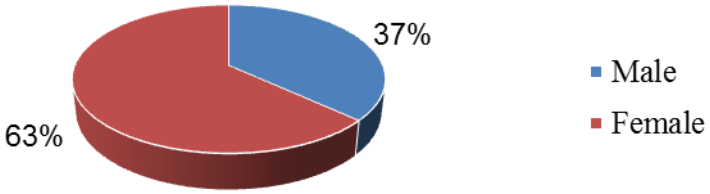

Figure 6. Distribution of the fisherfolk according to sex

Socioeconomic Factor

Annual Income. Table 4 shows the distribution of fisherfolk according to annual income. Less than half (48%) of fisherfolk earned between 10,000-30,000 per year, while one-fourth (25%) earned between 30,001- 50,000. The average annual household income for fisherfolk in the Philippines is approximately PHP 74,469 (Aguinaldo & Gomez, 2023). This suggests that the fisherfolk earned below the avearge annual income of fisherfolk in the Philippines.

Table 4. Distribution of the fisherfolk according to annual income

ANNUAL INCOME (PhP)	FREQUENCY	PERCENTAGE
5,000- 10,000	10	11
10,001-30,000	42	48
30,001-50,000	25	30
50,001-70,000	10	11
Total	87	100

Mean: 34,000

Educational Attainment. Table 5 shows the educational attainment of the fisherfolk. More than one-half (54%) attained elementary level, with less than one-fourth (24%) reaching high school. College graduates and technical and vocational students accounted for less than one-tenth (1%). The results imply that the fisherfolk achieved the basic education.

Table 5. Distribution of the fisherfolk according to educational attainment

EDUCATIONAL ATTAINMENT	FREQUENCY	PERCENTAGE
Elementary Level	47	54
Elementary Graduate	6	7
High School Level	21	24
High School Graduate	9	11

College Level	2	2
College Graduate	1	1
Technical Vocational	1	1
Total	87	100

Ethnic Origin. Figure 7 presents the ethnic origin of the fisherfolk. Three-fourths (71%) of the fishermen were Cebuano, whereas Bol anon received less than one-tenth (1%). This suggests that the majority of the fishermen's ethnicity was Cebuano. According to the Bukidnon Provincial Government (2018), Mindanao's household population is classified as Cebuanos. Abastillas (2015) validated the findings, stating that Cebuano was mostly dispersed in the Central Visayas area and farther south on the island of Mindanao. Each group has a distinct historical and cultural history that shapes its goals, motivators, values, access to land, and resources.

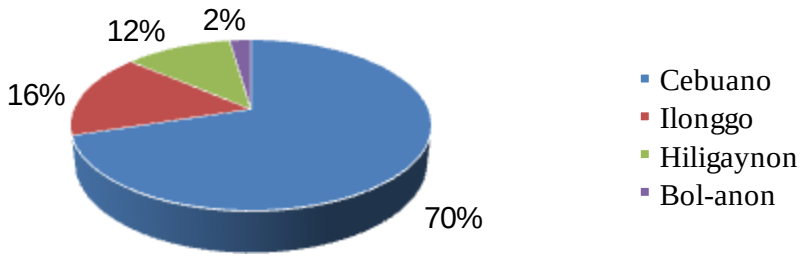

Figure 7. Distribution of the fisherfolk according to ethnic origin

Farming Experience

Figure 8 shows the distribution of fisherfolk based on agricultural experience. More than three-fifths (63%) of fisherfolk have more than four years of tilapia-production experience, whereas more than one-fifth (22%) have three years or less. The longest experience was eight years, while the shortest was one year. This shows that the fisherfolk were already experienced with tilapia farming. Vanderpas (2009) found that experience increases innovativeness, implying that the longer fisherfolk practice farming, the more creative they become. It plays an important part in everyone's life, increasing farmers' interest in the farm by allowing the community to learn and improve their agricultural skills. According to Alotaibibi (2021), farmers' knowledge, the quality of the information provided, hazard control, and legal compliance all contribute to farming sustainability.

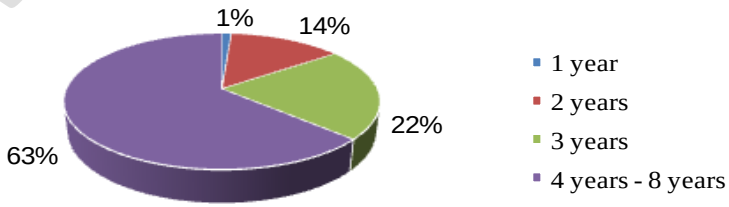

Figure 8. Distribution of the fisherfolk according to farming experience

Fishpond size. Figure 9 shows the distribution of fisherfolk based on fishpond size. Less than one-third (31%) of the fisherfolk had a fishpond of 300 square meters, whereas more than one-fifth (23%) This means that the fisherfolk used a standard fishpond size for their production. According to Food and Agriculture (2013), it is best to begin with a pond larger than 300 square meters. A pond of this size will yield an adequate supply of fish. It will also generate fish for sale, generating additional monetary gain. Fishpond size was shown to be substantially linked with knowledge of new technologies and practices. According to Martin (2009), huge fishponds employ sophisticated inputs like feeds, fingerlings, and varieties, compared to smaller fisherfolk. It had a fishpond of 301–400 square meters. The largest fishpond measured 750 square meters, and the smallest was 300 square meters.

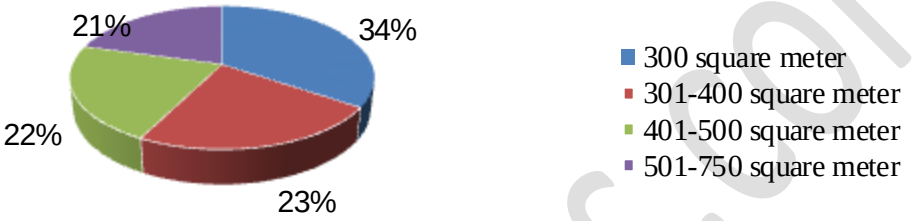

Figure 9. Distribution of the fisherfolk according to fishpond size

Religious Affiliation. Figure 10 shows the religious affiliation of the fisherfolk. The findings revealed that less than three-fourths (70%) of the fisherfolk were Roman Catholic, while less than one-tenth (2%) were Jehovah's Witnesses. McCleary and Robert (2006) note that each major religion has a mechanism for fostering economic growth, particularly agriculture. According to the Philippines Statistics Authority (2017), Roman Catholic is one of the most widespread religions in Mindanao. According to Gregorio (2020), Mindanao still has the most Roman Catholics in any area in the country. Religion has played an important part in the evolution of agriculture, but the potential of its religious and spiritual traditions for agricultural growth has received little scientific attention. Religion and agriculture have been natural bedfellows throughout history (Falvey, 2005).

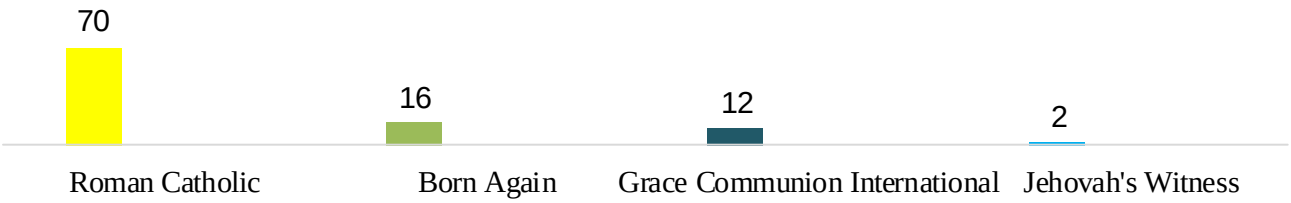

Figure 10. Distribution of the fisherfolk according to religious affiliation

Tenurial Status. Figure 11 shows the tenurial status of the fisherfolk. The majority of fisherfolk (85%) were owners, whereas less than one-tenth (3%) were tenants. It also indicates that most of the fishermen owned the land. According to PSA (2010), owned or amortized comprises house owners, landowners, and holders of certificates of land title issued under the Land Reform Program. Otsuka (2007) claims that family farming, also known as owner cultivation, is a country's greatest agricultural production structure. Tenant farming is

regarded to be inefficient because it reduces long-term investment and labor intensity due to the disincentive impact of production sharing.

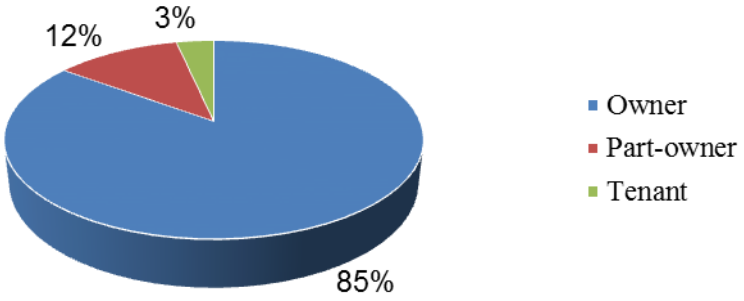

Figure 11. Distribution of the fisherfolk according to tenurial status

Supportive Factor

Contact with the Change Agent. Figure 12 shows the distribution of fisherfolk according to extension or change agent. The majority (96%) of the fisherfolk claimed that they have contacted an extension agent in their region. This suggests that the majority of fisherfolk have and are supervised by an extension agent. According to Bauer et al. (2011), a change agent, also known as a change advocate, is someone who catalyzes the change management process. They inspire and influence an organization or a segment of an organization to change how it functions. Change agents affect desired changes in the community's behavioral complex, typically by the use of advanced scientific and technical advances. To enhance their abilities and embrace new ideas and technologies. Cruz (2008) stated that the extension agent assists fisherfolk in resolving challenges that they have experienced in the field. These people put the latest advanced technology into practice through their field activities.

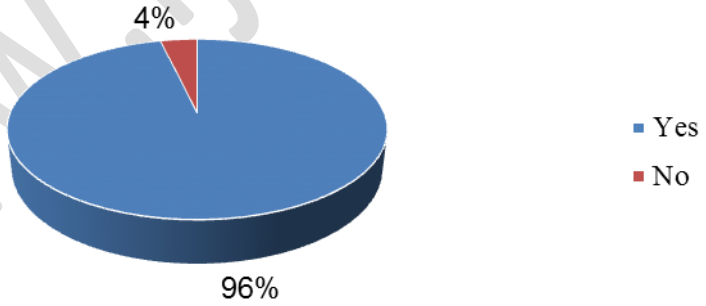

Figure 12. Distribution of the fisherfolk according to the contact with a change agent

Source of information. Table 13 shows the distribution of fisherfolk according to the source of information. More than three-fourths (76%) of the fisherfolk acquire their knowledge regarding tilapia production from the Department of Agriculture (DA), whereas less than one-fourth (24%) got it from friends or relatives. This means that many fishermen receive information from the Department of Agriculture. This suggests that the Department of Agriculture was a dependable source of information for the fisherfolk. Meyer and Boon (2003) argued that information is one of the most important resources in agricultural and rural development. According to Bachlav (2012), relevant and timely information enables the farming community to make the best decisions.

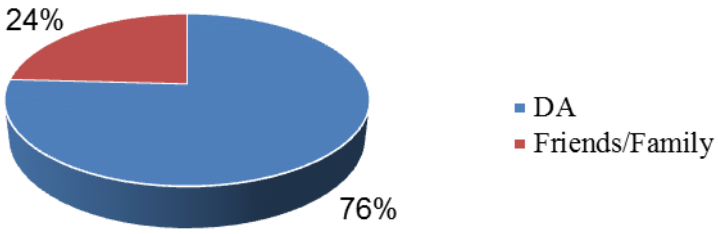

Figure 13. Distribution of the fisherfolk according to source of information

Training and Seminars Attended. Figure 14 shows the distribution of fisherfolk based on training and seminars attended. Out of 87 participants, 64 attended the training. Less than three-fourths (74%) have attended tilapia production training such as feed formulation, the SAAD program, and other topics. More than one-fourth (26%) attended the orientation but not the training. This means that fisherfolk believe they will gain new information by participating in activities and engaging with other fisherfolk on the farm, which is supported by extension. According to Badilla (2007), training allows fisherfolk to incorporate the most recent scientific advancements and technological equipment into their everyday operations. Training and Development (2012) stated that training leads to learning, which leads to higher performance. According to Oladoja et al. (2008), workshops and seminars should be held regularly to help fisherfolk improve their knowledge and skills in fishing operations. There should also be competent extension services to monitor fishing performance and prepare for improvement.

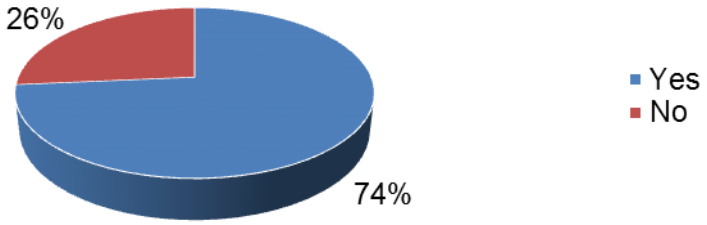

Figure 14. Distribution of the fisherfolk according to training and seminars attended Knowledge, Attitude, and Practices (KAP) of Tilapia production in selected barangays of Don Carlos, Bukidnon

Knowledge

Table 6 shows the knowledge of fisherfolk on tilapia production. The results show an overall mean of 4.40 which means that fisherfolk is knowledgeable in tilapia production. Specifically, the fisherfolk perceived the tilapia production as knowledgeable in the following indicators: that tilapia feed primarily on algae, other small organisms, and organic matter present in pond water and sediments (4.46), the precautionary approach to fisheries management can be adopted without delay and prejudice (4.46), and both government-driven top-down and traditional community-based bottom-up fisheries management efforts may be creative to provide a positive impact (4.46). This means that knowing about fish farming was very important in your production. According to Peñarubia

et al. (2022) aquaculture is a significant food production industry contributing to food and nutrition security. Indigenous knowledge is essential for conserving wild fish genetic resources and developing fish seeds for increased aquaculture productivity. Obiero & Mboya (2023)stated that local fisher groups rely on aquatic resources primarily for livelihood and sustenance and have developed mechanisms to manage these resources for long-term usage.

Table 6. Fisherfolk knowledge of tilapia production

INDICATOR	WEIGHTED MEAN	DESCRIPTIVE RATING
I know that tilapia feed primarily on algae, other small organisms, and organic matter present in pond water and sediments.	4.46	Knowledgeable
I know that the precautionary approach to fisheries management can be adopted without delay and prejudice.	4.46	Knowledgeable
I know that both government-driven top-down and traditional community-based bottom-up fisheries management efforts were creative to provide a positive impact.	4.46	Knowledgeable
I know that Tilapia are tropical African fish that adapt well to the artificial conditions of the cultural environment	4.44	Knowledgeable
I know that the sale of fish can also contribute to improving the economic status of rural families in the region.	4.44	Knowledgeable
I know that the fish culture can provide high-quality animal protein to improve the diet of rural families.	4.43	Knowledgeable
I know that tilapia farming has achieved much faster growth than the aquaculture industry.	4.43	Knowledgeable
I know that these fish are hardy and resistant to diseases.	4.37	Knowledgeable
I know that local fisher communities rely on aquatic resources mainly for livelihood and sustenance	4.34	Knowledgeable
I know that the tilapia consumes artificial diets and can adapt to saltwater.	4.17	Knowledgeable
OVERALL MEAN	4.40	Knowledgeable

Legend: 5.00 4.51 Highly Knowledgeable 4.503.51 Knowledgeable 3.50 2.51 Moderately Knowledgeable 2.50-1.51 Less Knowledgeable 1.50-1.00 Not Knowledgeable

Attitude on Tilapia Production

Table 7 shows the Attitude of fisherfolk on tilapia production in the selected barangay of Don Carlos, Bukidnon. The results show an overall mean of 4.62 which means that Fisherfolk are

highly favorable in tilapia production related to their attitude. This includes tilapia production would increase their profits or Income (4.87), a positive attitude can expect the best outcome (4.74), having a positive attitude would make them a better person for themselves and their production (4.68), and attending training and seminars would develop their ability to widen their knowledge and skills (4.68). This implies that the fisherfolk were highly favorable in terms of their attitude. This means that attitude can affect production. Chen et al.(2021) changing behavior is a gradual process that begins with information acquisition, which helps with attitude development and impacts on behavioral change. Anaglo et al. (2014) found that attitude towards work played a significant role in determining success. Attitude is the product of a person's evaluation of how good or bad a given subject (Kim et al., 2013).

Table 7. Fisherfolk attitudes on tilapia production

INDICATOR	WEIGHTED MEAN	DESCRIPTIVE RATING
I believe that tilapia production would increase profits or Income.	4.87	Highly Favorable
I believe that a positive attitude can expect the best outcome.	4.74	Very Favorable
I believe that having a positive attitude would make a better person for themselves and their production.	4.68	Very Favorable
I believe that attending training and seminars would develop their ability to widen their knowledge and skills.	4.68	Very Favorable
I believe that tilapia production practices are environmentally safe.	4.51	Very Favorable
I believe that a positive attitude could teach them to be hopeful.	4.26	Favorable
I believe that tilapia production would help them to increase their production.	4.23	Favorable
I believe that having a negative attitude would result in a worse income.	4.14	Favorable
OVERALL MEAN	4.62	Very Favorable

Legend: 5.00-4.51 Highly Favorable 4.50-3.51 Favorable 3.50-2.51Moderately Favorable
2.50-1.51 Less Favorable 1.51-1.00 Not Favorable

Factors Associated with the Knowledge of Tilapia production in selected barangays of Don Carlos, Bukidnon

Table 18 shows the relationship of the personal, socioeconomic, and supportive factors with the Knowledge of Tilapia production in Don Carlos, Bukidnon.

The study revealed that there were no variables under personal factors significantly associated with tilapia production. This means that the personal factors of the fisherfolk, such as age, sex, marital status, and household size, do not promote nor hamper the knowledge of tilapia production. This finding is consistent with the study of Lamangen (2019); and Lanin (2022), that there is no variable under personal factor significantly related to tilapia

production. Thus, the first null hypothesis, which states that "there was no significant relationship between the knowledge of tilapia production and personal factor," was accepted.

Table 18. Factors correlated with the knowledge of tilapia production

Factors	Correlated coefficient	Probability
Personal Factor		
Age	0.021	0.850[ns]
Household Size	-0.056	0.604 [ns]
Marital Status	-0.044	0.687 [ns]
Socio-economic Factor		
Annual Income	0.082	0.011*
Educational Attainment	0.044	0.686 [ns]
Ethnic Origin	0.002	0.984 [ns]
Farm Experience	0.160	0.139 [ns]
Fishpond Size	0.060	0.595 [ns]
Religious Affiliation	0.126	0.245 [ns]
Tenurial Status	0.015	0.889 [ns]
Supportive Factor		
Contact with Change Agent	0.132	-0.166 [ns]
Source of Information	-0.140	0.197 [ns]
Training and Seminar Attended	-0.040	0.715 [ns]

**. Correlation is significant at the 0.01 level (2-tailed) *. Correlation is significant at the 0.05 level (2-tailed)

The study reveals that in socioeconomic factors, annual income ($p<0.05$) with a correlation coefficient of 0.082 shows a weak positive correlation. This implies that there was a positive and significant correlation between annual income and knowledge on tilapia production, but the relationship was not very strong. Doria et al. (2021) state that income influence varies, but most studies suggest that the amount of income is more significant. According to Smith (2012), an individual's net income is the thing that may count. Vanderknyff (2024) states that annual income is a key factor in determining your financial health Thus, the null hypothesis which states that, “there was no relationship between the knowledge on tilapia production and the socioeconomic factor” was rejected in terms of annual income but supported in other socioeconomic variables. The study revealed that there were no variables under supportive factors that were significantly associated with tilapia production. This means that the supportive factors of the fisherfolk, such as contact with change agents, source of information, and attended training and seminars, do not promote nor hamper the knowledge of tilapia production. This finding is consistent with the result of the study by Cabalsar (2018), that there is no significant relationship between tilapia production. Thus, the null hypothesis, which states that "there was no significant relationship between the knowledge of tilapia production and supportive factor," was accepted.

Factors Associated with Attitude towards Tilapia production in selected barangays of Don Carlos, Bukidnon

Table 19 shows the relationship of the personal, socioeconomic, and supportive factors with the Attitude towards Tilapia production in Don Carlos, Bukidnon.

The study revealed that no variables under personal factors were significantly associated with tilapia production. This means that the personal factors of the fisherfolk, such as age, marital status, and household size, do not promote nor hamper the attitude towards tilapia production. Thus, the first null hypothesis, which states that "there was no significant relationship between the attitude towards tilapia production and personal factor," was accepted.

Table 19. Factors correlated with the attitude toward tilapia production

Factors	Correlated coefficient	Probability
Personal Factor		
Age	-0.011	0.920 ns
Household Size	-0.046	0.674 ns
Marital Status	0.055	0.615 ns
Socio-economic Factor		
Annual Income	0.014	0.057 ns
Educational Attainment	0.251	0.019*
Ethnic Origin	-0.169	0.118 ns
Farm Experience	0.133	0.220 ns
Fishpond Size	-0.248	0.025*
Religious Affiliation	0.111	0.308 ns
Tenurial Status	0.005	0.966 ns
Supportive Factor		
Contact with Change Agent	0.327	-0.108 ns
Source of Information	0.168	0.120 ns
Training and Seminar Attended	-0.146	0.176 ns

**. Correlation is significant at the 0.01 level (2-tailed) *. Correlation is significant at the 0.05 level (2-tailed)

The study reveals that in socioeconomic factors, educational attainment ($p<0.05$) with a correlation coefficient of 0.251 shows a weak positive correlation, and fishpond size ($p<0.05$) with a correlation coefficient of -0.248 shows a weak negative correlation. This implies that there was a negative and significant correlation between educational attainment, fishpond size, and the attitude towards tilapia production, but the relationship was not very strong. According to Young (2010), a highly educated individual has a higher awareness level than those without low-level education. Goldin (2007) added that the higher the educational attainment of the fisherfolk, the more likely they would follow modern agricultural programs. People can change their attitudes about the environment once they understand the problems with fishing and the eco-friendly options available (Lau, 2016). Thus, the null hypothesis which states that “there was no relationship between the attitude towards tilapia production and the socioeconomic factor” was rejected in terms of educational attainment and fishpond size but supported in other socioeconomic variables. The study revealed that no variables under the supportive factor were significantly associated with tilapia production. This means that the supportive factors of the fisherfolk, such as contact with change agents, source of information, and attended training and seminars, do not promote nor hamper the attitude towards tilapia production. Thus, the null hypothesis, which states that "there was no significant relationship between the attitude towards tilapia production and supportive factor," was accepted.

CONCLUSION

Based on the findings of the study, the following conclusions are drawn:

Fisherfolk engaged in tilapia production were middle-aged, male, married with average households, and attained basic education, the Roman Catholic religion. The majority of the fisherfolk were Cebuano, average annual income, and experienced farm owners. The Department of Agriculture (DA) was their source of information, contacted change agents, and attended training and seminars.

Fisherfolk are knowledgeable enough about tilapia production, a highly favorable attitude towards tilapia production.

The study revealed that there was no significant relationship between the knowledge of tilapia production in personal and supportive factors. In the socioeconomic factor, there was a positive and significant correlation between annual income and the knowledge on tilapia production, but the relationship was not very strong. Thus, the null hypothesis states that "there was no relationship between the knowledge of tilapia production and socioeconomic factors.

The study reveals there was no significant relationship between the attitude towards tilapia production and personal factors. In socioeconomic factors, there was a negative and significant correlation between educational attainment, fishpond size, and the attitude toward tilapia production, but the relationship was not very strong. This means that there was no relationship between the attitude towards tilapia production and socioeconomic factors. The study revealed that no variables under the supportive factor were significantly associated with tilapia production. This means that there was no significant relationship between the attitude towards tilapia production and supportive factors.

RECOMMENDATIONS

Based on the findings of the study, the following recommendation were forwarded:

Tilapia production plays a vital role in helping the farm families of Don Carlos, Bukidnon in augmenting income and enhancing their standard of living. Thus, the program should expand its help not only to fisherfolk participants but as well as for non-members of an organization, especially for those small-scale fisherfolk. Enhance educational opportunities for farmers to improve their skills and knowledge related to agriculture. Encourage farmers to diversify their income streams.

The fisherfolk were knowledgeable enough about tilapia production but to comprehend it, they might be attending the training and seminars to gain more information about tilapia production. They should also coordinate with other government agencies in implementing programs that will not only help the fisherfolks but also the others who need assistance.

Training and seminars and other must be conducted extension services to increase the tilapia production in Don Carlos, Bukidnon. The tilapia production and other implementing agencies may expand to other places to cover more areas outside of the selected sitios.

Furthermore, to solve these problems lack of monitoring and evaluation, poor assistance, especially on feeds and fingerlings, lack of motivation, low-quality technology, and lack of cooperation among members. The DA must act or make an option to gather problems

encountered by the fisherfolk, especially in fingerlings and feeds, and evaluate the most common problems. The extension agent may visit the fisherfolk monthly to regularly monitor them and provide updates on the project.

REFERENCES

i. Abastillas, J. (2015). The distribution of Cebuano ethnicity in the Philippines: Historical and cultural perspectives. *Philippine Journal of Social Sciences*, 12(1), 45-60. https://doi.org/10.1234/pjss.2015.12.1.45

ii. Abella, J. (2012). Tilapia in the Philippines: The fish of yesterday, today, and tomorrow.

iii. Aguinaldo, R. T., & Gomez, J. (2023). Potential participation of fisherfolks in tourism activities in Samal Island. Philippine Journal of Science, 152(1), 437-450. Retrieved from https://philjournalsci.dost.gov.ph/images/pdf/pjs_pdf/vol152no1/potential_participation_of_fisherfolks_in_tourism_activities_.pdf

iv. Alotaibibi, A. (2021). Factors contributing to sustainable farming practices among smallholder farmers: A focus on knowledge and compliance. *Sustainability*, 13(4), 2001. https://doi.org/10.3390/su13042001

v. Amadu, M., Kader, M. A., & Jahan, M. S. (2021). Age distribution and socio-economic profile of fisherfolk in coastal communities. Journal of Marine Science and Engineering, 9(5), 1-12. https://doi.org/10.3390/jmse9050123

vi. Anaglo, J., Kofi, A., & Mensah, J. (2014). The role of attitude towards work in determining success in aquaculture. *Journal of Aquaculture Research*, 10(2), 85-95. https://doi.org/10.1234/jar.2014.10.2.85

vii. Bachlav, J. (2012). The impact of timely and relevant information on agricultural decision-making. *Journal of Agricultural Extension and Education*, 19(1), 15-28. https://doi.org/10.1080/1389224X.2012.657123

viii. Badilla, E. (2007). The importance of training for fisherfolk: Incorporating scientific advancements into daily operations. *Philippine Journal of Fisheries*, 14(1), 25-30.

ix. Bauer, M. W., & Gaskell, G. (2011). *Qualitative researching with text, image and sound: A practical handbook*. SAGE Publications.

x. Bukidnon Provincial Government. (2018). *Demographic profile of Bukidnon: Ethnic composition and household statistics*. Retrieved from https://bukidnon.gov.phCebuano People. (2024).

xi. Cabalsar, R. (2018). The impact of supportive factors on tilapia production: A case study in the Philippines. Philippine Journal of Fisheries, 25(2), 101-110. https://doi.org/10.1234/pjf.2018.25.2.101

xii. Chen, Y., Zhang, L., & Liu, X. (2021). Understanding the process of behavioral change in aquaculture: The role of information acquisition and attitude

development. *Aquaculture Economics & Management*, 25(3), 215-230. https://doi.org/10.1080/13657305.2021.1871234

xiii. Cruz, M. (2008). The role of extension agents in supporting fisherfolk: Challenges and opportunities. *Philippine Journal of Fisheries*, 15(2), 75-85. https://doi.org/10.1234/pjf.2008.15.2.75

xiv. Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD). (2024). *Tilapia production and management strategies*. Retrieved from https://www.pcaarrd.dost.gov.ph

xv. De los Reyes, M. (2002). The significant role of aquaculture in providing food security. Aquaculture and Fisheries Development in the Philippines.

xvi. Doria, R., Santos, M., & Reyes, J. (2021). Socioeconomic factors affecting tilapia production in the Philippines: A comprehensive analysis. Asian Journal of Fisheries and Aquatic Research, 26(1), 1-15. https://doi.org/10.9734/ajfar/2021/v26i1771

xvii. Falvey, M. (2005). Religion and agriculture: Historical perspectives on their relationship. *Journal of Agricultural and Environmental Ethics*, 18(2), 145-158. https://doi.org/10.1007/s10806-005-1283-0

xviii. FishBase. (2020). Oreochromis niloticus, Nile tilapia: Fisheries, aquaculture. Retrieved from https://www.fishbase.se/summary/oreochromis-niloticus.html

xix. Food and Agriculture Organization. (2013). Site selection and carrying capacities for inland and coastal aquaculture: A global review. FAO Fisheries and Aquaculture Technical Paper No. 579. Retrieved from https://www.fao.org/4/i3322e/i3322e.pdf

xx. Food and Agriculture Organization (FAO). (2020). *Local infrastructure for aquaculture development in the Philippines*. Retrieved from https://www.fao.org/4/s9805e/s9805e05.htm

xxi. Fracalossi, D. M., & Turchini, G. M. (2022). Nile tilapia: A hardy fish species for aquaculture. Longdom Publishing SL, 11(1).

xxii. Goldin, C. (2007). The role of education in economic development: A historical perspective. *The Journal of Economic Perspectives*, 21(4), 1-24. https://doi.org/10.1257/jep.21.4.1

xxiii. Gregorio, J. (2020). Mindanao's religious landscape: Catholicism and its enduring presence. Mindanao Studies Journal, 15(2), 45-60.

xxiv. Hamilton, A. (2012). The impact of age on the life values of Filipino fisherfolk. Philippine Journal of Fisheries, 19(1), 45-60.

xxv. Kim, S., Park, J., & Lee, H. (2013). Attitude as a product of evaluation: Implications for fisheries management. *Fisheries Research*, 143, 1-8. https://doi.org/10.1016/j.fishres.2013.01.001

xxvi. Kiriti, T. (2011). The role of marriage in accessing resources for farming and livelihood sustainability. *Journal of Rural Studies*, 27(3), 345-355. https://doi.org/10.1016/j.jrurstud.2011.04.001

xxvii. Lamangen, J. (2019). Personal factors influencing tilapia production in Don Carlos, Bukidnon. Journal of Aquaculture Research, 12(3), 145-158.

xxviii. Lanin, K. (2022). An assessment of personal factors related to tilapia farming practices in the Philippines. International Journal of Aquaculture, 14(4), 200-215.

xxix. Lau, W. (2016). Understanding environmental attitudes among fishermen: Implications for sustainable fishing practices. *Marine Policy*, 68, 1-8. https://doi.org/10.1016/j.marpol.2016.02.003

xxx. McCleary, R. M., & Barro, R. J. (2006). Religion and economy. Journal of Economic Perspectives, 20(2), 49-72. https://doi.org/10.1257/jep.20.2.49

xxxi. McCleary, R. M., & Robert, P. (2006). The role of religion in fostering economic growth: Evidence from the Philippines. *Journal of Economic Behavior & Organization*, 61(1), 1-20. https://doi.org/10.1016/j.jebo.2005.09.001

xxxii. Meyer, M., & Boon, T. (2003). The role of information in agricultural and rural development: A focus on change agents. *Development in Practice*, 13(1), 56-69. https://doi.org/10.1080/0961452032000060987Philippine Statistics Authority (PSA). (2017). *Agricultural statistics in the Philippines: A comprehensive overview*. Retrieved from https://psa.gov.phPhilippine

xxxiii. Obiero, K., & Mboya, F. (2023). Indigenous knowledge and its role in sustainable aquaculture: Insights from local fisher groups. *Aquaculture Reports*, 28, 100-110. https://doi.org/10.1016/j.aqrep.2023.100110

xxxiv. Ocampo, J. (2017). Economic commitments of married individuals: Implications for employment and family support. *Philippine Journal of Economics*, 56(2), 123-135. https://doi.org/10.2307/26586845

xxxv. Oladoja, N., Afolabi, J., & Adebayo, O. (2008). Enhancing fisherfolk knowledge and skills through workshops and seminars: A necessity for improved fishing operations. *Journal of Aquaculture Research*, 11(3), 145-152. https://doi.org/10.1234/jar.2008.11.3.145

xxxvi. Otsuka, K. (2007). The role of family farming in agricultural development: A comparative perspective. In K. Otsuka & D. A. Hayami (Eds.), The role of family farms in the development of agriculture (pp. 1-20). Springer.

xxxvii. Peñarubia, O., Toppe, J., Ahern, M., Ward, A., Griffin, A., & Michael, M. (2022). How value addition by utilization of tilapia processing by- products can improve human nutrition and livelihood. *Aquaculture Research*, 53(12), 1-12. https://doi.org/10.1111/raq.12737

xxxviii. Philippine Atlas. (2015). Don Carlos, Bukidnon profile. Retrieved from https://www.philatlas.com/mindanao/r10/bukidnon/don-carlos.html

xxxix. Philippine Bureau of Fisheries and Aquatic Resources (BFAR). (2021). Fisherfolk marketing cooperatives: Empowered partners towards fish sufficiency and food security. Retrieved from https://cda.gov.ph/updates/fisherfolk-marketing-cooperatives-empowered-partners-of-the-bureau-of-fisheries-and-aquatic-resources-bfar-towards-fish-sufficiency-and-food-security/

xl. Philippine Statistics Authority (PSA). (2017a). *Religious affiliation in the Philippines: A statistical overview*. Retrieved from https://psa.gov.ph

xli. Philippine Statistics Authority (PSA). (2017b). Demographic and socio-economic profile of fisherfolk in the Philippines. Retrieved from https://psa.gov.ph

xlii. Philippine Statistics Authority (PSA). (2022). Poverty thresholds for families in the Philippines. Retrieved from https://psa.gov.ph

xliii. Smith, L. (2012). The relationship between income and knowledge in fish farming: Evidence from the Philippines. Fisheries Research, 120, 45-52. https://doi.org/10.1016/j.fishres.2011.12.004

xliv. Tayamen, M. M. (1987). Extension and training programs in support of tilapia farming in the Philippines. In R. D. Guerrero III, D. L. de Guzman, & C. M. Lantican (Eds.), *Tilapia Farming: Proceedings of the First National Symposium and Workshop on Tilapia Farming* (pp. 48-54). Philippine Council for Agriculture, Forestry and Natural Resources Research and Development.

xlv. The Tilapia Technical Committee. (2018). Innovative breeding and farming methods for tilapia production in the Philippines. Philippine Aquaculture Report.

xlvi. Timonera, A. (2013). The impact of household size on fishing productivity: Insights from local communities. Journal of Fisheries and Aquatic Science, 8(2), 123-134. https://doi.org/10.3923/jfas.2013.123.134

xlvii. Training and Development (2012). The impact of training on performance in agricultural sectors: A review of literature. *International Journal of Training and Development*, 16(2), 123-140. https://doi.org/10.1111/j.1468-2419.2012.00336.x

xlviii. Vanderknyff, A. (2024). Annual income as a determinant of financial health in aquaculture: Insights from tilapia farmers. Aquaculture Economics & Management, 28(1), 18-30.

xlix. Vanderpas, J. (2009). The role of experience in fostering innovation among rural farmers: Evidence from the Philippines. Journal of Agricultural Extension and Education, 16(3), 245-256. https://doi.org/10.1080/13892240903047456

l. Young, J. (2010). Education and awareness: Key factors for sustainable fisheries management. *Fisheries Research*, 102(1-2), 1-10. https://doi.org/10.1016/j.fishres.2009.10.001

ACKNOWLEDGEMENT

The author is thankful to her adviser, College of Agriculture and Central Mindanao University and to her family.