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A SURVEY OF FISH CULTURE FACILITIES USED BY FARMERS IN EDO SOUTH, NIGERIA

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ABSTRACT

Several fish rearing facilities have been introduced to increase chances of fish production in any location in Nigeria without corresponding information about their level of adoption and effectiveness in improving fish production. A survey of the types and production output of fish culture facilities in Edo South Agricultural zone was conducted. A total of 200 well-structured questionnaires were administered to fish farmers in the study area. Data collected were carefully analysed using the Statistical Package for Social Sciences (SPSS) and results were also presented using descriptive statistics in form of frequencies, percentages and charts where appropriate. Results from this study indicates that majority of the fish farmers in the study area uses concrete tanks (48%) to cultured their fish, followed by plastic tanks (11%), 8.5% uses both concrete and plastic, 6% uses both concrete and tarpaulin, 6% uses concrete, plastic, tarpaulin and wooden trough, 5.5% uses tarpaulin, 5% uses fibre glass tanks, and 4.5% uses earthen ponds. Result also indicates that output per production is highest while using earthen pond as 88.9% of user produces 1000kg and above. The problems faced by the fish famers in using these facilities were facility specific. It was concluded that concrete tanks are the most commonly used fish culture facility in Edo South Agricultural Zone, and that fish production is higher when using earthen pond.

Keywords: culture facility; farmers; fish; survey

INTRODUCTION

Fish farming has proven to be an important sector in Nigerian economy and a successful method of enhancing fish production in the world (FAO, 2002; International Food Policy Research Institute, IFPRI, 2003). The rearing facilities are of major importance in aquaculture due to their obvious effects on usage, productivity and profitability of fish farming (Ayoola and Fredrick, 2012). They also reported that fish culture medium and their accessories add up to a large portion of fish farm capital. Therefore, the need arises to choose the best production system with good operating strategy to optimize fish farm profitability. A wide range of culture mediums have been exploited for culturing fish. The need to study the culture facilities used in aquaculture is vital for optimum productivity and for easy manipulation of the aquatic environment for predetermined and desired results (Miller and

Atanda, 2004). Ayoola and Fredrick (2012) noted that an important decision before embarking on aquaculture project involve the choice of production facility or culture medium, be it ponds, cages, tanks or any other rearing facility. Therefore, perfect understanding and knowledge of the fish culture facilities in these regards is of no doubts important prior to the establishments of fish farming.

Similar studies have been done by Adeogun *et al.* (2007), while studying Urban Aquaculture in Lagos State, and reported that culture facility influenced fish production output. They also noted that the use of concrete tanks was the most widely adopted in the area due to its durability, and ease of management. Adebayo and Adasoji (2008) did similar work in Ekiti State; in their assessment on the production output of *Clarias* catfish reared using different culture medium and found out that catfish gives higher yield in terms of weight while using the earthen pond as culture medium.

There is paucity of knowledge on the influence of the various fish culture facilities on fish production output in Edo South Agricultural Zone, hence the need for this survey. The main aim of this study was to identify the type of fish culture facilities in use and to determine the effect of each culture facilities on fish production in the study area.

MATERIALS AND METHODS

Study Area

This study was carried out in southern part of Edo State which is made up of seven local government areas (Oredo, Egor, Ikpoba-okha, Uhunmwode, Orhionmwon, Ovia South West and Ovia North East). It is located between latitudes 6°10′10.49″N to 6°28′10.38″N and longitudes 5°46′46.42″E and5°59′55.42″E. The study covers the rural, suburban and urban areas. This southern part of Edo is typified by low land rain forest ecosystem. Human interference especially subsistence and large scale farming have reduced many naturally occurring forests to secondary ones as well as tree crop plantations and bush fallow lands. The soil samples from the zone have high levels of organic matter. It experiences both wet and dry seasons; the wet season lasting from April to November while, the dry season lasts from December to March.

Sampling and Data Collection

Southern Edo State was purposively selected for this study based on the concentration of fish farming activities in the area. Structured questionnaire was designed for primary data collection and a total of 200 copies of the questionnaire was administered in the seven Local Government Areas in Edo South based on the intensity of aquaculture activities as documented by the Edo State Agricultural Development Program (ADP). Number of randomly sampled farmers per LGA were 40, 20, 40, 20, 20, 30, 30 for Oredo, Egor, Ikpoba-okha, Uhunmwode, Orhionmwon, Ovia South West and Ovia North East, respectively.

Data Analysis

Data obtained from the above information were carefully analysed using the Statistical Package for Social Sciences (SPSS) version 26. Results were presented using descriptive statistic such as percentages and bar charts.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Fish Farmers

The results showed (Table 1) that majority of the respondents (62%), were males. This may be attributed to the tedious nature of the job of fish farming unlike fish processing activities. This is in line with the findings of Adewuyi *et al*. (2010), who reported that production activities in an agricultural enterprise are male dominated. In their study of farm ownership by small scale farmers in Edo state Nigeria, about 68% agricultural firms were owned by males. This is also in accordance with Adewuyi *et al*. (2010) who reported that over 80% of the fish farmers in Ogun state were males. Sex is an important factor in determining the choice of an agricultural enterprise to embark upon, for instance, women are found more in marketing and processing that require less tedious production activities than men (Oluwasola and Ajayi 2013). The results revealed that majority of the respondents were within the age range of 30-40 (55.6%), followed by age between 41-50years who were 28.8%. while 10.6% and 5% were within the age range of below 30 and above 50 years respectively. This implies that higher proportions of the respondents were within their productive age and with the possibility of possessing the necessary strength to carry out fish farming operations. The result agrees with the findings of Egbufor *et al.*, (2012), who reported that the average age of 33years (young able-bodied men) were the ones largely and actively involved in fish farming in Edo South.

Table 1: Socio-economic characteristics of the fish farmers.

	Category	Frequency	Percentage
Gender	Male	124	62.0
	Female	76	38.0
	Total	200	100.0
Age	<30	21	10.6
	30-40	110	55.6
	41-50	57	28.8
	>50	10	5.0
	Total	198	100.0
Marital status	Single	40	20.0
	Married	134	67.0
	Divorce	14	7.0
	Widow/widower	6	6.0
	Total	194	100.0
Level of education	Primary	6	3.2
	JSS	10	5.3
	SSCE	28	14.8
	Tertiary	126	66.7
	Adult education	8	4.0
	Vocational	11	5.0
	Total	189	100.0
	Full time	53	26.5
Farming status	Part-time	147	73.5
	Total	200	100.0

Majority of the respondent were married (67%), 20% were single while 7% and 6% were divorced and widower/widow respectively. This is similar to the findings of Nwosu and Onyeneke (2013), who studied fish pond farmer in Owerri agricultural zone Nigeria where majorities (85%) were married. Similarly, Odefadehan *et al.,* (2015) opined that farming populace often gets married quickly in order to have a helping hand from their offspring in the farming enterprise because labour is a significant resource input and could be scarce at very critical periods. Also, Oluwasola and Alimi, (2007) in their study of Financial Intermediation in Agriculture in Nigeria also reported that fish farming is now majorly carried out by married fish farmers with large families in the rural-urban areas. Contrary to this finding is that of Okoedo and Ovharhe (2012) in Delta State where higher proportion (47.3%) of the fish farmers were single, they attributed this to the dominance of young respondents.

Majority of the respondents had tertiary form of education (66.7%) and 14.8% had their secondary school education. This implied that majority of the farmers in the study area are educated people who are likely to be more favourably disposed to adoption of new innovations. This result is similar to the findings of Ifejika *et al.* (2013), who reported that 82.8% of farmers in Niger state were found to be graduates of various degrees.

Majority of the fish farmers were part-time farmers (73.5%) while 26.5% are into full time farming. The result is an indication that most of the farmers were into other forms of business due to the fact that fish farming can easily be practiced alongside other forms of agriculture. This result agrees with Ideba *et al.* (2013), who reported that 89% of fish farmers in Cross River state were part time fish farmers and 11% full time fish farmers.

Fish Farm Production Information

The result fish farm production (Table 2) shows that majority of the farmers have between 6-10years (58%) of production experience, while 30.5% had below 1-5years experience and only 10.5% had 11 and above farming experience. This implies that majority of the respondent have adequate fish farming experience.

Table 2: Showing the fish farm production information

Category	Frequency	Percentage
Type of fish cultured		
Cat fishes	156	78
Tilapia	3	1.5
catfishes and tilapia	41	20.5
Years of farming		
1-5years	61	30.5
6-10years	116	58.0
11-15years	21	10.5
Above 16 years	2	1.0
Total	200	100
Management option		
Intensive	5	2.5
Semi intensive	187	93.5
Extensive	8	4.0
Total	200	100.0

Majority of the fish farmers practice semi-intensive aquaculture (93.5%), 4% practiced extensive system; while 2.5% practices intensive aquaculture, thus the study area was dominated by semi-intensive culture system. The dominant use of semi-intensive aquaculture maybe due to the relatively moderate inputs required and it is economical. This result corresponds with the findings of Oyinbo and Rekwot (2013), who reviewed aquaculture production and management in Nigeria, and reported that 16.5% of fish farmers in Nigeria operates intensive aquaculture which is relatively low as compare to the semi-intensive system.

The result (Table 2) shows that majority of the respondent cultured catfishes (78%), while 20.5% cultured both the African catfish (*Clarias gariepinus*) and tilapia. A negligible 1.5% of the respondents rear Tilapia only. This is an indication that catfishes were the fish mostly cultured in the study area this may be due to their characteristic such as hardiness, acceptability, resistance to pest and disease among others. Adewumi *et al*. (2015), reported that catfish is the most cultured fishes in Nigeria.

Types of Culture Facility Used

From the result (Figure 1), majority of the respondents used concrete tanks (48%), to cultured their fishes while 11% used plastic, 8.5% used both concrete and plastic, 6% used both concrete and tarpaulin, 6% uses concrete, plastic, tarpaulin and wooden trough, 5.5% uses tarpaulin, 5% uses fibre glass tanks, and 4.5% used earthen ponds. This implies that most respondents prefer to use concrete tanks compare to other facilities in the study area. This is similar to the findings of Adeogun *et al*. (2007) in Lagos State, who reported that the use of concrete tanks was the most widely adopted (62.5%) due to its durability, ease of management and pollution control. This result also agrees with Olaoye *et al.* (2014), in their assessment of socio-economic analysis of fish farming in Oyo, who reported that 75% of fish farmers used concrete tanks.

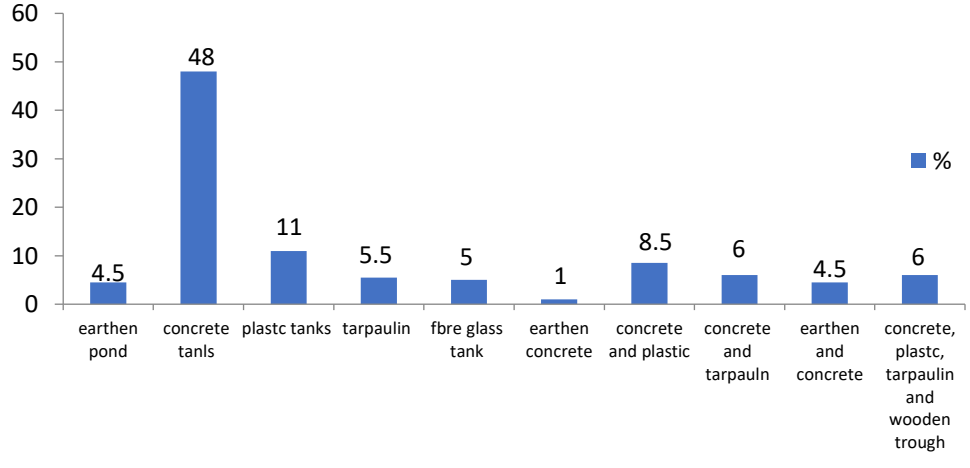

Figure 1: Types of culture facility used

Reasons for the Choice of Culture Facilities

The result in Figure 2 shows that majority of the fish farmers in the study area based their choice of rearing facility on durability (50%), 31.6% on higher yield, 13.6% on low cost, while 3.5% and 1% said its easily available and it is easy to use respectively. Adeogun *et al*. (2007) in Lagos State reported that the use of concrete tanks was the most widely adopted (62.5%) due to its durability and location of the farm.

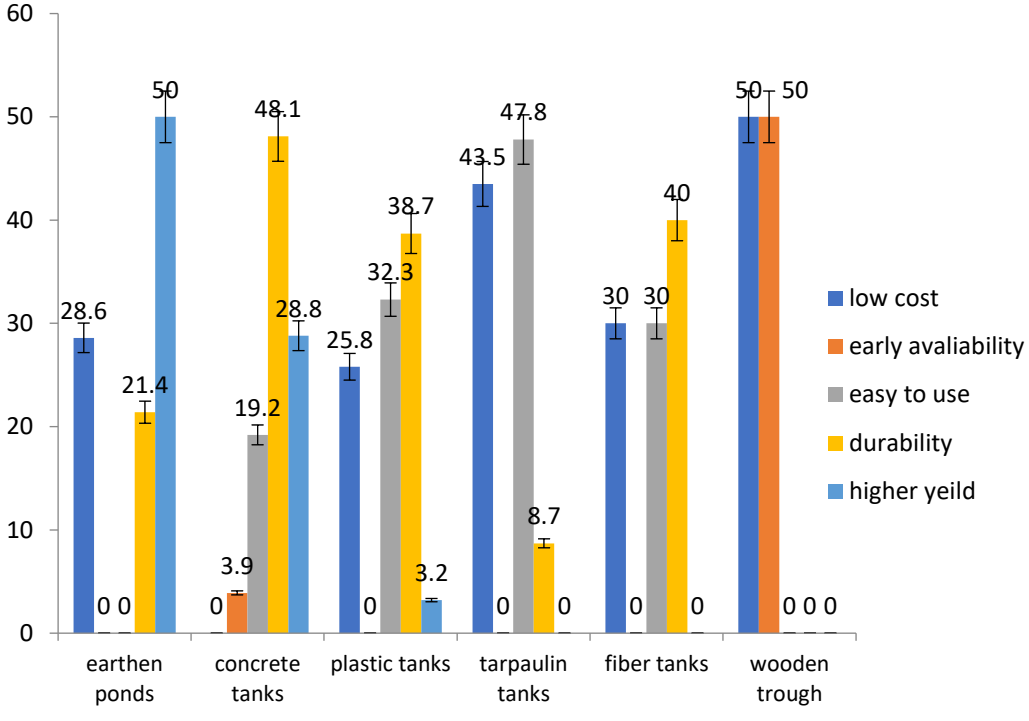

Figure 2: Reasons for the Choice of Culture Facilities

Number of Culture Facilities Owned by the Farmers

The results in Figure 3 showed that aquaculture production in the study area is dominated by farmers with few production facilities. This may account for the low production rate because of the small scale. This is similar to the findings of Adeogun *et al*. (2007), who reported that 55.4% of fish farmers in Lagos State had between 1-10 production facilities. It also agrees with Aphunu and Nwabeze (2012), who reported that 73.8% fish farmers in Delta State had between 1 to 5 culture facilities. Thus, aquaculture production in the study area is characterized by low production outputs in general. Concrete tank was the most predominantly used culture facility in the study area (72%), followed by plastic, tarpaulin, earthen ponds, fiber tanks and wooden trough

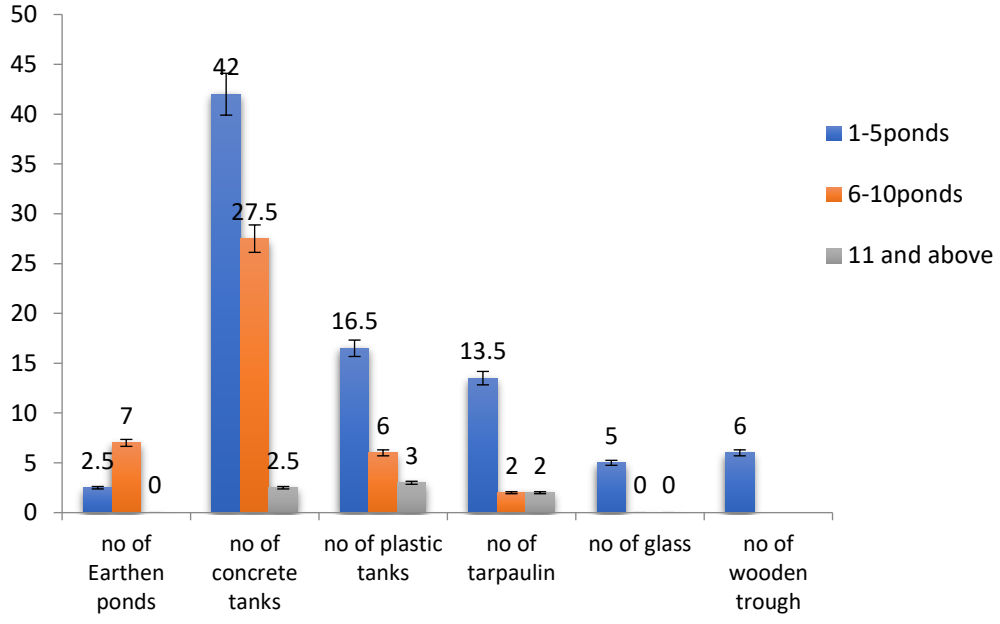

Figure 3: Number of culture facilities owned by the farmers

Possible Yield (kg) per 100 Fish Seed Stocked

Majority of the fish farmers using the earthen ponds (88.9%) have the highest total harvest in weight of above 1000kg, while 11% had total weight of between 601-1000kg (Fig. 4). This indicates that earthen ponds tend to promote higher fish yield in the study area but the soil type in the study area limit the use of it. This better performance by earthen ponds may be due to the fact that earthen pond being a semi natural environment for fish aid in provision of natural fish food (algae).

Most of the fish farmers using concrete tanks (72.9%) produce fish of between 601-1000kg, while 27.1% produces fishes of above 1000kg. This indicates that concretes tanks, when properly managed, can comparatively and moderately gives high fish yield.

Majority of the fish farmers using plastic tanks (55%) produces fishes between 601-1000kg, while 45% produces between 400-600kg. this level of production is relatively moderate, this may be due to the fact that plastic tanks are readily easily drainable enhancing fish survival. Feed was well consumed in the often-clean tank water. Majority of the fish farmers using this culture medium (75%) produces fishes of between 400-600kg, while 25% produces fishes of between 601kg-1000kg. The level of production in using this culture medium is relatively low, this maybe as a result of the small number of production facilities, small size of production facility and low capital out lay all associated with small scale fish culture. The frequent insect and pest infestation of the wooden materials, also the issue of leakage is common while using this culture medium in the study area this may have led to the low production output. Majority of the respondents using tarpaulin tanks (70%) produces fishes of between 601-1000kg, while 30% produces fishes of 400-600kg in weight. The level of production in using this culture facility is moderately high in the study area, this maybe as

a result of the easy of management and operation, its easily drainable thereby enhancing good water quality for proper fish growth. All respondents (100%) using fibre glass tank produces fishes of between 601-1000kg. Although the number of fish farmers using this culture facility is few, fish production is intensive leading to moderate to high fish output.

Challenges faced by fish farmers using the fish rearing facilities

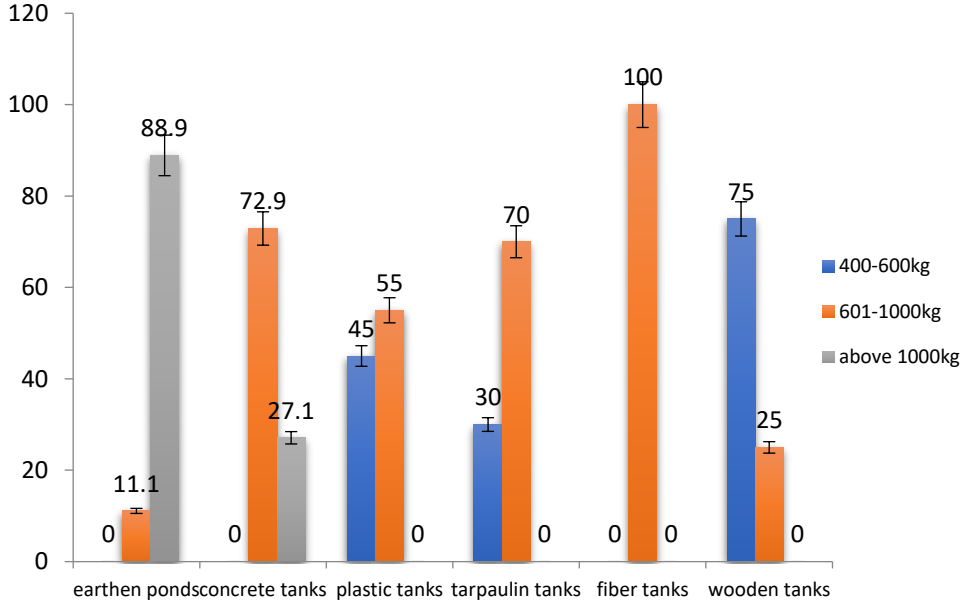

Figure 4: Possible yield (kg) per 100 fish seed stocked

Figure 5 showed that fish farmers using the earthen ponds system face the problem of seepage, collapse of dyke and high cost of maintenance. The problems of seepage and collapse of the pond dyke maybe due to age and poor construction of pond. Also, high cost of maintenance which may be due to pond degradation evident in heavy siltation, also affected earthen pond yield. Finance that ought to be channel for better production output of the fishes is thereby use for pond maintenance.

Fish farmers using the concrete, plastic and tarpaulin tanks face the problem of leakage and the attendant high cost of rearing facility maintenance. The problem of leakage in concrete tanks maybe accounted for as a result of long term usage, and construction problems. Total leakage of water from the culture medium may lead to total fish kill. Leakage in the tarpaulin tanks maybe due to the substandard tarpaulin materials and poor construction. Leakage in plastic tanks was rear, leakage was also seen in the inlet and outlet pipe installation, which lead to frequent cost of maintenance by the fish farms.

The number of fish farmers using the fiber tanks as culture facility in the study area is relatively low, the problem of leakage was not reported for this culture medium but it was reported that it involve high cost of acquisition and installation, this agrees with the findings of Okonji and Osayi, (2016), in their study on the Assessment of the current status of

aquaculture production in Edo State, they stated that some fish culture facilities are expensive to acquire thereby making the level of usage low. Wooden trough users encountered the problem of insect and pest infestation. The wooden materials then leak leading to reduced efficiency in fish production. This reduced efficiency of this culture medium has been reported by Adewuyi *et al*. (2010), in Ogun State, where fish farmers low yield cum profit was attributed to low production output due to the use of wooden trough as culture medium.

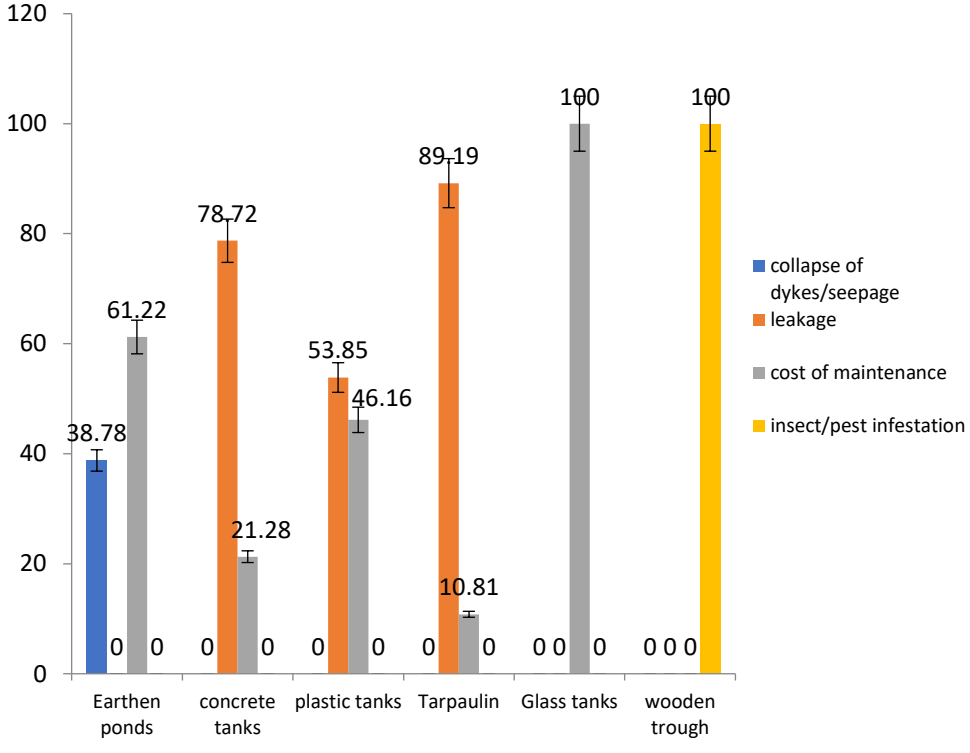

Figure 5: Challenges faced by fish farmers using the fish rearing facilities

CONCLUSION

In conclusion concrete tanks is the most commonly used fish culture facilities in the study area while earthen ponds give higher yields relative to any other fish culture facilities. The problem encountered while using the various fish culture facilities were facility-specific.

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