

APPLICATION OF PARTICIPATORY RURAL APPRAISAL (PRA) TECHNIQUES IN THE VERIFICATION OF FISHERIES DATA AND TREND ON LAKE KAINJI

By

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ABSTRACT

After several years of surveying the Kainji Lake Fisheries activities by the Nigerian German Kainji Lake Fisheries Promotion Project (KLFPP) trends regarding catches, yield and other parameter begin to emerge. However, it also became obvious that some of the data are not quite that accurate, as they were believed to be. Look at the different editions of the statistical bulletin of Kainji Lake, concerning one given fisheries parameter, reveals sometimes, inconsistencies and unexplained trends.

As compared to the survey method, PRA is primarily for analysis of differences in local phenomenal and processes. therefore, PRA was used as a complementary tool to enhance our knowledge on issues like, fisher women enterpreneurs, gear ownership structure, mode of operation by owners of large gear number, preference in the use of twine and nylon gill nets, and reasons for misinformation concerning the number of fishing equipment owned by entrepreneurs, which cannot be done with frame survey. PRA Techniques like timeline, mapping, seasonal calendar, transect walk and key informant interviews were utilized in the study process. This paper shall present the findings of the study.

INTRODUCTION

Kainji Lake, in the middle belt zone of Nigeria was created in 1968 by the damming of the River Niger. Although the Lake's primary function is for hydroelectric generation, an important small-scale fishery developed using beach seines (which is now banned), gill nets, fishing traps, drift nets, long lines and cast nets (du Feu and Abiodun, 1999). As one of the first man made lakes in west Africa the lake fishery initially attracted much research. Early yields estimate after impoundment reached 28, 639 metric tonnes (mt) in 1970, which then fell to 4,500 mt in 1980 (Ita, 1982). After this period, regular monitoring of the fishery stopped, due to lack of fund and logistics.

The reported decline of fishermen's catches prompted the Nigerian government to seek a technical assistance from Germany. This gave birth to a 9-year technical co-operation project, the Nigerian / German Kaniji Lake Fisheries Promotion Project (NGKLFPP) IN 1993.

The project purpose is that the fisheries and other aquatic resources of Kainji Lake are managed on a sustainable basis. The results through which the purpose is to be achieved include the followings, amongst others.

1. A community - based fisheries management (CBFM) plan is put in place and partly implemented.
2. An effective, extension delivery system is fully functional, and
3. Monitoring and evaluation system for Kainji Lake fishery is put in place and operated sustainably by counterpart institutions.

For the project to achieve the 3rd result above, it commenced an annual frame and monthly catch assessment fisheries surveys shortly after inception. This is to assist in developing a plan for the long evaluation and monitoring of the fishery.

Since 1993, 8 Annual Frame surveys have been successfully conducted. The purpose of a frame survey is to provide information concerning the size and distribution of a fishery. It usually details parameters that change from year to year (number of fishing entrepreneurs, canoes, type of fishing gear used), whether fisheries are expanding or contracting and where these changes are occurring (du Feu and Omorinkoba, 1995). It becomes even more important, as the number of gears are used to extrapolate the total fish yield from the lake during the catch assessment survey (Apeloko and du Feu, 1996).

The data collection for the frame surveys are done with a fishing-based survey, utilizing a village - based questionnaire. The questionnaire has four main sections. The first records the details of the village, the second section records the number of canoes in the village, classifying as fishing canoes, transport canoes and canoes used for both. The third section records the number of Fishermen fishing from the shore and the fishing method, and the fourth section details the names of the fishing entrepreneurs in the village at the time of the survey, the number of assistants, the number and type of canoes, engines and fishing gears owned.

The results of the frame survey are used to implement the following year's catch assessment survey. Catches are sampled from all gear types in 15 stations for 2 days per month (formerly 4 days). Gear activity is measured from 20 selected fishermen per station for the same period (du Feu and Abiodun, 1999). The activity data is derived from the 20 sampled fisher flocks in each station who are selected annually as being representatives of the total gears present for that village. The number of gears recorded as having fished on each recording day is divided by the total for the village to give an estimate of activity by gear type.

What is Participatory Rural Appraisal?

Participatory rural Appraisal (PRA) is a methodology, which helps in interacting with local communities, understanding them and learning from them. It helps in the process of involvement with local communities for indigenous knowledge - building exercises. It is a way of learning from and with community members to investigate, analyse and evaluate constraints and opportunities and make informed and timely decisions regarding development projects.

It involves a set of principles, a process of communication and a menu of techniques for seeking villager's participation in putting forward their points of view about any issue and enabling them to do their own analysis and offer their own contribution in different forms with a view to making use of such learning. It initiates participatory process and sustains it. Its principles and the menu of techniques help in organizing participation. PRA is a means of generating different kinds of data, identifying and mobilizing intended groups and evoking their participation and also opening ways in which intended groups can participate in decision-making. Because of its participatory nature, it is a useful methodology to focus attention on people, their livelihoods and their inter-relationships with socio-economic and ecological factors.

PRA is sometimes known as rapid Rural Appraisal (RRA) Participatory Rural Appraisal (PRA) where the emphasis is on both 'rapid' and 'participatory'. The emphasis on 'rapid' however, is more in terms of data collection and less in terms of the process of development or even implementation of plans. Other names are also used for describing PRA, some of which are Participatory Rapid Rural Appraisal (PRRA) and Participatory Learning Method (PALM), PRA, as practiced in the field has given rise to different schools of PRA with difference in style and emphasis (Chambers, 1991).

The Principles Governing Questionnaire Survey and PRA

The principles governing the methods are quite different. In case of a questionnaire from a sample or by complete enumeration of the population in the universe. One is basically trying to find a general picture along certain lines which means a set of common questions are to be repeated in a questionnaire and investigations carried out on that basis whether of a household or of an individual.

The focus of survey is on identifying general trends and patterns.

As compared to the survey method, PRA is primarily for analysis of differences in local phenomenal and processes. It is based on people's perceptions for analysis of complexities and heterogeneity underlying socio-economic systems and processes. The answers or averages and set patterns can be found only when analysis of difference has been conducted.

Are Objectives of Questionnaire Survey and PRA any Different?

Both the questionnaire survey and PRA can be undertaken with various objectives in view. As far as data collection is concerned, questionnaire survey and PRA can have similar objectives in view (Mukherje, 1995). Some of the objectives are as given below:

- * For generating data for immediate or future use,
 - * For estimating trends and ascertaining conditions of the issues at hand,
 - * For validation or cross-checking of data collected from other sources.
 - * For learning about the impacts of earlier or on-going policies and programmes and to frame new ones and
 - * To know people's perceptions and aspirations.
- In the initial stages, a PRA type of inquiry starts with probing, generation of information and data collection, hence PRA sessions are generally conducted with other objectives in view. There can be a mix of objectives to serve such as,
- * For greater and better involvement of local communities in people's action through their perceptions, experiences and capabilities,
 - * For training, raising awareness and spread of participation through training of different categories of persons involved, in the development process, whether from the government, NGOs, villages, banks, donor agencies, research, extension etc.

Evaluating Data

Any data collected is likely to have some errors. Proneness to different kinds of errors vary from method. A weak methodology is one, which is prone to more errors. It is important to identify the errors since they affect any estimation made from the data set and the conclusions and recommendations made on the basis of those estimates (Katzer et al. 1982).

Errors can be of two kinds:-

- (i) Bias (which includes misunderstanding, misreading, lying inventing answers, differential/prudent replies and others of similar kind) is a systematic error and
- (ii) Noise is a kind of error which is unsystematic and random.

Bias in some form and for some reason is present in most data sets and there are several sources through which it can arise. For systematic errors having identifiable pattern they can be minimized in different ways. For factual questions, it is possible to check the respondent's answer against a reliable record. For questions about

subjective phenomena such as opinions, feelings or perceptions there are not many direct ways to assess the accuracy of answers.

Error, which are random and unsystematic, are termed 'noise' in data and can be caused by the same factors, which cause bias in data. For instance, noise can be created by the differences amongst the people being studied. Events prior to interview, education, personal problems and traits are not controllable and they affect the quality of data in different ways. Even for the best methods some noise is bound to occur.

The problem statement

After 5 frame surveys, trend of the fisheries begin to emerge concerning catches, fishermen's activity and the maximum sustainable yields. However, along side, anxieties concerning inaccuracies of the review of the monitoring and evaluation system of the Kainji Lake fishery by du Feu (2001), he noted that after the 2000 frame survey, some observations were made, this include amongst there that:

1. There was some dissatisfaction from fisherfolks that not more had been done concerning the banon beach seines (B.S) and therefore, some were not keen to disclose information to the teams,
2. Not all entrepreneurs present on the lake are included in the frame list,
3. There are some 'in house' fabrication of data which are becoming difficult to detect and
4. There are cases of under recording by entrepreneurs who do not declare those gears they lend out to other fisher folks.

Considering the above, the quest for other complementing, participatory, quick and reliable method, like the participatory rural appraisal techniques, to cross - check the emerging trend, from the method in use for the lake became imminent.

Objectives of trying a complementary technique the general objective of employing the technique is to ascertain the possibility of applying PRA tools to verifying the fishing trend emerging for the lake as obtained from the frame and catch assessment surveys. Specifically, it attempt to:

1. Cross-Check the number of female entrepreneurs who own fishing equipments and go fishing
2. Ascertain the trend in fishing equipment ownership per entrepreneur
3. Describe the entrepreneurs concerning fisher folks preference in the use to twine and nylon gill nets
5. Determine reasons for misinformation concerning the number of fishing equipment owned by fishermen entrepreneur, and
6. Assess the effect of low catches on the bargaining power of fisher folk.

Materials and Methods

In the study, both primary and secondary sources were utilized to generate data for discussion and analysis. The

various publications of the Nigerian - German Kainji Lake fisheries Promotion Project, especially, the annually frame survey report until 1997 and the statistical bulletins thereafter, gave the secondary sources while data generated from field visits using Participatory Rural Appraisal tools formed the primary sources of data. The study was conducted over a period of 6 months between April and September 2001.

Sample Size

Twelve fishing communities were purposively chosen, from the 314 fishing communities on the Lake (Kainji Lake Statistical Bulletin 2002), for the study. Kasabu and Gafara baba were chosen because of the large number of fishing entrepreneurs (more than 50 entrepreneurs according to the 2000 frame list) in the village. Jijima and Kikiya were selected because of the inclusion in the monthly catch assessment surveys. Tungan Alhaji Manu and Tungan Liman were chosen because local mobilisers, Wakili lives in the villages. Tunga Leda and Tungan Mairuwa were chosen because the number of entrepreneurs is below 30 from the 2002 frame list and the remaining 4 villages. T. Alh. Maisaje, Buka Dubu, Duga, Mashay and T. Samai were include because of the existence of fisher women in the villages.

Instrument Design

Six PRA techniques were used in gathering data. They include, Timeline, social and fishing resource mapping, transect walk, seasonal calendar and Direct Observation for the first two days in a village. The third days were utilized for reflection, analysis and preparation for the validation session through group presentation of data set by the 4th day.

Study Process

1. Time-line - the elders of the villages participated in the development of the timelines. In order to facilitate easy understanding of events over time, the Nigerian heads of state and the village heads from the time of settlement were used in establishing reference points. While the former assisted in establishing the periods each of the village heads reigned, the latter made it easy for events within the village level to be recalled, Changes in the fishing activities came out distinctly with little effort. The point at which alternative means of survival was embarked upon were recalled with humour.
2. Seasonal Calendar - The starting points were problematic. Agreeing on the system of categorizing the seasons was no easy task. The easiest way out would had been the use of the 'roman' method of counting the months of the year, this however is not properly 'understood' by the fisher flocks. After some brainstorming sessions, usually, the names of the twelve months were then established, first in Arabic and thereafter, the Hausa equivalent. The different activities concerning fishing input in use at different periods of the year, the species caught, price and quantity variation within the year

is then established. Whilst the distinction between the variations of inputs in use over the periods seemed difficult, issues of prevalence and intensity at a particular time of the year proved to be helpful. Coping strategies, which is usually farming activities, can be discussed with some precision concerning what is done and when.

3. **Social and Fishing resources mapping** - The discussion usually starts with the location of the different compounds within the village, after which, the households within the compounds, are identified (Social Mapping). The issue of fishing resources is approached first, by identifying the fishing entrepreneur out of the different households in each of the compounds. thereafter, the fishing inputs owned by individuals is discussed while trying to identify some of the resources owned by the households regardless of being a fishing entrepreneurs or not. i.e resource discussed can include livestock holding economic tress, draught animals, canoes, number of packets of longline, bundles, of cast nets, engine boats etc. Using in this rather roundabout way seemed the only sensible method of not raising their suspicion?
4. **Transect walk** - after a summary of the fishing resources map findings had been made, a few of the fishing entrepreneurs are selected for interview concerning the number of each of the fishing equipment they actually owned. This is to cross-check the information given by third parties in the mapping session. In some instances, actual inspection of the equipment is made.
5. **Direct Observation** - for each day of the fieldwork in the villages, physical counting of the canoes and engines is made twice, while the fieldwork is on and after fieldwork shortly before leaving (some 3 hours later). This assist in estimating the number of canoes and engines in use.
6. **Validation sessions** - the validation sessions were quite productive. These gave opportunities to clarify emerging issues. The open discussion of some of the issues raised gave an impression of sincerity. Likewise other that might require subtle tactics and further probing became glaring.

Results and Discussion

Ownership of fishing gears and fishing activities by female entrepreneurs

In all the 4 villages visited with female entrepreneurs, no fisherwomen owns a canoe; they all borrow from their husbands. This then puts a question mark on the claims of their having assistants.

At least in T. Samai, none of the female entrepreneurs operates her gear by herself. Initial contact resulted in claims of their having assistants, however further enquiries resulted in their admission of not having assistants and they do not fish themselves

Fishing equipment owned per entrepreneur

The number of bundles of a given gear owned per entrepreneurs was said to have gone down when compared to the past years. At Kasabu, Hikiya and

Tunga Alhaji Manu, it was said that the number of bundles owned by an average entrepreneurs had dropped from between 4 to 5 in the seventies and eighties, to or 2 since the mid nineties to date. The only exception was at Tunga Leda. During the discussion on the Timeline, it was said that in the Seventies, an entrepreneurs would conveniently make a living with 1 or 2 bundles of gill net, but that as of now, an average enterprenuer would need up to 6 bundles if he has to survive in the fishing profession. However, after the completion of the fishing resource map of the village, none of the entrepreneurs had more than 4 bundles of gill net. This act was put to the whole community during the validation session. The outcome of the discussion was that, as a matter of fact, the situation of the fishery on the Lake, in terms of catch per effort, demands that an average enterprenuer operate a minimum of 6 bundles to make a meaningful living from fishing, however, the prohibitive cost of gears would not permit such!!! The implication is that most of them cannot make enough from fishing alone to cater for all their needs?

This result also confirms the trend observed from the monitoring and evaluation report. The mean number of gill not bundles owned by entrepreneurs dropped from 5.2 in 1993 to 3. 4 in 1996 and now is at 1.6 in 2000 (Kainji Lake Statistical Bulletin (KLSB, 2000).

Entrepreneur Dynamics on the Lake

The response concerning the number of fishing entrepreneurs on the Lake differ with individual fishing communities. While at Tungan Leda and Tungan Alhaji Manu, entrepreneurs were said to be migrating to other fishing communities with the Lake and out of the Lake to other Water bodies. At Kasabu, in the seventies, there was an estimated 150 entrepreneur as compared to the estimated 600 entrepreneur (given during the Timeline Discussion). The Social mapping yielded a total number of 134 entrepreneur, while the 2000 frame gave 94. During the validation session this discrepancy was pointed out. The argument of the fishermen was that, if the total number of entrepreneurs and their assistant were to be summed up we would move closer to the number estimated in the Timeline, that also do gave a total of 217 fishermen, they confirmed that in most instances, there may be more than 1 entrepreneur in a compound, but only one name is given and usually, it is the name of the eldest man in the compound. This meant that, some of those who should have been listed as bonafide entrepreneur are either not given or listed in some cases as assistants. At Hikiya, it was also mentioned that more fishermen are entering the fisheries.

The picture that was painted in the statistical bulletin is quite similar to what is obtained above, when it is examined across the sub-strata of the Lake (KLSB,2000). The pattern showed that entrepreneur dynamics are location specific, the movements of fisher folks are determined by abundance of fish at their place of residence.

Preference in the use of twine and nylon gill nets

the gill net, as the most dominate fishing gear had experienced change in type and mesh size over the year. An analysis of all the timeliness revealed that, at the onset, only teenier gill nets of high mesh sizes (4" to 5") were in use on the Lake. However, today, those of nylon type are more and are mostly of small mesh sizes (1" to 2") reason advanced for the preference of the nylon type include the fact that:

- * The twine type, despite its longer life span, accumulate debris which can be easily spotted by fish, leading to their avoidance of such nets,
- * The nylon type on the other hand is finer and therefore much more efficient than the twine type, and
- * the nylon net, although costlier and does not last as long as the twine type, can make enough to compensate for the investment and replacement.

Reasons for misinformation concerning the number of fishing equipment owned by enterpreneur

Experience over the years shadowed that, in most cases, attempt to cross check information on fishing equipment given by enterpreneur generates as many different results as to the number of time of visits. In selecting enterpreneur for inclusion in the monthly catch assessment survey exercise, entries on number of gears owned by individuals often differ from the initial claim during the frame survey.

When enterpreneurs were confronted with the issue at the different validation sessions, the following were given to justify the occurrence.

- * The rampant theft of gears on the lake. This phenomenon is said to be an everyday occurrence which reduced the gear holdings of enterpreneurs,
- * the total dependence of enterpreneurs on their fishing equipment for survival, at time high financial pressure, enterpreneurs may resort into the sale of fishing equipment to meet such immediate needs.
- * While fishing, gear can get entangled and damaged, and
- * As assistants graduate to enterpreneurs, fishing equipments are shared to them for a take off out of the holdings of their masters.

Effects of low catches on the bargaining powers of fisherfolks

The decline in catch now been experienced by fisherfolks has inadvertently placed some of them at the mercy of the fishmongers. The opinion of fisherfolks as to the effect borrowing from fishmongers has on their bargaining powers differs from borrowers to non-borrowers. However, in all the villages, after heated debate, the consensus usually is the acceptance of the fact that, once you take a loan from a monger, he is more or less in a position to dictate the selling price of the catch brought to him, except in few cases where agreements exists as to the selling price of the different species per kilogram weight. This situation was

described as giving fisherfolks a triple dilemma

- * Purchase of gears at mongers' price
- * Selling catches at mongers' determined price and
- * Resultant financial stress that ensures constant patronage of mongers Whilst the mongers gains tripled as well at the expense of the fisherfolks
- * Sales of gears at own price to fisherfolks
- * Lower price of fish bought from patronizing debtors (fisherfolks) an
- * Profit on fish sold in urban markets

Mode of operation by owners of large gear numbers.

A list of 96 enterpreneurs who owned up to 7 and above bundles of gillnets was drawn from the year 2000 frame list. Discussions and physical inspections held with them revealed that those with high number of gears do not usually declare all their assistants. In majority of the cases, the assistance operate most of the bundles. An assessment of those they, in some instances, claimed to be assistants are well qualified to be enterpreneurs by definition and operation?

Conclusion and recommendations

A closer look at the results of the exercises reveals the followings:

1. that the use of PRA tools can assist in unearthing issues that had been overlooked the time line can take memories back to the past, and when a trend has been identified, likely causes of observed problem may be better discussed and joint proffering of possible solutions done.
2. that identifying and or agreeing on a reference symbol or event may be difficult, but once established it make discussions easier.
3. That the variation in the results of PRA and frame survey tends to increase as the number of enterpreneurs in the villages increases,
4. That the fishmongers plays a significant role in the Lake fisheries that demand a careful attention of the management unit.

It is recommended that:

1. Fishing communities with higher number of enterperuners be framed using the PRA in conjunction with questionnaire survey,
2. Collection of fisheries data from third parties, during frame and catch assessment surveys be seriously discouraged,
3. There is an urgent need for further investigations into the roles of fishmongers on the lake fisheries to enhance their involvement in the management activities of the lake,
4. The issue relating to the number of fisher women who owns and operate their fishing equipments still require more investigations after further training of our female extension workers in the use of PRA tools,
5. The Translation of the PRA tools into Hausa language should be pursued until it is accomplished.

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INTEGRATING CULTURAL, ECONOMIC AND ENVIRONMENTAL REQUIREMENTS FOR FISH PRODUCTION IN BORNO STATE

BY

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ABSTRACT

The study examines the integration of cultural, economic and environmental requirements for fish production in Borno State, a reconnaissance survey was conducted transferring some selected Local Government Areas. 60 questionnaires were administered in the six Local Governments representing Southern Borno State with Biu and Shani, central Borno with Konduga & Jere and Northern Borno with Gubia and Kukawa respectively.

There is no cultural constraint to fish production but about 63% prefers to invest in other farming activities than in fish farming, 33% are not a wear believe that fish can be cultured apart from getting it from the wild. As much as 35% have the impression that fish farming ventures can be handled by government only. The economies for fish production is high especially in parts of Northern Borno, but the Local market potentials throughout the state is great.

The State posses suitable soil for ponds apart from few locations at the central and Northern Borno that are made of sandy soil. There exist numerous perennial and seasonal rivers, streams, lake, pool and flood plains adequate fish culture especially in Southern Borno. The mean annual rainfall can result in some storage in ponds. In areas where annual precipitation is less than 550mm, there exist a number of few flow boreholes with potentials for fish production. The temperature regime is that which will support growth and survival of fish even during they hottest months of the year (March, April and May). With the understanding and manipulation of these requirements, fish production in the State can be greatly enhanced.

INTRODUCTION

Borno state has a great potential for fish production both from the capture and culture fisheries, regrettably the potential for the later has not been developed, this can be attributed to the enormous fisheries resources of the State Inland water particulary the Lake Chad whose fisheries although entirely artisanal is one of the most productive in Africa having produced an estimated 1.7 million metric tonnes of fish between 1960 and 1988, having annual sustainable yield in the 1980's estimated at between 100,000 - 180,000 tons under normal condition (Durand 1980).

It is a fact of life that Borno Station is the largest producer of fish from inland river and lakes in Nigeria providing a significant part of the National Inland fisheries 61% (Aminu and Omoiyeni, 2000). However, the Lake Chad fisheries has experienced a classical 'Borno and bust' scenaio. Production increased from 15,000t (1960) up to 220,000t (1974) and has now dropped to 52,000t (Neiland and Lada, 1997). This

shows that artisanal fisheries production from Lake Chad have been fluctuating to the extend that it has decline in recent years. Obviously, the Lake Chad Fishery is an integral part of the World's Inland fisheries which has been estimated to be on their maximum level of exploitation (FAO, 1995). Furthermore, welcome and Bartley (1997) have indicated that caught from inland fisheries are in decline due to deteriorating quality of the aquatic environment and poor management.

With the growing concern that the fisheries of N.E Nigeria have been increasingly over exploited, there is the need to look inward and redirect fisheries enhancement programmes leading to increased fish production. One of the ways to enhance fish production is by shifting attention to fish culture practices, considering the fact that aquaculture is an industry in its early development stages in Africa. This is more so in Nigeria especially in the N. E region where Borno State lies. Fish production from aquaculture in Borno State is