UTILIZATION OF TRAWL BYCATCH IN SOUTHEAST ASIA

by

TAN SEN MIN
Marine Fisheries Research Department (MFRD)
Southeast Asian Fisheries Development Center, Singapore

ABSTRACT

The paper describes the successful implementation of the SEAFDEC/MFRD programme to increase the utilization of bycatch and low-value species in a number of SE Asian countries. Technological advances have contributed lizardfish and small pelagic species as raw material for the dramatic growth of the surimi industry. New products, such as satay fish and battered and breaded surimi chips have been developed and new raw materials sourced for traditional products. An important element of the programme has been the transfer to industry of the technology developed.

INTRODUCTION

A major portion of the catch by fish and shrimp trawlers operating in the Southeast Asian region comprises bycatch fish species which are discarded at sea or used for production of fish meal. Depending on the fishing area and season, the bycatch can comprise from 40% to 60-70% of the total catch. As in many parts of the world the problem of under-utilization of the bycatch and discard of vast quantities at sea is an important area of concern for the Southeast Asian countries. In the late 1970’s a survey team of technical experts from Japan recommended that the MFRD look into ways to better utilise the bycatch for direct human consumption. In the early 80’s the MFRD conducted research into the species composition of the trawl bycatch and to assess the suitability of the major component species for the production of surimi and surimi products, based on the Japanese technology for surimi production. The MFRD then promoted the concept of surimi to the fish processing industry in Southeast Asia, on the bycatch species as raw materials. This was done through training and lecture-demonstration courses directed at the fish processors from the SEAFDEC Member Countries.

Growth of the surimi industry

The trawl catch in the Southeast Asian region comprises of over 100 species which are sorted on board into high value species like snappers, groupers, poraflers etc. The larger sized individuals of species like threadfin snappers, big-eye snappers, croakers are also sorted out separately, but a significant proportion of the catch is either iced as mixed species or discarded as bycatch. With the use of threadfin snappers, big-eye snappers and croakers for the production of surimi, the fishing industry is now able to identify a specific market use for these species and as a consequence, better sorting of the bycatch to select these species for the surimi industry resulted in reduction of the bycatch discarded or brought back for fish meal.

Presently, the surimi industry in Thailand, exports more than 60,000 tons of surimi annually, mainly to Japan. These species used comprise mainly the threadfin snappers, big-eye snappers, and croakers. Singapore now imports about 8,600 tonnes of surimi per year mainly from Thailand for its fishball-fish cake industry. Malaysia has about 6 factories each with production capacity of 5 tons/day.

As part of its transmigration policy, Indonesia has developed a fisheries complex in the Aru Islands in the Irian Jaya area, with a fleet of about 200 trawlers. Part of the operations include a 40 ton/day capacity surimi factory to utilise the lower value fish species from the trawl bycatch, as well as a fish meal plant. There is also potential growth for the surimi industry in other ASEAN countries like Vietnam and Myanmar.
RECENT TRENDS IN THE SURIMI INDUSTRY

The present surimi industry in the region is targeted at the production of high grade surimi for export to Japan. However as the domestic fish processing industry sees the benefit of using surimi as a raw material, there is a growing demand for lower grade, lower priced surimi for the local and regional markets. This is also due to the increase in demand and prices for the surimi species like threadfin snappers and big-eye snappers. A factory in East Malaysia produces surimi from mixed species for export to S. Korea. Several manufacturers from Singapore have also moved to the nearby Indonesian Rhio Islands to produce surimi from mixed species from the shrimp bycatch, for the Singapore market.

The use of mixed fish species however can give rise to inconsistent quality in terms of gel-forming ability but this can be controlled to a certain extent through proper sorting. With the increase in use of surimi by the local industry there is therefore a potential to develop this concept to produce lower grade surimi for domestic use. Local fish ball processors in Malaysia and Thailand are now producing leached meat for their own use.

Through this concept, small end-product manufacturers can obtain lower grade surimi from these manufacturers and need not depend on an overseas import of surimi, or process their own raw material. At the community or village level, one such factory could serve to utilise the bycatch from the trawlers and produce leached meat for several small end-product manufacturers as part of an integrated fisheries management system. The MFRD will be initiating this system as a case study in Cat Bai, Vietnam as part of the SEAFDEC Integrated Coastal Fisheries Management Project in the Cat Bai and Cat Hai region.

One of the most abundant under-utilised fish species from the trawl bycatch in the region is the lizard fish (Saurida spp). These fishes are not consumed directly and fetch a relatively low price. Presently the smaller individuals are salted and dried as a traditional product and the remainder is used as minced fish for making lower grade fish jelly products (fried fish cakes etc.). In Japan, the lizard fish is considered as a good raw material for surimi, but in this region, lizard fish has very low gel-forming ability. The MFRD in collaboration with the Fishery Technology Development Institute, Thailand did a study to look into this problem. Lizard fish after death deteriorates very quickly without proper icing, forming formaldehyde as one of its breakdown products. The study indicated that after 6 days in ice the gel-forming ability of lizard fish drops drastically with a corresponding increase in formaldehyde levels. Experiments on polyphosphate leaching resulted in increase in gel-strength but the effect is greatest in fish less than 6 days in ice. With this information several surimi manufacturers have been paying more attention to icing of lizard fish and are now producing lizard fish surimi for export to Japan. Most of the surimi factories in Vietnam are using lizard fish as raw material but can only produce low grade surimi, mainly exported to S. Korea.

During the fishing season, pelagic species such as sardines and round-scads in this region are considered as under-utilised and are often sent to the fish meal factories. In southern Japan, sardine surimi has been used for producing fried tempura fish cakes, chikuwa, and fish noodles (about 20-30% surimi). In Chile, horse mackerel resources have been used for surimi production and are now exported to Japan for fried tempura, chikuwa production. Several surimi factories in Thailand are also producing sardine surimi for specific markets in Japan.

OTHER PRODUCTS FROM BYCATCH

In terms of product development, the bycatch has been widely used for a wide range of products mainly for local consumption. Malaysia has been very successful in sorting out the goat fish (Mullidae) from the bycatch for production of 'satay' fish in the Pangkor Island area. In Thailand, a similar product made from mixed fish, has been very popular. Recently several large fish processing factories in Thailand have also started producing karasaki-ika, a surimi-based product similar to dried cuttlefish/squid slices. Traditional
products like ‘kerupok’ or fish crackers uses low value fish species like sardines to give the product a better taste.

Recently a low-cost battered-breaded surimi-based ‘fish chip’ made from lower grade surimi became very popular in Thailand and Malaysia. The fish chip are thin slices of surimi paste mixed with ingredients and flavours to taste, covered with breadcrumbs and frozen. To improve the texture of this product, the MFRD in collaboration with the ASEAN-Canada Fisheries Post-Harvest Technology Project developed a ‘cut-and-mixed’ fish nugget, using diced cooked fish cakes, mixed with surimi paste or fresh fish mince from lower value fish species (lizard fish) as a binder.

In some of the smaller fishing villages in Japan, the small bycatch species are used for making a product called kawatempura. This is made from very fresh, small, head-gutted, scaled mixed fish, passed through a mincer with small mesh several times to reduce the bone and skin particle size and ground with salt into a sticky paste. Diced vegetables are added for taste and formed into nuggets or cakes and deep fried. This product is quite similar to the Thai fried fish cake with diced vegetables and spices, but in this case the whole fish (including skin and bones) are used.

By-products from tuna processing

Processing of tuna into loins or canned tuna is now a big industry in Thailand and Indonesia. Trimmings from this industry are presently used as pet food, fish meal or discarded. There is a potential to make use of these by-products or the small tuna species presently under-utilised. The MFRD has used technology from Japan, several products like fish sausage, tuna burger, seasoned tuna cubes, tuna stick etc. using these trimmings. The technology has now been transferred to the fish processing industry in the region through training courses manuals etc. A tuna processing factory in Thailand have started commercial production of tuna salami and tuna sausage.

Traditional fish products

When looking at the problem of bycatch utilization it is very important to consider traditional fish products. In Southeast Asia, many of these products are based on bycatch species as raw materials. Small pelagic fish like sardines, scads and croakers are often salted and dried and distributed widely into areas where they serve as an important cheap source of protein. Minced fish meat with low gel-strength is also used in a variety of indigenous products usually as a binder in deep fried fish cakes, rolls, etc. Countries like the Philippines, often indicate that all the bycatch is fully utilized in one way or another in the form of salted, fermented, or dried products. The MFRD has therefore initiated a survey on traditional fish products in the ASEAN, to document the types of products in each country, raw material used, processing methods, production figures, packaging etc. This could perhaps shed some light on how bycatch is used or can be more fully utilised in such products.

CONCLUSION

In looking at the problem of utilization of bycatch in the ASEAN region, MFRD has taken the technology approach, in terms of developing technology to promote greater use of the bycatch species by the industry. Our strategy is then to transfer these technologies directly to the industry, through training courses and manuals in collaboration with the respective department of fisheries and to provide technical assistance to them for commercial application of these technologies.