



Case study:

Addressing sardine catch wastage during the glut season in Zamboanga del Norte



During the tuloy glut family and relatives of small fishers in Zamboanga del Norte share the task of harvesting the catch upon landing.

Summary

Sardines make up a significant part of the catch of small-scale fishers in the Philippines' Zamboanga del Norte province. During the annual glut season large amounts are dumped back into the sea due to an inability of fishers and processors to cope with such a volume. To address this situation and to help enhance the livelihoods of small-scale fishers and their families, the Regional Fisheries and Livelihoods Programme (RFLP)

provided technology transfer training for fish processors on sardine-based post-harvest technologies. This case study presents the activities undertaken, lessons learned and recommendations in this regard.

Key lessons learned

- Low cost, low technology inputs can make a significant contribution to small-scale processor groups.
- Considerable emphasis needs be placed on group strengthening and community involvement if producer groups are to be functional and sustainable.
- Emphasis should not be placed solely on People's Organizations at the expense of motivated individual producers.
- It is a considerable challenge for small-scale producers to meet government legislation and regulations pertaining to food safety.

Overview

Sardinella lemuru, commonly known as the Bali sardine, or *tuloy* in Visayan language, is the most abundant fish caught by small fishers in Zamboanga del Norte, one of the poorest province of the Philippines. Between March and May, when a seasonal glut period of *tuloy* occurs, fishers resort to throwing excess catch back into the sea or allowing it to rot. To address this situation and to help enhance the livelihoods of small-scale fishers and their families, the Regional Fisheries Livelihoods Programme (RFLP) provided technology transfer training for fish processors on *tuloy*-based post-harvest technologies. In addition, livelihoods support was also given to People's Organizations (POs). While *tuloy* wastage during the glut period cannot be fully addressed, successful implementation of improved post-harvest technologies has made *tuloy* products more marketable and helped them enjoy wider consumer acceptance. This has led to a significant reduction in wastage during the glut as well as better economic returns for fish processors and small fishers during the glut period and beyond.



Chilling tuloy is crucial to keep catch fresh during the glut period, especially when fishing is done at night and buyers come in the morning.

The *tuloy* glut

The *tuloy* glut is hereby described through an analysis of the strengths, weaknesses, opportunities and threats (SWOT) of this situation, from the perspective of RFLP beneficiaries.

Strengths: *Tuloy*, the most abundant fish landed by small-scale artisanal fishers in Zamboanga del Norte, is a popular raw material for fish drying and bottled sardine production in the province. Being an oily fish, it is among the best sources of Omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and it makes a good raw material for canned or bottled fish production. The glut period of *tuloy* occurs during March and May, the start of the harvest period after the lifting of the closed season commercial fishing ban from December 1 to March 1 each year. During the glut, significant volumes of *tuloy* are landed by small-scale fishers. Upon landing, family members, relatives and other villagers all help in carefully removing the *tuloy* from the net. Direct selling of catch is carried out upon landing and delivery to processors of bottled Spanish sardines takes place in the morning.

Weaknesses: During the glut period, as supply exceeds demand, the price of landed *tuloy* drops significantly. Moreover, with the absence of cold storage or proper chilling facilities and the high perishability of *tuloy*, large volumes are thrown away by fishers or left to rot because they are already considered useless due to histamine levels that render the fish inedible or unfit for human consumption. Fishing during the glut period occurs at night and landed *tuloy*

is usually kept overnight until being dried or bottled the following morning. As a result, fishers often fail to meet the stringent physical quality parameters of small and medium enterprise (SME) processors as raw materials for bottled Spanish sardines. As the later part of the glut period also coincides with the onset of the monsoon season, this also makes it difficult for processors to dry the excess sardines. Drying is a key step during the sardine bottling process. Dried fish processors suffer from insufficient drying facility capacity and the increased difficulty and complexity of drying fish when there is only limited sunlight during the rainy season. Sardines need gutting before they can be held in cold storage. Without a mechanized system that is compliant with current Good Manufacturing Practices (cGMP) it is impossible to process large quantities of sardines for cold storage.

Opportunities: During the glut more *tuloy* are landed than can be utilized by direct selling, Spanish sardines bottling, fish drying, and feed meal production. Taking advantage of the low prices at this time, RFLP beneficiaries were able to buy a very cheap raw material to pilot some innovative processing methods including fish sauce (known locally as *patis*) production from bottled Spanish sardines processing wastes, *tuloy* tempura, and bottled dried *tuloy*.

Threats: Prices invariably decline for small-scale fishers during the glut period. Small-scale People's Organization processors face strong competition from more established SMEs. *Tuloy* balls or *tuloy* tempura vending do not have good market acceptance because consumers are already used to the taste of commercially produced fish balls or fish tempura. Beneficiaries who are

processing *tuloy* using RFLP promoted post-harvest technologies are also likely to be challenged to operate sustainability unless they can expand their markets and sales.

RFLP interventions

The issue of *tuloy* catch wastage during the glut was identified by an RFLP baseline report and validated by fieldwork in the early stages of the project. RFLP interventions related to this issue included: 1) A *tuloy* value chain analysis and mapping workshop; 2) training of trainers which produced a pool of Barangay Extension Trainers (BETs); 3) technology transfer training for products that utilize *tuloy* as raw materials; 4) livelihoods support for women's organizations and small-scale fishers; and 5) provision of ice making machines.

Value chain analysis (VCA) workshop

A participatory value chain analysis (VCA) workshop was conducted in June 2011 to determine champion commodities for RFLP support. Two of the four priority items identified used *tuloy* (improving processing and packaging of dried fish; and providing technical support to bottled Spanish sardines processing). Mapping of the *tuloy* chain was conducted during the workshop, identifying bottlenecks and key points of intervention. These interventions took the form of capacity building and technology training, as well as providing coaching and livelihoods support to People's Organizations (POs).

Topics discussed at the workshop also included Hazard Analysis Critical Control Points (HACCP) principles and their application in fisheries post-harvest technology; the Philippine Food and Drug Administration's regulations for small-scale fish and fishery businesses; marketing and promotions; the Barangay Micro Business Enterprise Act of 2002; and basic management skills development. In addition it was also an opportunity to bring together resource people from the regional offices (Zamboanga Peninsula) of national government agencies (NGAs). It was agreed at the outset that RFLP would create linkages with possible NGA partners in the region in order to reinforce their mandate as support institutions to RFLP as well as to small-scale fishers.

Training of Trainers (ToT)

Fisher beneficiaries were trained as trainers (ToT) so that they could share what they had learned with other coastal communities, through Local Government Unit (LGU) outreach programs.

The objective of the training was to teach fisher beneficiaries different post-harvest processing techniques through demonstration courses and practice sessions. The ToT training helped build the capacity of participants to process *tuloy* using technologies and techniques other than bottling and drying.

The training produced a pioneer group of sixty-eight Barangay Extension Trainers (BETs) who were used to promote various fisheries post-harvest skills and technologies in fishing communities where they work as volunteer trainers. The

beneficiary trainees who were mostly women from municipal and village women's associations, barangay leaders, food handlers of sardine processors, Fishery Technicians, Municipal or City Agriculturists, Provincial BFAR staff, and staff from the Provincial government fisheries office completed the 10-day training in July 2011.

The training of trainers covered three units: Unit 1: Traditional and Value-Added Fish and Fishery Products and Marketing; Unit 2: Processing of Mature Sardines and Anchovies into Fish Paste and Sauce and Marketing; and Unit 3: Smoke-curing of Small Pelagics and Deboned Milkfish (*Bangus*). Throughout all the training units, participants were taught the importance of Good Manufacturing Practices (GMP) and Good Hygienic Practices (GHP) when handling and processing aquatic products.

The 10-day training also included discussions and practice on simple book-keeping which covered proper recording, listing of expenses and calculating return on investment; and tips on product marketing.

Technology transfer training

Having identified two *tuloy* champion commodities during the VCA workshop as a starting point, training on *tuloy* technologies was then conducted. This covered:

- The enhancement of Spanish sardine bottling;
- Fish sauce or *patis* production from mature *tuloy* and Spanish sardine processing wastes;
- bottled dried *tuloy*; and
- Recipes for minced *tuloy* meat, such as fish tempura, fish balls, fish chips,

fish *sinaing*, pickled fish balls, and fish flakes.

Patis production was included because 30% of the raw materials used to make bottled Spanish sardines are wastes that can be used as raw material, as well as the whole fish which can be used when there is excess supply during the glut.

A post-harvest International Consultant delivered demonstration training that provided SMEs with new options for the processing of *tuloy* besides bottling, including dried *tuloy* flakes and bottled pickled *tuloy* balls using local recipes.

RFLP enhanced the capacity of three People's Organization processors of bottled Spanish sardines. Formal training was provided and incorrect processing schedules amended. The processors were also taught how to process bottled dried fish which included *tuloy* as raw material to provide them with their own niche and which built upon their existing drying skills.

Coaching and mentoring sessions took place on-site for those who had adopted the post-harvest techniques introduced by RFLP. These were customized sessions specifically addressing technical or business related concerns. Only those with existing businesses were provided this training.

Livelihoods support for People's Organizations and small-scale fishers

In addition to technology transfer training for new and feasible value-added *tuloy* food products, RFLP provided financial support to women's organizations in the form of production inputs such as basic fishery post-

harvest and processing equipment and fish raw materials and ingredients.

For example, the Milanid Women's Association for Sustainable Environment received production inputs worth Php 150,000 for improved traditional sun drying. Meanwhile, Roxas Sardines Livelihood Association, Manukan Sardines Savers Association and Dipolog City Fishermen's Wives Association received production inputs worth Php 73,940 each for bottled dried *tuloy* in corn oil.

These groups were assisted by the RFLP and the Provincial Department of Trade and Industry (DTI) consultants to improve their respective business processes and in the preparation and improvement of business plans.

A sub-project called Cocina del RFLP that sought to provide a business starter kit to individual fishers, fisher's wives or People's Organizations was conceptualized in support of itinerant informal vendors that sell directly to consumers alongside streets and in other public places. Twenty-nine individual fishers or fisher wives and ten People's Organizations from fisher communities were identified as beneficiaries.

Most of the Cocina business starter kits were fish tempura business cart packages. Others included business kits for fish paste, fish balls, fish drying, smoked fish, seaweed crackers, and some non-fish products such as milk candy (*yema*) production.

Two Cocina post-harvest livelihoods projects were tested in two People's Organizations, each received Php 15,000 worth of production inputs, namely

Kababaihan sa Langatian producing and selling *tuloy* chips and San Antonio Fishers' Association producing and selling yema or milk balls.



Members of Kababaihan sa Langatian used powdered tuloy to make fish chips during the test run of Cocina.

Collaboration with the programmes of the Department of Labour and Employment (DOLE) and the Department of Trade and Industry (DTI) were undertaken to complement RFLP-initiated post-harvest based livelihoods projects and to forge upstream and downstream linkages among small-scale enterprises and players along the value chain. Collaborative linkages with the Philippine Food and Drug Administration (FDA) also took place to help small-scale women processors in setting up systems and procedures in compliance with food safety standards.

However, the Cocina did not progress beyond these test runs due to budget cuts.

Set up of an ice making facility

Ice in the Municipality of Salug is sourced from the Municipality of Labason, or Pagadian City, which are 21 and 47 km away respectively. The municipalities of Liloy and

Leon B. Postigo do the same. Two commercial-scale ice production facilities that previously operated in Liloy and Salug were abandoned for lack of sustainability.

An ice making facility was set up in the Municipality of Leon B. Postigo, with RFLP providing the ice block-making machine and the municipal local government unit undertaking the maintenance and operations as well as providing the facility that housed the ice making machine.

The planned ice making facility in the Municipality of Salug was cancelled due to RFLP budget cuts.

Top takers

Of those fish processors who adopted RFLP technology training and support, four top takers are presented as cameos.

Case study 1: Small-scale sardine bottler Gaso Food Products achieved better sanitation and improved production

Jocelyn Gaso of Dapitan City, owner-manager of Gaso Food Products, was one of the trainees of RFLP's Training of Trainers. After the training, she instituted stricter sanitation and hygiene measures among her employees and in her production areas, where she installed a pedal-operated washing station for her employees for both hands and feet. She also convinced fishers and dealers at the fishing ports to clean their fishing boats to make sure that their fish catch is hygienic, and to use plastic mats or tarpaulins to put their fresh fish on rather than on the soiled cement floors.



Barangay Extension Trainer Jocelyn Gaso of Gaso Food Products stands by her advocacy for highest fish handling and processing cleanliness levels.

During an inspection by an RFLP International Consultant it was observed that Gaso's processing plant was very small, with an area of only 16 m² for the whole production process. Subsequently, Jocelyn started and completed renovation of the production plant, adding a second storey devoted to frying, drying, bottling and packing, with the ground floor dedicated to fish preparation and brining. She also followed the consultant's recommendation to establish a process schedule documenting standardized pressure cooking times, a critical practice in assuring food safety of bottled products.

For more details on this case study, please visit the following link:

http://www.rflp.org/Philippines_sardine_production

Case study 2: SME Montaño Foods Corporation tries out patis production to utilize its Spanish sardine processing waste

Hazard Analysis Critical Control Points (HACCP) accredited fish processing establishment Montaño Corporation is among the leading producers of bottled Spanish sardines in Zamboanga del Norte.

Rolly Malata, one of its staff, attended the RFLP technology transfer trainings where he learned that the waste from Spanish sardine production (offal, heads, and other trimmings) could be utilized into a new product—fish sauce or *patis*. These wastes are normally used as pig feeds or fertilizer.



30% of the tuloj wasted during Spanish bottled sardine production can be used to produce patis (fish sauce).

Rolly shared what he learned with his boss Stephen Montaño who was convinced to try out *patis* production rather than transporting the wastes to be used as fertilizer at their distant farm and thereby saving significant haulage costs.

The RFLP consultants assured Rolly that the danger of contamination with *Clostridium botulinum*, a major food safety hazard which is found in the gills and intestines of some fishes would be eliminated entirely in *patis* by following the proper fermentation process which would degrade the protein content in all parts of the fish, including the blood; and by using the right amount of salt and other appropriate technologies. This would then have to be confirmed by laboratory testing.

Still in the process of conducting a test run on *patis* production, Montano is looking for technology options for bottling, before

sending the finished product for physicochemical analysis and microanalysis for safety and quality. The final step will be to register the new product with the Philippine Food and Drug Administration (FDA) for approval.

Because of the human health and food safety issues RFLP preferred working with an established SME with the right resources like Montañó on this pilot project. The gains for Montañó could potentially be very high considering the high market demand for *patis*. Montañó bottled Spanish sardine production peaks from March to May, with an average of 2 tons of raw materials going through the plant daily, which would yield 0.6 tons of *patis*.

Stephen Montañó hopes that when perfected, *patis* production will allow employees to continue working that would normally be laid off during the low catch season from July to December.

Case Study 3: Micro-enterprise Roxas Sardines Livelihood Association starts bottled dried sardines business

The Roxas Sardines Livelihood Association (RSLA), a People's Organization of 25 fisher wives in Dohinob barangay, Roxas municipality was one of three women's organizations which RFLP provided with enhancement training for their existing bottled Spanish-style sardines product. Technical training with production inputs worth Php 73,940 were provided for fish drying and production of bottled dried fish. These used sardines as raw materials, an innovative product providing them with a niche market to be more competitive with more established fish processors.



For small people's organizations a new product like bottled dried tulyo allows for potential expansion of their market.

Prior to the RFLP training, Roxas Sardines Livelihood Association was already operating a Spanish sardine bottling business in a processing facility provided through the support of Congressman Rosendo Labadlabad of the 2nd District of Zamboanga del Norte. The lot which holds the facility was donated by the Dohinob barangay council; the basic equipment and utensils were provided by Congressman Labadlabad; and more tools and equipment were provided by the Department of Labour and Employment.

RFLP initially provided enhancement training for the livelihood group on making bottled Spanish sardines. The technology that the PO was using was introduced by one of their members who used to work with an SME. RFLP provided formal training, correcting the incorrect processing schedule they were using. Achieving the correct cooking time, pressure and temperature is a critical control point for bottled Spanish sardines, a point that is considered to be non-negotiable, being a critical processing step that determines the food safety of the finished product.

Roxas Sardines Livelihood Association has already started producing Spanish sardines in bottles. Although the production volume remains low, adding a new product line to their existing processed products like bottling of dried *tuloy* gives them potential for market expansion to other places, local and abroad.

For more details on this case study, please visit the following link:

http://www.rflp.org/roxas_sardines

Case study 4: Micro-entrepreneur women of Dicayas Rural Improvement Club (RIC) go into *tuloy tempura mobile barrow (negocart) business*

The 27 members of Dicayas Rural Improvement Club (Dicayas RIC) were wives of small-scale fishers most of whom did not have their own fishing boats, but rather worked on commercial fishing boats for a share of the profits depending on the catch volume per fishing trip. Most of these women were totally reliant on the income of their husbands.

Dicayas RIC was a participant in the Nego-Kart Project of the Department of Labour and Employment's (DOLE) in partnership with the government of Dipolog City. The project provided them with a mobile vending cart, a frying pan, and a cooking stove. The vendors pushed the cart around local streets to sell their cooked food products.

Two officers of Dicayas RIC attended the RFLP technology transfer training on processing of fish value-added products using *surimi* technology such as fish tempura, fish balls, *kikiam*, and fish burgers.

They subsequently passed on the training in their barangay to the other Dicayas RIC members.



Augmenting their husband's income on a daily basis is a sweet deal for women Dicayas Rural Improvement Club members.

Dicayas RIC started their fish tempura business with a working capital of Php 300 borrowed from a Dicayas RIC advisor plus member contributions (membership fee of Php 10.00 and monthly dues of Php 5.00.) Members lent basic utensils such as knives, basins and cutting boards; and one offered the use of her refrigerator for storing processed *surimi*.

Processing of *surimi* is conducted in houses of members with good, potable water sources. Using a nutritious recipe learned from RFLP, low value fish species such as *tuloy*, snake mackerel or scad is used, depending on seasonal availability. The processed *surimi* can be stored for up to a month. Cooking tempura is done twice daily by a production group and sold daily in the morning, seven days a week by another group. At Php 3 each, the fish tempura sells well.

Profit is shared on a daily basis with the association getting a share of the day's profit per production team. Four months after starting the project, the women

reported receiving at least Php 35 per person per week.

The group later plans to set up a permanent production facility instead of using the houses of the members; and to diversify the products they sell so that customers have greater choice.

For more details on this case study, please visit the following link:

<http://www.rflp.org/tempura>

Implementation problems

Technical issues in processing tuloy

Being an oily fish, *tuloy* tends to become rancid easily. The intrinsic qualities of processed *tuloy* meat mean that the flesh has a dark colour flesh and a strong flavour. This also poses a problem for fish balls or tempura making as consumers are used to commercially available lighter coloured flesh and mild flavours. This necessitates the creation of nutritious recipes that not only complement the flavour but also help for marketing, by positioning *tuloy* as a health food.

Tuloy fish powder can be used for fish chips and can be safely stored for up to five months, according to Edna Cabilin, President of *Kababaihan sa Langatian*, a People's Organization in Langatian, Roxas which began production of *tuloy* chips following an RFLP Cocina trial run.



Squash or other vegetables enhances the nutritional value and masks the strong taste of tuloy in tempura.

Infrastructure limitations – non-functional cold storage facility

A newly built 300 ton cold storage facility, a joint project of the Department of Agriculture - Bureau of Fisheries and Aquatic Resources (DA-BFAR) Region IX and the provincial government of the Province of Zamboanga del Norte was scheduled to be operational by 2012.

This cold storage facility has a floor area of 5,000 m² with two contact freezers which can freeze 500 kg of fish in three hours (or about 2 tons/ day) at -35°C. It has a 285 m³ chill-room that can hold up to 50 tons of fish at 5-10°C, and six 182 m³ cold storage rooms at -18°C that can hold up to 50 tons each.

It was designed to accommodate the fish catch of the province, particularly during the glut season when there is excess sardine catch. The main potential clients of this facility are members of the In-glass Sardines of Dipolog Association who can drop off fish at the facility for processing prior to cold storage in the facility. At the time of writing however, it had not yet been turned over by the contractor due to key technical specifications being unmet.

Insufficient livelihoods and micro-finance support for POs

Considering there is a need to establish and develop a market for any new product such as bottled dried *tuloy*, the Php 73,940 assistance per People's Organization in the form of production inputs from RFLP was insufficient. Only one of the three POs provided with livelihoods assistance has successfully taken off, namely the Roxas Sardines Livelihood Association, presented as case study 3 above.

The two other POs need a processing building before they can go into production. There was inadequate collaboration between RFLP and the LGU regarding this matter: no memorandum of agreement was signed prior to the project which would have secured processing facilities for the POs. There was also no budget allocated for sales, marketing, and promotion. RFLP did establish linkages with the Department of Trade and Industry however this was for training and to take part in local trade fairs. There was furthermore no budget to attain the statutory and regulatory certificates needed by the Philippines Food and Drug Administration, e.g., the license to operate for food processors.

The organizational development process was unsuccessful in sufficiently strengthening the groups, and the financial business models were not properly established. Many housewives were dissatisfied because the project was unable to meet their daily supplemental cash income needs, due to insufficient initial market demand and so they left the organizations.

Conflict with local law on size of harvested tuloy

The Bureau of Fisheries and Aquatic Resources (BFAR) and the Department of Interior and Local Government (DILG) issued Joint Administrative Order No. 1 (JAO No. 1) enforcing a commercial fishing ban or closed season for *tuloy* from December 1, 2011 to March 1, 2012 for the first year of implementation, and for three years thereafter from November 1 to February 1. This Order also specified the minimum allowable harvest size for *tuloy*.

The demand for dried *tuloy* is high but the ideal size for drying is legally juvenile, at about 12 cm or less. For bottled Spanish sardines, the ideal raw material weight is about 100 grams per fish i.e. under sized according to the administrative order.



Fishers and dried fish processors claim that juvenile tuloy (about 12 cm) make the best sized raw material for fish drying and bottled Spanish sardine production.

Budget cuts and earlier termination of RFLP

In late 2012 the budget of RFLP was reduced due to the financial crisis in Spain. One intervention affected by the budget cut

and the resultant earlier than planned wind-down of project activities was the establishment of ice making facilities at municipal local government units. Initial budget limitations saw RFLP select two beneficiaries: the municipalities of Leon B. Postigo and Salug. Following the budget cut however, only Leon B. Postigo was awarded an ice making machine in a facility provided by the local government unit.

Cocina del RFLP was another RFLP initiative meant to benefit the marginalized sector, mainly the wives of small fishers. The Cocina initiative aimed to provide business vending carts for each organized group of housewives, as well as individual fishers or housewives. It was planned that the Cocina carts would also be operated as mobile business centres that would market other products made by the group, as well as promoting a brand of healthier fish food options, and hygienic food handling practices. This project did not go beyond the test run phase as its implementation coincided with the funding cut and the early termination of RFLP field activities.

Lack of potable water in the area

There is lack of basic services such as water and sanitation particularly in far flung coastal village areas where there is also irregular electricity supply. Lack of facilities is a hurdle to the delivery of the post-harvest activities where basic hygiene and sanitation in handling and processing of aquatic products is a minimum requirement.

Lessons learned

There are unique lessons that can be drawn from working with various post-harvest stakeholders, such as: 1) Local government units, 2) Itinerant PO vendors like the Dicyas Rural Improvement Club (RIC); 3) Micro-enterprise processors like the Roxas Sardines Livelihood Association; 4) Small and Medium Enterprises like Gaso Food Products and Montaña Foods Corporation; and 5) RFLP.

1. LGUs: RFLP worked closely with the local government units of the cities and municipalities within its area of geographic coverage. The mayors of these were the ones who recommended the beneficiaries of the project. With a patronage system in place, some small fish processor groups were not identified to join the Value Chain Analysis workshop and the Training of Trainers. Only as RFLP became visible in the communities did these POs learn of the project and approach RFLP for support. This was accommodated because they had evidence of effective collaboration and were therefore more likely to be sustainable. They, however, received less than half of livelihood support that other POs received because they were supported late.
2. RFLP: RFLP initially focused only on working with existing and organized POs. It was only later that it became apparent that there were many individuals, mostly fisher wives, who were informal or itinerant vendors that would have greatly benefitted from RFLP support. In response to this need, the Cocina sub-project was later

introduced but it did not prosper beyond the trial run phase due to budget cuts and earlier than planned closure of RFLP field activities. This was a missed opportunity to have positively impacted on the lives of these individuals who could have gone a long way with only minimal RFLP support.

3. RFLP: Inviting fishery technicians and Municipal Agriculture Office staff who were not regular employees was a waste of RFLP resources because they are unlikely to continue RFLP activities after their training and will be very likely transferred to other departments or posts at any time.
4. Itinerant PO vendors and small PO processors: It is common for non-government organizations to attribute failure of projects to attitudinal problems. This, however, should be reassessed. RFLP experience was that better results would have been obtained if more time and resources had been invested in group strengthening and basic financial literacy training and business model development. Without an efficient PO financial management system in place, the POs were challenged to sustain member interest and to sustain their business. Also, insufficient collaboration took place with the LGU to secure processing facilities, which could have been accomplished by a memorandum of agreement prior to the project.
5. Itinerant PO vendors: With the seasonal supply of sardines at certain times of year, it makes sense to promote the Cocina strategy, and multi-faceted low

technology livelihoods means, i.e., fish value-added products, fish balls and tempura, which are not dependent on a single aquatic species or on the weather. For example fish flakes can be produced year round by almost any household. Poor families in particular require a constant source of income. Because Cocina also utilizes low-cost technology, it is not affected by shortages due to seasonality of supply. It is flexible and does not require high capital investment or specialized equipment, e.g., a pressure cooker. Furthermore, the processing methods of the aforementioned products are not dependent on the supply of a single species as raw material and are not reliant on fine sunny weather as is the case with drying.

6. SMEs: Pilot projects such as fish sauce or *patis* production should only be undertaken by companies or groups that are committed and able to comply with all the technical and legal requirements. Food commodities such as bottled sardines result in food safety hazards like botulism if precautions are not properly taken. An established process schedule has to be determined for every product or variant to attain the desired sterilization value. This must be done through heat penetration studies. Using the Montaña Corporation, an established fish processing SME to do the pilot testing on *patis* production, was a win-win situation as they have the resources to perfect this new *tuloy* processing technology and thereafter to promote its adoption by other SMEs.

7. SMEs: The demand for bottled aquatic products remains strong, but the supply of raw materials is seasonally restricted and determined by the *tuloy* life cycle. During the glut, SMEs are unable to handle larger processing volumes because of limited production capacities. There also needs to be good weather as drying is necessary to complete the sardine bottling process. Evisceration, which is a requirement for safe bottled Spanish sardines can be difficult to do on a large scale, requiring large numbers of workers. Bottled sardines are shipped from Mindanao Island through Ozamis City, 130 km from Dipolog City which adds transport costs. Addressing the glut wastage necessarily requires recognizing and mitigating these other problems.
8. Micro-entrepreneurs/processors: The demand for bottled aquatic products remains strong, but government regulations on food safety are overly stringent. It is a challenge for small POs to maintain their business amidst such restrictive policies. Should they consider diversification or shift to other businesses? Will there be business growth under present circumstances? What resources can POs tap into to survive this challenge? These questions were hard to answer within the context of enterprise development when trying to compete with more established and larger businesses. A longer incubation period is needed by these POs until they become self-sufficient.
9. Micro-entrepreneurs/processors: The very stringent and demanding government regulatory requirements on food safety for food processing establishments were exacerbated by there being no funding under RFLP for infrastructure (e.g. for a dedicated processing facility). This made it extremely difficult for entrepreneurs without a supportive external environment to create a thriving business.
10. Itinerant PO vendors and micro-entrepreneurs/processors: Officers or key personnel lost their focus on the essential aspects of running their business as they found themselves increasingly involved in various community related functions, e.g., Fisheries Law Enforcement Teams, Day Care Worker, etc. As a result they often missed organizational capacity building training, and production and marketing of their products.
11. Micro-entrepreneurs/processors: As post-harvest issues were addressed, other challenges emerged, e.g., POs were not getting repeat orders, there were more frequent customer complaints, inter-personal rifts, lack of formal agreement between POs and those that place orders to address the problem of collecting payments, etc. All of these gradually began to impact on the sustainability of businesses.
12. RFLP: RFLP should have focused more on assisting POs to set up appropriate financial management systems and to facilitate strategic direction setting with key PO personnel and members.
13. RFLP: RFLP would have benefitted more from engaging resource people from BFAR or local trainers who had a better grasp of the immediate environment of

the coastal communities thereby paving the way towards understanding of the local context and managing interpersonal dynamics with coastal communities better.

14. RFLP: Economic feasibility should have been examined not only the production of increased product quantity and quality, but also on management systems including the equitable sharing of benefits and profits between PO members.
15. RFLP: An assessment should have been made of the level of accountability that POs were willing and able to assume when provided with a grant or donation of project equipment. A self-help process would have been good a criteria for the selection of beneficiary groups and POs that were to be provided with RFLP-donated equipment and support.
16. RFLP: The requirement for POs to provide counterpart funds or for post-harvest and livelihoods enterprise development would have provided better motivation for the POs to take RFLP support more seriously.

Recommendations

1. Considering the intrinsic qualities of *tuloy* meat (dark colour, strong flavours, and ease with which it turns rancid), techniques for handling, preserving and processing *tuloy* into snack items need further technical investigation and consumer testing to ensure that the finished products meet wide consumer acceptance. Some extra precautions

should be taken when manufacturing value-added products from minced raw materials such as fish balls, *quikiam*, and *longganisa* (fish sausages). These foodstuffs are high risk products due to their limited shelf-life (and should be kept refrigerated) and their susceptibility to contamination during preparation.

2. The BFAR-Province of Zamboanga del Norte Cold Storage layout needs to be re-designed. Key points that need addressing include:
 - Installation of hand washing and sanitizing facilities (sink, automatic faucets, automatic hand dryers, hand sanitizing equipment and a footbath) at the entrance to the main processing area. Hand and raw material washing facilities in the main processing area should also be provided;
 - Provision of a raw material receiving area (with footbath) and washing facilities for raw materials;
 - Removal of access doors to toilets from the main processing area;
 - Physical separation of the freezing equipment from the main processing area;
 - Provision of a packaging area with hand washing facilities; and,
 - Provision of storage areas for packaging supplies and cleaning supplies and materials.

The staff should also be provided with checklists of all requirements to keep the facility functional (equipment, utensils, etc.). Additional support could be provided through on-the-job training (OJT) of the staff on how to prepare the raw materials

(fish) for the cold storage, once the facility is already fully equipped with the necessary equipment.

3. Financial support is needed for the rehabilitation of the Dipolog City Fish Port Complex and the landing site in West Poblacion, Salug. Landing sites in the Province of Zamboanga del Norte are geographically dispersed and are generally underdeveloped, informal and fragmented. Small-scale fishers usually land *tuloy* anywhere along the beach or close to the estuary or harbour. Almost all municipalities (except Salug, Dapitan and Dipolog) have no landing site infrastructure. LGUs should find ways to tap donor agencies to support the construction of landing sites. The availability of proper landing sites is essential for bottled sardine establishments to meet EU export requirements, a market which many local bottled sardine processors would like to access. The EU demands that there should be a dedicated landing place where fishers supplying raw materials to bottled sardines processors can take and market their catch.
4. Setting up ice making equipment in other strategic places such as Salug, Liloy, Roxas, Rizal, and Sibutad should be considered. When selecting sites for ice making machines, special attention should be given to the availability of a good source of potable water. There is no guarantee that the ice presently being produced in the convenience (*sari-sari*) stores and even the ice plants in Zamboanga del Norte area of geographic coverage is manufactured from potable water. Interested groups

should verify this situation by funding appropriate water testing if necessary.

5. The national government should enhance the capacity of the Philippine Food and Drug Administration (FDA) to take on an active role in enforcing a potable water management system for LGUs by setting standards for drinking water quality and overseeing the cities, municipalities, state-run and private water suppliers that implement these standards.
6. The Cocina del RFLP model should not only provide income, but also guarantee three nutritious meals daily for workers and an opportunity for them to send their children to school. Interested NGOs can contribute by providing templates cum worksheets that show profit per member and minimum recommended amounts, as well as essential steps that the POs must follow in accomplishing a sound business plan. This could be implemented online with sufficient funding. Enhancing the capacity of POs will help them provide competitive salaries, social security insurance and performance-based incentives or salary increases to their employees.
7. DOLE and DTI should promote further PO development through team-building activities and sessions integrating food safety advocacy, e.g., under the Cocina program, in organizational policies and practices. Examples of these include a review of workloads, salaries and benefits of livelihoods workers, participatory formulation of operations manuals and project proposal preparations. Community spirit must be

fostered to help the POs learn from their mistakes.

8. LGUs should support the construction of solar dryers in some municipalities with suitable areas (e.g., Salug, Leon B. Postigo and Selinog Island, Dapitan City). Solar dryers will enable dried fish processors to continue their activities even during the monsoon season. Solar dryers should be sited away from shore areas because of possible erosion, and the influence of extreme weather events such as wind and sea water surges which would easily destroy the structures.
9. LGUs should provide smokehouses (drum-type) to those who would like to

venture into fish smoking. Smoking of fish is one of the best alternative methods that can be adopted particularly during the monsoon season. Raw materials for this process are readily available. Many species of fish which can be used as raw materials such as sardines or *tuloy*, scads, mackerels, bullet tuna, cultured species (milkfish and tilapia) and other low cost species of fish (*barla*). Fuel materials for smoking in the form of coconut husks are readily and cheaply accessible wherever coconut trees are found and these are plentiful in the area. The use of this fuel would also clean up beaches and inshore waters in the project area, which are full of discarded coconut husks.

About RFLP

The Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP) sets out to strengthen capacity among participating small-scale fishing communities and their supporting institutions in Cambodia, Indonesia, the Philippines, Sri Lanka, Timor-Leste and Viet Nam. The four-year (2009 – 2013) RFLP is funded by the Kingdom of Spain and implemented by the Food and Agriculture Organization of the United Nations (FAO) working in close collaboration with the national authorities responsible for fisheries in participating countries. For more information about the Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP) visit www.rflp.org.

About the writer and RFLP in the Philippines

Jonelo Sobreguel, National Consultant for Post-harvest and Marketing for RFLP in the Philippines, worked on measures for improved quality of fishery products and market chains, providing technical assistance to fisheries post-harvest needs assessment and interventions directed at improving returns and market potentials for fresh and processed fish in the Province of Zamboanga del Norte. Valuable inputs were drawn from the terminal report of Jasmin Espejo-Hermes, International Consultant for Post-harvest and Marketing for RFLP in the Philippines; and from Glenn Labrado, RFLP Philippines Monitoring and Evaluation Officer, Don Griffiths, RFLP Chief Technical Advisor and Steve Needham, RFLP Information Officer.

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