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DELIVERABLE 7: FISH TAG AND TRACE: IMPLEMENTING A CLOUD DATA SYSTEM

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Overview

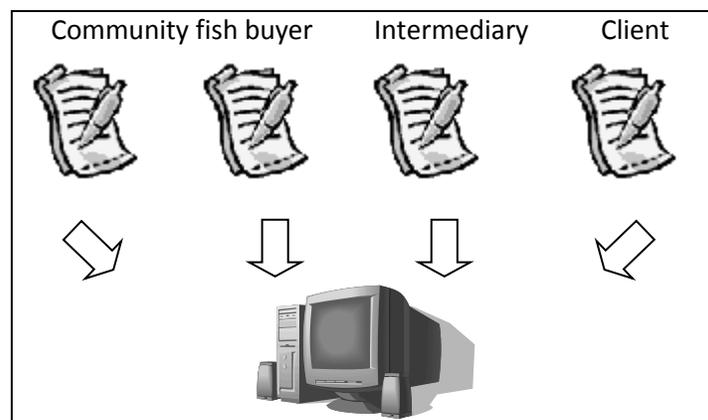
Fish caught by artisanal fishers from the Colombia Pacific are being sold to high end restaurants in the main cities of Colombia. Restaurants are prepared to pay improved prices for fresher, higher quality fish. The increased price is used as an incentive for fishers to adhere to a set of guidelines on responsible fishing including gear type, minimum size and species selection. The restaurants want confirmation that the fish they are buying is indeed coming from the fishers involved in this responsible seafood market chain.

The existing chain of custody

To provide chain of custody evidence to the restaurants that the fish is coming from these responsible fishers and as a mechanism to monitor fish production, a system of paper forms are used at each part of the market chain to be filled out as fish passes through.

The fish buyer in the community fills in a landing record and a separate fish monitoring record for every purchase. When the fish is sold on to the intermediary in Nuqui a further form about the receipt and shipment of the fish is filled in. At the restaurant a final form is completed by the client to confirm size and weight of fish arriving.

The paper based information from the community, intermediary and client all needs to be collated and entered manually into a data base for future analysis.



Under the paper based system information was being filled in four times for a single fish in the market chain. The data recorded on the sheets includes multiple replications of the same information, such as the fish species, fisher name, etc. The process is time consuming and laborious for each person along the chain and the quantity of paper leads to a bottle neck in it being collected and digitized before it can be analyzed.

The main concerns with this system are:

- Time consuming to fill in
- Repetitive data entry on forms and between sequential forms along supply chain

- Bottleneck in converting paper to digital records for analysis
- No feedback mechanism to data collectors on the information they are compiling

The consequence of the data collection system being a burden to the market chain means that data collectors in the community find the system time consuming and frustrating. They need to be compensated financially for the effort of filling in the forms and see no benefit in the data collection beyond the financial remuneration that comes with it. This system is unsustainable because as soon as funding to pay for data collection stops, the data collection and trace system will also stop.

A new approach

By integrating simple user friendly data collection systems with cloud databases the proposed solution to these problems aims to streamline the data collection process and improve data flow for analysis and feedback.

Adopting a non-paper based system can significantly reduce the effort and man hours required by each person along the supply chain to collect and enter data. Importantly the system can provide real time feedback to the market chain so that there is a tangible benefit as a business management tool through the collection of information. The minimal additional time required to log the information combined with the benefits of being able to visualize the data in real time means that it is likely to be sustainable without significant external funding.

The aim

The aim was to design a user friendly data collection system for the premium fish supply chain that could attach information to individual fish so that it could be traced from fisher to consumer.

The pilot area for the system is the premium fish market chain from the community of Jurubirá, through the intermediary of Fishmare in Nuqui, to the clients of Takami in Bogotá.

Similar systems to tag and track fish through market chains already exist for a few other fisheries around the world (including Canadian Pacific and United States Gulf fisheries) but the novelty of the proposed solution is how to overcome limitations in infrastructure, telecommunications and internet found in Colombian Pacific and make the data recorded at the community level simple and user friendly.

Method Overview

The system aims to replace the written forms with a simple tag attached to the fish and a data entry form through a computer, ipad or phone to a cloud database.

The tags attached to individual fish and a combination of written details on the tag and a bar code system enables the trace from fisher to restaurant.

The information the system needs to retain is:

Community Buyer	FishMare		Client
	IN	OUT	
Name of fisher			
Fishing method			
Location (Grid)			
Date Caught	Date Received	Date Shipped	Date Received
Fish weight	Fish weight	Fish weight	Fish Weight
Price per Kg	Price per Kg	Price per Kg	Price per Kg
	Fish Species		
	Presentation	Presentation	
		Shipping Details	
			Satisfied Y/N

Fish Buyers

When the community fish buyer receives fish she simply tags the premium fish and writes on the tag some simple details about the who, how and where of the fish. However we have simplified this system so that the amount that needs to be written is very short.

Instead of writing out the fisher name each time, the fisher can simply have a unique number. Similarly for fishing gears these can simply be given a two letter code. For the fishing sites to overcome inconsistency in the location names and to provide some level of privacy to fisher locations a grid code number can be given for the fishing location. It takes less than five seconds to tag a fish and under ten seconds to write the information. A waterproof marker means that the text does not come off. Tags for each community fish buyer (Jurubira or Arusi) can be different colors for ease of identification when in FishMare. The full date is not required to be written out as the fish is sent within a few days or it cannot be considered premium fresh fish. So only one day of each week is possible and the database can convert the day to a date when Fishmare input the data.

To achieve this data simplification at the fish buyer there needs to be:

- A list of fishers with a corresponding unique identification number
- A map of local fishing areas with a grid number system

Item on Tag	Explanation	Text Example
Name of fisher	Fisher ID number	001
Fishing method	Method Initials	ES (espinel)
Location	Map Grid Reference	22
Date Caught	Day of the week	mar
Fish weight	Weight of individual	15

Price per Kg	Price paid per Kg	3500
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In Fish Mare

When the tagged fish is received from the community fish buyer, Fishmare needs to enter the details from the tag into the data base. The database will be available off line to enable fish data to be inputted.

The system will produce a unique code for each fish received. This code will be the way to trace the fish through the supply chain. The code can either be written on the other side of the tag or if desired it could be converted into a bar code to be stuck on to the label.

Jurubira (tag colour)	Orange		
Name of fisher	001		
Fishing method	ES		
Location (Grid)	22		
Date caught	mar		
Fish weight at landing	15 kg		
Price per Kg	\$3500		

So in our example the fish data was put into the system and it generated a unique number of 50495 that was written on the other side of the tag

Additional information about the tagged fish can now be added to the database including the species of fish, the preparation (gutted - head on; gutted - head off, etc) and the weight of the fish in the event that the fish loses mass with time (such as tuna drying out). The price paid per kg to the fish buyer can also be put in.

None of this information needed to be collected by the community fish buyer because it is obvious to FishMare and wasn't going to change (e.g. fish species).

	Additional info added at FishMare
	<i>Date Received*</i>
	Fish Species
	Presentation
	Fish weight Received
	Purchase price per Kg

	* the dates are automatically added by the system
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When FishMare is ready to ship a fish they can enter the tag number to recall the fish, enter a new weight if it has changed, put in the sale price per kg and adjust the presentation if they have altered it. The tag number can then be added to a shipment. The shipping details are entered and the shipment is ready to leave.

	Shipping info added at FishMare
	<i>Date shipped*</i>
	New Presentation
	Fish weight sent
	Sale price per Kg
	* the dates are automatically added by the system

Multiple fish can be added to a box of fish for shipping and connected with a shipping reference number.

When the box of fish arrives at the client they can simply open the box and either enter the fish numbers or scan the bar codes. The code will bring up the relevant details for the fish and they need to manually accept or reject the fish by checking a box

	Information available	Client
	• <i>Date Caught</i>	<i>Date received</i>
	• <i>Fish Type</i>	-
	• <i>Fish Presentation</i>	-
	• <i>Shipped Weight</i>	Weight Received
	• <i>Total Sale Price</i>	-
		Accept / Reject
	<i>Additional information also available</i>	
	• <i>Name of Fisher</i>	
	• <i>Fishing Community</i>	
• <i>Gear Type</i>		

The important origin information is available as well as additional information of general interest such as the fish or the community. The client needs to input the weight received for the fish and accept or reject the fish. When this is finished for all fish in shipment the system will generate an invoice total. An automated message will notify FishMare that the fish was received and if there were any issues with a particular numbered fish.

Setting up the system

There is little equipment that is needed to implement the trace system along this short supply chain. At the fisher end they need to be able to tag the fish and record simple data and at the buyer end they need to be able to access the cloud database.

Equipment at Fish Buyers

- Tagging gun and nylon tag lines

A simple clothes tag gun that punches nylon tag lines through material can be used to attach a tag to the fish fin or through the operculum (cover over the gills)



- Tags

Tags need to be water resistant so they do not disintegrate and strong enough so they do not rip in transit. Tags can be made of waxed card, cloth or plastic and written on with a permanent marker. A potential recycled source of tag material could be to cut up rinsed plastic bottles discarded by the community.

Communities could have different colour tags or use different colour pen to identify that the fish is coming from their location rather than having to write out each time that the fish is from Jurubira or Arusi.

- Water proof marker pens

Sharpie and other brands of permanent markers are ideal for writing on the tags.

- List of fishers with unique identification number

All fishers selling into the market chain need to be recorded on a central list and assigned a unique identification number. This number can be given as they come into sell their fish. Having a number saves time writing out a full name and avoids errors of miss spelling names that may cause duplication of the fisher the data set.

- Grid map of fishing areas with numbered cells

To save time writing out names of fishing sites and to provide some level of confidentiality to exact fishing locations, a numbered grid map can be used to refer to fishing areas. A map of the sea area with a grid can be put up on the wall and fishers can simply give the corresponding number for their fishing location (see example). To help identify the correct cell, well known fishing grounds can also be shown on the map in the correct grid location. A common size for cells is 2 x 2 km but they can be smaller or larger depending on



the wishes of the fishers and the resolution requirement of the data set.

Equipment for FishMare

- Computer or Ipad

A computer with an offline version of the ourfish/trace.org data base and an intermittent connection to the internet to upload the information in to the cloud system is required.

- List of fish species with corresponding identification numbers

The main fish species are listed in the database. It will be faster to input the fish species if they each simply have a number and there is a picture chart of the species with the corresponding number

- Water proof marker pens or bar code printer

FishMare can either write the generated fish trace identification codes on to the tags or print out a bar code and stick it on to the tag. They should not need to replace the original tag.

Equipment for the Client

Access to the online version of the database and a bar code scanner (if needed). There should be no other equipment needed for the clients beyond the scales that they use to weight the fish that they already have.

Preparing the data base for the pilot

To establish the pilot we need to configure the system by assigning an access name and password to each user and set permission levels to restrict what information each person can see.

The Identification codes for fishers and the Identification codes for fish species will be set automatically based on the list already in the database. These lists will need to be printed out and given to the fish buyer in each community and Fishmare will need to print out these lists so that they can refer to them during tagging or data entry.

Updating the lists.

A button on the webpage will enable new fishers to be added to the system and new fish species. Any new fisher should receive a sequential number by the community fish buyer and Fishmare should be informed to add the fisher's full name and number to the system. Similarly new fish species should be add in the same way. Any problems there will be a "help" link on the web interface so that support can be provided.

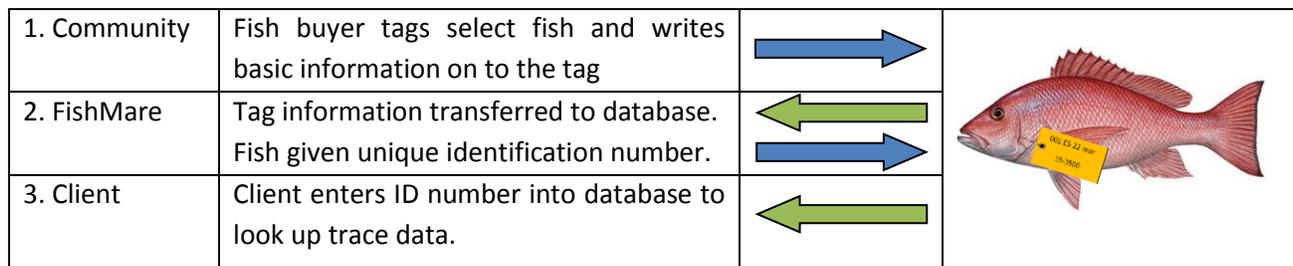
Hosting and confidentiality

The system will be hosted free on servers currently used to support other applications as part of the ourfish.org network for fisher management tools. There is no charge for use or maintenance of the tool.

The trade data such as price and transaction information contained in the system is confidential to the user. Production statistics for fisheries monitoring including productivity of different fishing areas and other fisheries related analysis may be produced based on the data from participating fisheries. Outputs will be available through a parallel portal at ourfish.org/trace_outputs

Summary

The system is simple and user friendly and enables the simple collection and use of data. At the current time this system is not intended to monitor all landings from a fishing community. instead it is a specific tool to enable trace of origin for specifically selected premium fish. A parallel data system called ourfish.org/captura is a fisheries landing monitoring tool that can be used to input general landing data. But a description of that system is beyond the scope of the current project.



Extension

Connecting the fisher to the consumer through cloud based databases enables the source of ingredients to be “humanized”. This is a powerful tool to provide information about responsible practices to responsible consumers. The current system has the capacity to produce profiles for each of the fishers in the system that can be accessed if consumers want to know who caught their fish. This provides a wealth of educational opportunities about the Colombian Pacific and fisheries issues in general as well as niche marketing through a “Who caught your fish?” campaign.

