

Extrusion **by Ed Clark**

# India aquaculture

Already the No 2 farm fish producer, Indian production is expected to grow by 8% annually over the next five years.



*Indepesca cages with common carp.*



*Soya-based fish feed in feed mill storage.*



*Rohu carp, one of the species of carp grown in India.*



*Soya-based extruded fish feed*

Indepesca, an aquaculture producer from India, became the nation's second farm-raised carp operation to use extruded soya protein in February, as the world's second largest fish farming country is beginning to embrace a system that incorporates aquaculture cage technology and extruded floating fish feed. The first fish farm in India to use floating pelleted fish feed began operation only in 2008, although pelleted sinking fish feed has been used by other fish farming operations for a number of years.

"When our technicians first proposed soya protein to a group of Indian fish farmers in 2004, their suggestions were strongly rejected," says Catalina Valencia, aquaculture marketing manager, for the US Soybean Export Council, known internationally as the American Soybean Association-International Marketing (ASA-IM). "That attitude has substantially changed," she says, as Indian aquaculture producers are seeing how much more profitable and sustainable it is to use extruded floating soya-based fish feed than the traditional method of feeding the fish a mash/manure diet. Beyond increased weight gain and efficiency (reduction in the grow-out period) from the soya diet, Valencia says "it's far more sustainable to feed extruded floating soya-based feed to fish", as it is a renewable feed source and water quality is also preserved.

The ASA-IM Indian aquaculture team says that until soya-based feed formulations were introduced, India's freshwater fish farmers relied almost exclusively on manure-based systems. Manure was dropped into ponds resulting in algae that the fish ate, sometimes along with low nutrient feeds comprising rice bran or peanut cake. Needless to say, this feeding 'technology' is highly inefficient. Promoting the results of the trials over the last two years has resulted in quite good

reception, although there still is quite a way to go before there is widespread acceptance, ASA-IM officials say.

"Excess organic loading (in a traditional system) pollutes pond bottom and causes a wide variety of production problems," adds Dr P. E. Vijay Anand, who heads India's ASA-IM animal feed programme. "The profitable long-term sustainability of intensive carp farming are threatened by continuing the existing feed use practices."

Fish farming in India is based on Indian carp (three species) and a few Chinese carp species. However, the Indian government has given licence to a few groups to farm-improved strains of tilapia. Traditionally, ponds use agricultural by-products as feed ingredients. These are mixed and made into a mash form and delivered to fish through perforated bags tied in the ponds. "This is a very inefficient way to feed fish as most feed goes as waste into the water and some of it gets converted into plankton," Anand says. Owing to this, water quality goes bad very quickly and becomes a limiting factor for fish growth. It also does not support increased production/stocking. He says that in contrast to this, ASA-IM has taught the industry that fish can be profitably farmed using modern feeds.

## Twice the stocking rates

In addition to being more sustainable, using extruded floating soya-based fish feed "results in consistently faster fish growth, higher fish yield, better feed conversion and better economic returns than the traditional practice of feeding fish with a farm-mixed feed," Anand states.

"Though stocking density in the ASA-IM ponds (trial) was slightly more than twice that of the traditionally managed ponds, the ponds support the higher biomass and

# embraces extruded soya feed

produce more fish weight in fewer days", he adds.

In 2008, extruded floating soya-based fish feed production started and was estimated to be a modest 2,500 metric tons per month or 30,000 metric tons per year with soya bean meal incorporation levels ranging from 35-56%, as the pelleted feed industry had just gained a foothold. By the end of 2009, ASA-IM estimates extruded floating soya-based fish feed sales will be 114,000 metric tons annually; 371,800 metric tons for 2010, and 500,000 metric tons for 2011.

Three commercial feed milling operations have started manufacturing and marketing the recommended soya-based extruded floating fish feed, Valencia says, including multinational feed companies. The first company to make extruded soya-based aqua feed was actually a broiler company called The Indian Broiler Group. The second company was Uno Feeds, which will supply Indepesca's feed. The third company that also began making a pelleted fish ration in 2008 was CP Feeds. Additional plants that plan to begin pelleted fish feed operations in 2009 are Anawanda Feeds and Dwality Feeds, which have commenced trial runs, and Growel Feeds, slated to go into production by August 2009.

## Motivated by China

What has really motivated Indepesca to embrace pelleted soya technology, along with aquaculture cage technologies, Valencia says, was a trip of industrialists to China in 2008, the world's No 1 producer of farm-raised fish.

One member of the group was Dr Suryaprakash Rao, general manager of Indepesca. After seeing the success of the ASA-IM programme in China, where the soya-based aquafeeds and feed-based production techniques were developed, Dr Rao came back motivated to set up a cage aquaculture system in India, Valencia says. "Indepesca saw this method of production as an efficient way to increase fish production for its company in addition to farming fish in ponds in an environmentally friendly way."

Indepesca's cage culture fish will be fed on the ASA-IM 32/6 feed. This contains 32% crude protein (of which approximately 52% is soya bean meal) and 6% crude fat.

Indepesca will market the carp it raises

domestically. Officials say that the Indian market for fish is "opening up fast as purchasing power improves. There has been some progress in the retailing of fish, which is expected to increase with the booming middle class. Consequently, the demand for fish feeds is expected to increase," according to *AQUA Culture AsiaPacific* magazine.

Two other participants in the tour to China plan on exploring the possibility of processing *Pangasius* catfish soya to begin with and follow this up with tilapia processing in a leased processing plant. Processing of *Pangasius* has begun and fillets are being marketed in a small way. The firm plans to brand their fillets as products from "soya fed fish".

The industry visit has been very successful for the India programme as it has yielded measureable results with the establishment of soya-feed-based fish feed technologies and the setting up of modern feed plants with "very high investments", says Anand.

"Feeding demonstrations that showed entrepreneurs the returns on investment has brought about a sudden change in mindset," Anand says. "This has led to investments in feed plants despite a 35-40% import duty on machinery."


Valencia says that ASA-IM began marketing efforts for aquaculture in China in 1993 and has actively played a role in transforming the Chinese freshwater fish culture industry from a manure-based traditional system into a more productive feed-based system. Since then, ASA-IM has worked on promoting its soya-based aquaculture technologies in

Southeast Asia, India, Latin America, the Middle East and Europe.

"Chinese government agencies adopted ASA-IM's technologies and have stepped up their freshwater fish production in leaps," according to the ASA-IM website. Although India is in its infancy in developing a feed-based system, it has the opportunity to avoid some production problems of past years, "such as water quality and disease-related issues", according to Valencia. At the heart of ASA-IM's model is to develop soya-based fish farming technologies in a sustainable way, she states. Key to making the system work, she says, is to work with local and national extension experts, where applicable.

## Environmental issues

"In China, the industry is facing a lot of environmental issues. Little by little, we're making headway. It's difficult but we're getting the message across," Valencia says. For both China and India, she added that "if they want a place in the world", they will have to produce fish in a sustainable way. In India, the ASA-IM Indian aquaculture team says that the state and central government policy makers have recently "become convinced of this new technology and are recommending it to their stakeholders".

Valencia notes, though, that feeding fish is not as easy as feeding swine or poultry, because each species has different nutritional requirements and needs a different first stage, grow-out and maintenance-level diet. 



Entrepreneurs examine soya-based feed.



Boats filled with soya-based fish feed.