



CLIMATE CHANGE, THE STATE AND PEASANT RESPONSE TO MODERN FISH FARMING PRACTICES: A CASE STUDY OF KAIAMA TOWN IN KOLOKUMA/OPOKUMA LGA OF BAYELSA STATE

EBIERE LYNSA ATANI

Abstract

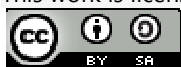
This paper interrogated the adoption of modern fish farming practice (MFFP) in Kaiama town in Kolokuma/Opokuma Local Government Area of Bayelsa, in the context of climate change and other environmental effects. The study was designed a case study and combined this with multi-stage and purposive sampling methods. Primary data was collected through the instrumentality of semi-structured interviews. The findings show that the response of peasants and the state to policies on new fishing methods is low.

Key Words: modern fish farming practices (MFFP), Peasant Response, Climate Change, The State, Kaiama.

Introduction

The place of fish as a source of dietary protein for most homes in Nigeria cannot be overemphasized. According to the FAO, (2005), fish is very nutritious, providing a high source of high-quality protein and other essential nutrients, which are of primary importance to mothers and growing children. Fish production is a source of job creation for the rising population of unemployed youth in the country and can contribute significantly to national income. In the 2005 CBN annual report, it was stated that the fisheries subsector contributed N162.61Billion to the GDP of Nigeria in 2005 alone (Salau, Lawee, Lika and Bello, 2014). As a country, Nigeria is blessed with many natural sources for fish capturing and fish culture that can make it a “fish self-sufficient nation” if optimal production is achieved. However, capture fishing alone appears insufficient to meet the protein requirement of households in Nigeria. This is because peasant production is characterized by the use of rudimentary implements that can only allow for subsistence output which is insufficient for national consumption.

In Nigeria, oil exploration activities which provide the largest percentage of national income also constitute a source of challenge to peasant fish farming due to oil spillage that causes damage to the environment, destroying both land and aquatic life (Amodu, 2016; Chuks-ezike, 2018; Nwilo & Badejo, 2005; Ejiba, Onya, & Adams, 2016). This activity further reduces output per fishing expenditure for peasant fish farmers. With population on the rise, climate change challenges, increase in demand for fish and low yields as a result of overfishing of natural sources, it is apparent that capture fishing is not sustainable as demand far outweighs supply. Expressing this view, Dauda pointed out that as at 2010, national fish demand in Nigeria stood at 1.85 million





metric tons while domestic production was 0.51 million metric tons (2010). To a large extent, this gap was made up for by importation of frozen fish to the tune of 0.7 million metric tons in 2014 with an annual foreign exchange cost of N35 Billion (Salau et al, 2014).

To remedy this situation, the Nigerian state has in the past decade been promoting the idea of culture fishing (aquaculture) as a way of supplementing capture fishing, creating employment and substituting importation of fish. The policy on increasing local fish production is adopted at both the federal and state level in the country as the government aims at generating foreign exchange and reducing spending on food importation. At the local level, peasants are encouraged to practice culture fishing as a way of increasing output, they are however constrained by low productive fish breeds in aquaculture, low production due to lack of inputs (fingerlings, fish feed), poor water quality from pollution, the lack of security around ponds and so on. As a result of these and other challenges, local fish production in Nigeria is far from attaining “self-sufficiency” as currently, Nigeria imports between \$400 and \$600 million worth of fish and fish products each year (FMARD, 2016).

Achieving self-sufficiency in fish production would require the adoption of Modern Fish Farming Practices (MFFP). That is a method of fish production that is capable of ensuring high yields. This includes the use of modern fishing gears, preventing over-fishing, sustainable fishing practices, improved methods for pond construction, improved or enhanced fish species, water improving techniques and so on. Our focus here, however, is on modern fish farming practices with regards to fish culture. For optimal production to be achieved in fish culturing, there is need to adopt new and modernize techniques which would require the involvement of the state because ultimately, MFFP aims to ensure increased and optimal yield in fish production and sustainability by the adoption of the environmentally friendly practice of fish farming.

The Nigerian state as part of its policy in boosting food production is emphasizing the use of modern techniques in agriculture including fish farming. Are fish farmers in Kaiama adopting modern fish farming practices? This research aims to explore this question by inquiring and assessing the response level of fish farmers in Kaiama town, to modern fish farming practices. The key issues in the literature would be discussed under the theme of climate change, the state, and fish production; and Modern Fish Farming Techniques (MFFP) as a tool for improving Fish Production. First, we begin with an explanation of the key concepts.

Concept Clarification

Modern Fish Farming Practices (MFFP): The study considers MFFP to new technique in pond construction, introduction of modern fish hatchery equipment, provision of inlet and outlet devices in ponds, introduction of improved fish species for optimal yields, Aerated containers for transporting fingerlings to reduce stress and mortality, construction of modern fishing gears, techniques for improving water quality in fish culture, fortification of fish feeds using roots and tuber crops, fertilization and liming of fish ponds, fish preservation and storage techniques, prevention and control of fish disease, control of predators in fish ponds, techniques for hatchery and fingerlings production, integrated fish farming for increased fish production and construction





and use of modern kilns for improved fish smoking as modern techniques to fish production as identified by Salau et al, 2014).

Peasant Response: Peasant response simply means the level of adoption of MFFP by fish farmers in Kaiama town.

Climate Change: The changes in the atmospheric condition which is a direct consequence of man's production activities. It also means the depletion of the ozone layer which is assumed to be the reason why the earth is warmer, the inconsistency in weather pattern and flood being experienced in many regions of the world.

The State: This refers to the state as machinery for policymaking. Hence the term state is used to refer to the Nigerian state and Bayelsa State.

Climate Change, the State and Fish Production

Although the debate on climate change is ongoing, the literature contends that incidences of drought, flood, typhoons and inconsistent changes in weather pattern may be attributed to the effect of climate change (Ibaba, 2015). He makes the point that these incidences have implication for resource scarcity and fish is an important resource to the wellbeing of humans. This is particularly true for a state like Bayelsa where fishing is a major occupation of the people. Observing further that flood while leading to increase yields in fish capture, can lead to fish lose in ponds located in vulnerable areas, He, therefore, suggests that fish farming as an adaptation strategy to reduce the impact of climate change on fish resource should be located on higher grounds and built in such a way that will prevent the interference of flood water.

The Fishing industry is an important subsector of Nigeria's agriculture. Nigeria enjoys exclusive fishing rights over 256,000 Km of the adjoining Atlantic Ocean (80 Km coastline x 320 Km) termed 'Exclusive Economic Zone' (E.E.Z.) (Sea Around Us, 2016). Added to these are the country's rich perennial rivers, naturally occurring lakes, creeks and ponds. Nigeria's Fishing Industry can be classified under Artisanal fishery and Industrial fishery. The former which is the focus of this research is mostly carried out in Coastal and brackish waters as well as inland in lakes and rivers while industrial fishery is carried out in deep coastal water as well as deep sea water (Fishing in Nigeria, n,d). Nigeria has several policy implications for the artisanal fishing industries which include the National Fisheries Policy (NFP). Part of the focus of the policy is to introduce modern technology into fish farming both in capture and culture fishing with a goal of achieving a national target of exporting fish by 2018 (FMARD, 2015). The policy trust include a policy to enhance fish breeding; promote the availability of pest and disease control services, and enhance traceability; to make fishery/aquaculture inputs available by promoting hatchery development; standardization of hatchery and fish breeding processes; to reduce insecurity in fisheries areas and; to re-enforce the regulatory framework for fishing activities

In line with this NFP, many states in the federation including Bayelsa are adopting modern fish farming practices to increase the production of fish. Bayelsa state is located in the coastal region in the South-South geopolitical zone of Nigeria. It shares a border with Delta state on the west, Rivers state on the north and east, and the Atlantic Ocean on the south (Paki and Ibienu, 2014).





The state is surrounded by rivers and creeks which makes it a potential fish hotspot. Fish capture is the main occupation of the people of the state divided into eight local government areas namely Brass, Ekeremor, Kolokuma/Opokuma, Nembe, Ogbia, Sagbama, Southern Ijaw and Yenagoa. Although fish constitute a major component of the nutrition of the people of this coastal state, production cannot be considered as optimal. This is because fish production is mostly carried out by peasant whose production is characteristically subsistence.

The same can be said for Kaiama town which is located in Kolokuma/Opokuma LGA of the state. The town is at the bank of the river Nun as it makes its way to the Atlantic Ocean. Despite the strategic location and fishing as the main occupation, demand and supply of fish cannot be termed equilibrium. The factors generally implicated in this imbalance of demand-supply deficit are water pollution from continuous oil spillage which results in dwindling catches, overfishing of the rivers which in most cases involve by-catching sold along target species (Mafimisebi and Okunmadewa, 2006).

Also specifically implicated is the continuation of unsustainable fishing practices such as the use of chemicals, dynamites and the retaining and consumption of small, immature catches, and climate change. One solution to the demand-supply deficit and the achievement of optimal production for job creation and foreign exchange earnings is culture fishing which involves raising fish under a controlled environment where their feeding, growth, reproduction and health can be closely monitored. According to Delgado, Wada, Rosegrant, Meijer and Ahmed (2003), fishes raised in farms already constitute and accounts for rising proportion of total fish consumed in Nigeria. The same assertion can be made of Kaiama Town where currently there are over 60 culture fish farmers producing fish from over 100 fish ponds.

Modern Fish Farming Techniques (MFFP) as a tool for improving Fish Production

The literature on modern fish farming provides a list of techniques and practices which when adopted can guarantee increased yield and sustainable productivity of fish. Salau, Lawee, Lika and Bello (2014) listed improved technique in pond construction, introduction of modern fish hatchery equipment, provision of inlet and outlet devices in ponds, introduction of improved fish species for optimal yields, Aerated containers for transporting fingerlings to reduce stress and mortality, construction of modern fishing gears, techniques for improving water quality in fish culture, fortification of fish feeds using roots and tuber crops, fertilization and liming of fish ponds, fish preservation and storage techniques, prevention and control of fish disease, control of predators in fish ponds, techniques for hatchery and fingerlings production, integrated fish farming for increased fish production and construction and use of modern kilns for improved fish smoking as modern techniques to fish production.

For instance, improved techniques for pond construction involves soil testing before selection of site, liming of the pond, fertilization of pond and using special kits for testing the water. The essence according to Salau et al, (2014) is to reduce the mortality rate of fish and ensure optimal production. In summary, modern fish culture incorporates the following practices: protecting the fish from natural dangers and preparing them for release to the grow-out ponds or to the sea;





protecting the fish from predators; increasing the fertility of the water; adding feed supplement, and removing through water circulation poisonous materials in the water.

The Agricultural Development Programme (ADP) in Bayelsa state has taken considerable steps to introduce these modern techniques to fish farmers in the state. What is not known however is the response (measured in terms of adoption) of peasants to modern techniques of fish farming and the constraints they face in adopting these improved techniques to fish farming. It is therefore pertinent to examine how peasant fish farmers in the state, particularly in Kaiama, are responding to the modern practices. To achieve this objective, we would:

1. Describe the socio-economic characteristics of fish farmers in Kaiama;
2. Identify the sources of information of MFFP that is mostly practised by respondents;
3. Determine the level of response by the extent of practice by respondents; and
4. Identify the challenges that fish farmers in Kaiama face in production

Conceptual framework

The concept of sustainable development is adopted as framework for the study. The concept stipulates development which satisfies the needs of the present without compromising the ability of tomorrow's generation to meet their own needs (Harris, 2000). This means that while resources are being employed to make provisions available for today's generation, there should be a system in place to ensure that the provision for the next generation is guaranteed. The relevance of the concept to the study is that while attempting to achieve optimal fish production today, there is need to ensure that fish farmers particularly in Kaiama adopt methods and practices that will guarantee availability of fish for the future. Hence there is need to develop a collective productive force that will undertake fish production in line with sustainable development.

Methodology

The study was conducted in Kaiama, central senatorial district, Bayelsa state. Like the rest of the state, the dominant occupation of the people of Kaiama is fishing. Kaiama consists of nine quarters; a multi-stage sampling was adopted by first dividing the community into its nine quarters namely Odo-wari, Talagha-wari, Foru-wari, Kilegbegha-wari, Ere-wari, Isoki-wari, Ikatibiri-wari, Amaranbiri-wari, Wanka-wari.

The next stage was to identify fish farmers in each compound. Respondents were selected depending on the number of fish farmers in the quarter. Where fish farmers are between 1 and 5, one was selected; where they are between 6 and 10, 2 was selected. Probability sampling technique is applied to ensure that each farmer had an equal opportunity of being selected. To achieve this, all the names of fishpond owners in the compounds where fish farmers are between 1 and 5 are written down and made into a pool from which one was selected.

The same process was repeated for compounds with 6 to 10 fish ponds. However, since the total number of women culture fish farmers in all the quarters is just 4 whereas the men were 56, purposeful sampling was applied to ensure all four women were captured. With the pond owners as respondents, primary data was collected with the aid of a semi-structured interview scheduled





between August and September 2017. Data for the study were analyzed using descriptive statistics and simple percentage.

Table1: Population and sampling frame for the study

Quarters	No. of fish farmers identified	Sample Selected
Odowari	7	2
Talagha-wari	6	2
Foru-wari	8	2
Klegbegha-wari	8	2
Ere-wari	5	1
Isoki-wari	4	1
Ikatibiri-wari	7	2
Amaranbiri-wari	10	2
Wanka-wari	5	1
Total	60	15

Source: field data, 2017

Data Presentation

The demography of fish farmer in Kaiama shows that majority of aquaculture practitioners are in their middle age represented by 53.3 per cent of the total number of respondents (15); this is important because age according to Agbamu, (2006) is a latent characteristic in determining the decision to adopt. Of this number, 26.7 per cent were women while the majority of them (73.3%) were men. Most (53.3%) have only primary education which has implication on their willingness or openness to new ideas and use of technologically inclined production methods as noted by Ozor and Madukwe in (Salau et al, 2014).

In terms of socioeconomic distribution, table 3 below shows that 93.3 per cent of the respondents has had no formal training in fisheries at any level before going into fish culturing. However, one respondent (6.7%) has attained a master degree in the agriculture-related discipline. Also, 46.6 per cent of the respondents have been in the business for between 1-5 year which in terms of experience may be insufficient to determine expertise and skill. This is in line with the argument put forward by Adebisi (2008) that experience is vital to the running of a farm enterprise and can reflect positively on the adoption of innovations.

Again, 93.3 per cent of the respondents sourced their capital from personal savings meaning that they may not have access to credit for investment. The majority of respondents (40%) store between 100-1000 fingerlings and another 46.6 per cent turn in an annual income of between 1,000-200,000 thousand Naira. This shows that the majority of the fish farmers in Kaiama operate on a small scale. Table 3 also shows that 66.7 per cent of the respondents get information on modern methods of practising fish farming from other fish farmers while 80 per cent do not get visits from extension workers or visit others farms for information on new techniques, and are not members of any cooperative. The implication of this is that information on MFFP is





likely to be low and where available may not be accurate as a result of possible distortion along the different channels.

Table2: Showing demographic distribution of respondents. (n-15)

Variables	Frequency	Percentage
Age (years)		
21-30	2	13.3
31-40	3	20
41-50	8	53.3
51-60	1	6.7
60 and above	1	6.7
Total	15	100
Gender		
Male	11	73.3
Female	4	26.7
Total	15	100
Educational Qualification		
Primary	11	73.3
Secondary/Technical	2	13.3
Tertiary	2	13.3
Total	15	99.9

Source: Field data, 2017

Table3: Showing Socio-Economic Distribution of Respondents

Qualification in Fisheries		
Non-formal	14	93.3
Certificate Courses	Nil	-
Diploma (ND/HND)	Nil	-
Bachelor Degree	Nil	-
Masters Degree	1	6.7
Total	15	100
Years of experience in culture fishing		
1-5	7	46.6
6-10	5	33.3
11-15	1	6.7
16-20	1	6.7
21 and above	1	6.7
Total	15	100
Source of capital for culture fishing		
Bank Loan	Nil	

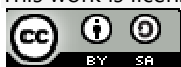
This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/)





Cooperative Loan	Nil	
Personal Saving	14	93.3
Gratuity/Pension	1	6.7
Government Loan/Grant	Nil	
Total	15	
No. of fingerlings stored per year		
100-1000	6	40
1001-2000	3	20
2001-3000	2	13.3
3001-4000	2	13.3
5000 and above	2	13.3
Total	15	99.9
Annual income from fish culture (₦)		
1,000-200,000	7	46.6
201,000-400,000	3	20
401,000-600,000	3	20
601,000-800,000	1	6.7
801,000-1,000,000	1	6.7
Above 1,000,000	-	
Total	15	100
Source of knowledge for MFFP		
Government Ext. workers (ADP)	2	13.3
Private sources	Nil	-
Other fish farmers	10	66.7
None	3	20
Total	15	100
No. of visits to/from source of MFFP per year		
None at all	12	80
1-5	3	20
6-10	-	
10 above	-	
Total	15	100
Membership of Cooperative Society		
Yes	3	20
No	12	80
Total	15	100

Source: Field data, 2017





With regards to production type, the majority of the respondents (86.7%) still operate with earthen ponds as against 13.3 per cent who makes use of concrete ponds. Water is sourced mainly from rivers, relying mainly on the level of the river water as put forward by 86.7 per cent of the respondent and from wells during the dry season. This reflects the limited availability of modern water facilities and the risk of fish lose as a consequence of flood as observed by Ibaba (2015). A great number of respondent rely on fish monger for fish feed with only 13.3 per cent combining it with commercial feed as reflected in table 4.

Table 4: Distribution of respondents according to the type of production

Variables	Frequency	Percentage
Type of Ponds		
Concrete	2	13.3
Earthen	13	86.7
Tarpaulin Tank/Basin	-	-
Source of water supply		
Dug well	13	86.7
Bore-hole	2	13.3
Rivers (level of water)	13	86.7
Source of fingerlings		
Wild catch	ALL	100
Own hatchery	-	-
Commercial hatchery	ALL	100
Source of fish feed		
Commercial feed	2	13.3
Fish Mongers	15	100
Human & animal waste	-	-

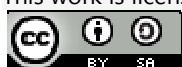
Source: Field data, 2017

The table below shows the percentage representation of the response level of respondents measured by their level of adoption and practice of MFFP. The data shows that just 13.3 per cent of the respondents adopts and practice some combination of MFFP. Challenges and constraints faced by respondents are the content of table 6. It shows that respondents face similar challenges of credit, training and information on MFFP, and security of fish ponds. However, only 33.3 per cent of the respondents have constraints relating to the availability of land.

Table 5: Distribution of respondents according to Adoption of MFFP

Variables	Frequency	Percentage
Pond construction	2	13.3
Hatchery equipment	nil	-

This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/)





Improved fish species/storage	nil	-
Water quality improvement techniques	2	13.3
Pond security	2	13.3
Fortification of feed	2	13.3
Storage and processing	nil	-

Source: Field data, 2017

Table 6: Distribution of respondents in terms of constraints

Variables	Frequency	Percentage
Availability of land	5	33.3
Security of ponds	ALL	
Training and information	ALL	
Credit	ALL	
others		

Source: Field data, 2017

Summary, Conclusion and Recommendation

This research examines the response level of peasant fish farmers in Kaiama town to modern fish farming practices in line with the state policy on improving fish production by introducing modern technology to fish culture, with the goal of making fish a focus of export for earning foreign exchange. Analysis reveals that the response level of fish farmers in Kaiama is abysmally low as just two 2 of the fish farmers representing 13.3 per cent of the total respondent (15) interviewed practice some combined modern methods of fish farming.

The reason for this low level of response may be attributed to several factors with the most significant being the lack of training and information to fish farmers in Kaiama. Thus the assumption can be made that the impact of the state policy on fish production is not felt by fish farmers in Kaiama. In line with this conclusion, we suggest the following recommendations:

1. The state should engage fish farmers in special training on modern fish farming practices;
2. On-farm training on the processing of fish feed from local sources should be carried out;
3. Hatchery facilities should be established to ensure the availability of improved fish species for quick and optimal yields;
4. The state should establish demonstration fish farms in a strategic location to serve as training grounds for fish farmers;
5. The government should intervene by allocating land to individuals who wish to go into fish farming;
6. Also, the state should intervene in security by establishing fish farming reserved areas where individual farmers can own lands for fish farming that can be collectively secured;
7. The government should make credit available to state ADP's for onward distribution to fish farmers;
8. Storage and processing facilities such as cold room and drying kilns should be located in strategic positions that are easily accessible by fish farmers to encourage increased productivity; and

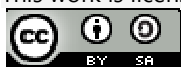




9. Finally, the state should put action to words and embark on the actual implementation of policy statements.

References

- Adebiyi, S. (2008). Factors Affecting Adoption of Cocoa Rehabilitation Techniques in Oyo State Nigeria. *Unpublished Masters Thesis, Department of Agricultural Economics, Federal University of Technology, Akure.*
- Agbamu, J. (2006). *Essentials of Agricultural Communication in Nigeria.* Lagos: Malthouse Press Ltd .
- Amodu, L. (2016). Oil Spillage and Environmental Preservation : An Evaluation of SPDC ' s Oil Spillage and Environmental Preservation : An Evaluation of SPDC ' s Community Relations Activities in Ogoni , Nigeria. *ResearchGate*, (September).
- Chuks-ezike, C. (2018). Environmental crime liability of the Nigerian government in its oil pollution menace . Retrieved from <http://www.alliedacademies.org/environmental-risk-assessment-and-remediation/>
- Dunn, S. (n.d). *On Exploitation of Peasants.* California: Highgate Road Social Science Station.
- Egbe, O. (2012). Nigeria: State Violence against Agriculture in the Niger Delta. *American International Journal of Contemporary Research*, 211-221.
- Ejiba, I., Onya, S., & Adams, O. (2016). Impact of Oil Pollution on Livelihood: Evidence from the Niger Delta Region of Nigeria. *Journal of Scientific Research and Reports*, 12(5), 1–12. <https://doi.org/10.9734/JSRR/2016/26633>
- Harris, M. J (2000). Global Development and Environment Institute: Working Paper 00-04
- Ibaba, S.I (2015). Post 2015 Development Agenda in the Niger Delta: The First Millennium Development Goal (MDG 1) and Adaptation to Climate Change. Climate Change, Human Security and Development in the Niger Delta. Proceeding of the First National Conference of the Centre for Niger Delta Studies, Niger Delta University, Wilberforce Island.
- Mafimisebi, T.E & Okunmadewa, F.Y. (2012). Comparative Yield Performance of Upland and Mangrove Aquaculture Farms in Selected Maritime States of Southwest Nigeria. *International Journal of Agricultural Management & Development (IJAMAD)* Available online on: www.ijamad.com , 187-198.
- Misund, O.A., Kolding, J. & Freon, P. (n.d). *Fish Capture Devices in Industrial and Artisanal Fisheries and Their Influence on Management.*





ADDIN Mendeley Bibliography CSL_BIBLIOGRAPHY Nwilo, P. C., & Badejo, O. T. (2005). Oil Spill Problems and Management in the Niger Delta. *International Oil Spill Conference Proceedings, 2005(1)*, 567–570. <https://doi.org/10.7901/2169-3358-2005-1-567>

Ogali, M. (2017). The Post-Colonial State, Minority Rights and Peasants' Revolts in Nigeria's Niger Delta. *Journal of Political Science and Leadership Research Vol. 3 No.1*, 48-61.

Olalekan, B. B. (2011). *Establishment of a Commercial Catfish and Tilapia Farm at Kuchi Kuchi Kau, Karu LGA Nasarawa State Nigeria*. Egyptian International Centre for Agriculture.

Oyatoye, E. (n.d). *Developing A Viable Fish Farming Industry in Nigeria- An Alternative Strategy to the Strategy in the Green Revolution programme*. Ile-Ife: University of Ife.

Paki, F.A.E. & Ebienu, K.I. (2014). Peasants and Development in Society: The Case of Bayelsa State. *Journal of Economics and Sustainable Development Vol.5, No.6*, 108-115.

Salau, E.S; Lawee, A.Y; Luka, G.E & Bello, D. (2014). Adoption of Improved Fisheries Technologies by Fish Farmers in Southern Agricultural Zone of Nasarawa State, Nigeria. *Journal of Agricultural Extension and Rural Development*, 339-346.

Sea Around Us (2016). A global database on marine fisheries and ecosystems. www.seararoundus.org

Sithole, B., Campbell, B., Dore, D. and Kozanayi, W. (2003). Narratives on Land: State-Peasant Relations Over Fast Track Land Reform in Zimbabwe. *African Studies Quarterly Vol 7, Issues 2 & 3*, 81-95.

Southeast Asian Fisheries Development Center. (1980). Fish farming handbook. Tigbauan, Iloilo, Philippines: SEAFDEC Aquaculture Department. HYPERLINK "http://hdl.handle.net/10862/1490" <http://hdl.handle.net/10862/1490>

The Mini Fish Farm Operation Manual, Pentair Aquatic Eco-Systems, Inc.

Interviews

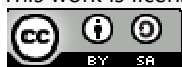
Talagha-wari - 21st August, 2017

Egbe, Albert
Julie Seikeme

Odo-wari, 21st August, 2017

DimieDiriyai
Agnes Bina

Isoki-wari, 22nd August, 2017





EbikanemofaBulutoru

Klegbegha-wari, 22nd August, 2017

Pere-ere Timitimi
EbikibinaSoro

Amaranbiri-wari- 6th September, 2017

Oruke Joseph
Agada Biri

Foru-wari- 6th September, 2017

EneyeZikiye
EbimieNimigha

Ere-wari- 6th September, 2017

EndyOrusa

Ikatibiri-wari 7th September, 2017

PreyeZibatubo
SiemieghaSuowari

Wanka-wari- 7th September, 2017

ZibaKokori

