Between the Canoe and the Laptop, Fish Sampling in the Amazonian Upper Rio Negro

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Summary

This poster shows how a survey aiming at investigating fish shortage in the Amazon resulted in a new methodological approach to **indigenous research.**

Fish shortage is usually considered a consequence of big scale fishing for mass sale. Nevertheless, remote communities such as the Indigenous people of the upper Rio Negro, in Northwest **Brazilian Amazon**, also have their livelihood affected and threatened by an ongoing diminishing fish supply.

To understand the reasons for this shortage, the Instituto Socioambiental (ISA), a Brazilian NGO, together with Indigenous partner organizations, started a series of initiatives and research such as the Fishery Survey of the Tiquié River.

The survey was organized by the ISA team, whilst data collection was conducted by a group of Indigenous researchers. Data collection, however, exposed problems related to language and mathematics that needed to be resolved beforehand.

The purpose of this poster is not to present the conclusions of a study, but to share the experience and pitfalls of **data collection by indigenous researchers.**

While the results of this survey are important for the community involved, the process itself contains valuable lessons for researchers worldwide who work in similar circumstances.

Background

The Rio Negro is a black water river tributary of the Amazon river. Its waters are acidic and poor in nutrients. As a result, fish production of the Rio Negro is low. The Rio Negro was nicknamed "the river of hunger" by early explorers.

The "Alto Rio Negro Indigenous Reserve" is an area of almost 8 million km^2, home to about 26 thousand Indigenous people belonging to 20 different tribes. Although they have a long history of contact with non-indigenous people, resulting in cultural changes, many aspects of traditional culture remains. Livelihood is based on manioc cultivation, as well as fishing complemented by the gathering of forest products and some hunting. Food production is basically for subsistence. Almost all Indigenous people have received some "Western" education so that illiteracy is rare.

The problem

Most of the tribes are river dwellers, who depend on fish for their regular protein intake. Indigenous people have developed several strategies to manage the poor black water ecosystem, but cultural changes have disturbed this balance **fish stock is declining** putting food security in jeopardy.

Methods and Procedures

In order to counterbalance the fish shortage, and to understand the origin of the problem, ISA undertook several initiatives:

Fish farming by indigenous people.

Instigate meetings of Indigenous leaders to discuss the problem and elaborate proposals of **sustainable management of local fish stock**.

Diagnosis of the causes of **fish shortages** through interviews with local fishermen.

Biodiversity survey of the fish population of the Upper Tiquié River.

Fishery survey through recording the catch of local fisherman.

The Survey

A survey was conducted at the Tiquié River which is a stretch of more then 300 km located in the Alto Rio Negro Indigenous Reserve.

Fish sampling was conducted by a group of **indigenous researchers** in 35 villages from 2005 until 2012.

The group of researchers was divided into two categories:

Volunteers who received only basic training.

Indigenous agents of environmental management – AIMA who received training to work in a scientific context.

The Indigenous researchers registered their fish catch and those of members of the same household in a form containing the following information:

Date, place, name and tribe of the researcher
Ecosystem and location
Start and end time of fish activity
Instrument used
Species, quantity, size and weight of fish catch.
(Only some trained AIMA researchers registered fish weight and the samples served to estimate the weight of the rest).

Data collection and its pitfalls

The main problem of data collection was how to train and supervise tens of indigenous researchers dispersed along hundreds of km of river. These difficulties gave rise to the following:

Accuracy of reading and recording the weight of to fish using a spring scale.

Researchers difficulty to understand the decimal system, specially to register fractions while recording weight.

Lack of language standardization leading to overestimating biodiversity.

Limitations of software to enter Indigenous letters that are not in the Latin alphabet.

Overestimation of fishing time due to inappropriate use of 24 hours cycle by software.

Analysis and discussion

Measuring units of weight on a scale can be confusing for the indigenous researcher when every mark does not represent a single unit. Weight scales with divisions of 2, 4, 6, 8 or otherwise should be avoided if possible. The researchers need to be trained well with this respect.

Indigenous researchers have a basic knowledge of "Western" mathematics, but little **knowledge of fractions.** For example, a fish with a weight of 2 kilos and 70 grams will be registered as 2.7 kg instead of 2.070 kg. To overcome this we adopted a method using units and subunits such as 2kg 70gm.

There are **several indigenous languages** in the Tiquié, five of them spoken by the indigenous researchers. As a result, the same fish species were being recorded with different names at the beginning of data collection. Although everyone also spoke Portuguese, the language does not lend itself for fish sampling because the Portuguese names for the local fishes are unknown or nonexistent in most cases. The Tukano language is used as a *lingua franca*, therefore chosen as the language for the database. This, however, did not completely solve the problem because there is no standardized form of written Tukano so that every researcher writes differently. Also some species have different names in different parts of the river and to further complicate the matter, some researchers use singular names and others plural. This means that the software analysis the data as different species. One way to overcome this problem is by conducting extensive workshops with the researchers to categorize and standardize fish naming convention prior to conducting any meaningful survey.

The input of Indigenous language alphabet characters into the database is still an unsolved problem.

Many fishing activities happen during the night starting one day and finishing after midnight. This is often problematic as database software may incorrectly calculate the fishing time. For example, a fishing trip that starts at 23:00 hours and ends at 01:00 hours will be calculated as a total of 22 hours instead of two. This is still a major problem of the research, making the calculation of the Catch Per Unit Effort (CPTU) value incorrect. Similar problems arise when researchers use the 12-hour method instead of 24.

Conclusions

Surveys using Indigenous researchers require Western scientists to emerge themselves in the local culture and remain in the field for a long period of time. Extended time in the field is mandatory to build up relationships with the population and to understand fishing practices for example. Failure to adhere to this practice will result in basic errors in data collection which may go unnoticed resulting in seriously compromised research conclusions. Well established relationships with Indigenous people is important in the context of this kind of work. Appropriate knowledge of the local culture facilitates the work relationship with Indigenous research team members. It is highly recommended that the Western researcher uses a test period for the intended methodology before embarking in any research with an indigenous population.

References:

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The Institute

The Instituto Socioambiental (ISA) is a not- for profit organization, registered under Brazilian law as a public interest civil society organization (Organização da Sociedade Civil de Interesse Público - Oscip). ISA was founded in 1994 with the purpose of developing solutions for social and environmental problems, especially related to the wellbeing of Indigenous and other traditional people.

ISA Instituto Socioambiental

FOIRN Federação das Organizações Indígenas do Rio Negro

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