

Extruded snakehead feed in Vietnam

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The introduction of floating feeds for the snakehead is improving profit margins for farmers in Vietnam.

In Asia, the carnivorous snakehead is a popular freshwater fish because of the fine flesh and flavour. The snakehead is also believed to play an important role in human health, especially in post surgical operation care because of its perceived curative properties. In Vietnam, farming of the fish has a 60 year history in several provinces in the Mekong Delta. The two main species of snakehead farmed in the region are the giant snakehead (*Channa micropeltes*) and the common snakehead (*Channa striatus*). The fish is fed trash fish (by catch from marine fisheries) or wild freshwater fish. Despite a feed conversion ratio (FCR) ranging from 4:1 to 5.0:1, the culture of this fish is profitable.

However, there are also some adverse effects with this type of traditional method of snakehead farming in that the over fishing of wild fish has exerted significant pressure on freshwater resources in the Mekong. As the price of trash fish increases, so does the cost of farming. The inefficient utilization of trash fish is not only a waste of resources but also pollutes the surrounding water area. The heavy pollution in turn can cause a number of diseases, lowering fish survival and reducing the carrying capacity of ponds and farmers' profit margins. Last but not least, the massive use of chemicals and antibiotics both threatens consumers' health and increases culture costs.



Checking snakehead feed production. Dr Yang Yong, General Manager of Hinter (middle) and Nguyen Huu Loi, Managing Director of Con Heo Vang (left).

Joint development of extruded feed

In 2008, Guangzhou Hinter Biotechnology Co. Ltd., a bellwether of the aqua feed industry in China, collaborated with Con Heo Vang Company in Dong Thap Province, Vietnam to explore the potential of extruded snakehead feed in Vietnam. Feed formulation, processing and laboratory trials were conducted over a period of 12 months, followed by

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Feeding snakehead with extruded feed.



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another 12 months of field trials. At the end of these trials, numerous farmers in Southern Vietnam testified that the extruded feed resulted in rapid growth, lower feed conversion ratio (FCR) of 1.2:1 to 1.4:1, lower incidences of diseases, and a lower deformity ratio. This initial success in the use of extruded snakehead feed has led to its endorsement by the Vietnamese government. Subsequently, an increasing number of snakehead farmers began to replace trash fish and farm made feeds with this extruded feed.

Case studies

The following case studies of two farmers who switched to the new extruded feed show the benefits of using extruded feed for the snakehead. In Dong Thap, Gu has been farming the snakehead for the last five years. During this period, he fed the fish with trash fish and profit margins have been relatively low. In 2009, he stocked 30,000 snakehead fingerlings (400 fish/kg) in his 560 m² pond. The fish were fed extruded feed for 110 days with technical support provided by experts from Hinter and Con Heo Vang. Besides a FCR of 1.24, survival rate of 98.4%, and a harvest of 9.87 tonnes, Gu had an impressive net profit of USD 4,430.20 (VND 84,616,000 at a USD 1=VND 19,100 exchange rate). The net income was USD 7.90/m² (VND 151,100/m²) with a gross income of USD 15,948.50 (VND 304,616,000) and a total cost of USD 11,518.30 (VND 220,000,000) (Table 1). He used 12.13 tonnes of extruded feed. The minimum fish weight was 375g/fish.

Table 1. Cost comparison of snakehead farming using extruded feed in Dong Thap, Vietnam.

Parameters	Gu	Khi
Culture area (m ²)	560	600
Pond depth (m)	2.4	2.6
Size of juvenile fish (fish/kg)	400	400
Stocking density (fish/m ²)	53.6	50
FCR	1.24	1.33
Feed frequency (times/day)	2 to 3	2 to 3
Feed rate (%BW)	3 to 5	3 to 4
Water exchange frequency (times/day)	1 to 2	1 to 2
Water exchange rate (%/time)	20-40	30
Culture duration (days)	110	180
Body weight at harvest (g/fish)	375	750
Survival rate (%)	98.40	88.00
Yield (kg)	9,722	20,000
Price (USD/kg)	1.60*	2.00**
Gross income (USD)	15,948.50	40,837.70
Production cost (USD)	11,518.30	26,178.00
Net income (USD)	4,430.20	14,659.70
Unit production (kg/m ²)	17.60	33.30
Unit profit (USD/m ²)	7.90	24.40
B/C (%)	38	56

*Price was collected on 15/11/2009

**Price was collected on 10/6/2010

In May 2010, another farmer, Khi harvested 20 tonnes of snakehead from his pond after a 6-month period. As in the first case study, the fish were fed with Con Heo Vang extruded snakehead feed. The net profit was USD 14,659.70 (VND 280,000,000, Table 1). In contrast, he had a profit of USD 2,617.80 (VND 50,000,000) from the same pond when he farmed snakehead using trash fish in 2009. In comparison with Gu's farm, the larger profits were attributed to better farm management, lower incidence of diseases, larger fish size at harvest, higher unit production and higher market price.

Advantages of extruded feed

The use of extruded feeds brings with it a number of benefits to farmers and consumers as well as to the fish. The extruded feed developed by Hinter and Con Heo Vang is formulated to meet the specific nutritional requirements of the snakehead and is very different from that of trash fish as well as commercial feeds for the catfish, tilapia and climbing perch. The premix from Hinter contains peptides as attractants for the fish while the extruded feed contains a high level of marine fish meal, imported from Chile or Peru. With a protein level of 38 to 41% and a fat level of 8 to 12%, the floating extruded feed is able to meet the nutritional requirements of the snakehead. The fish can be fed at a stable feeding rate of 3-5%; however, it is also very important to wean

Table 2. A comparison between two models of snakehead culture.

Subject	Farming with trash fish	Farming with extruded feed
Culture model	Intensive farming with flowing water	
Culture site	Ponds, cages, cement pits, rivers	
Culture area (m ²)	250 to 3,000	
Pond depth (m)	2.5±0.5	
Water exchange rate (%/day)	20 to 40	
Size seed (fish/kg)	500 to 2,000	
Stocking density (fish/m ²)	50 to 100	
Body weight at harvest (g/fish)	300 to 800	
Labour	The labour needs in feed preparation and feeding of trash fish are twice as that for extruded feed	
Price of feed (USD/kg)	0.29 to 0.42	0.88 to 0.94
Feeding rate (%BW)	3 to 6	3 to 5
Culture duration (days)	110 to 180	100 to 180
FCR	4.0 to 5.0	1.2 to 1.4
Diseases	Parasitosis, hemorrhagic disease, gill erosion disease, syndrome of liver and gall, etc.	Few cases with parasitosis
Medicines	Fenbendazole, PVP-I and antibiotics	No antibiotics
Survival rate (%)	40 to 60	≥85
Production cost (USD/kg)	1.31 to 1.57	1.15 to 1.31
Unit production (kg/m ²)	8 to 12	15 to 35
Unit profit (USD/m ²)	-0.31 to 0.31	2.36 to 26.18

juvenile snakehead with a length of 3 to 6 cm onto extruded feeds before doing so.

Under similar culture models and conditions, the advantages of feeding snakehead with extruded feeds are as follows; less labour, lower FCR, less diseases, higher rate of survival, lower culture cost, higher unit yield and profits (Table 2). The previous situation of farmers with low profit margins from snakehead culture is now changing. Under the guidance of technical experts from Hinter and Con Heo Vang, banned antibiotics and other pharmaceuticals are no longer used in farming. The benefit is better consumer health.

More importantly, unlike trash or fresh fish, extruded feed do not carry pathogenic bacteria and do not contaminate the water. With extruded feed, it is easy to top dress feed with functional additives. Better bioavailability of ingredients in feed means less waste of resources and energy. The extruded feed was formulated following the dietary requirements of the species, reducing the deformity ratio to less than 5% during the culture period.

Outlook for extruded snakehead feed in Vietnam

The rich water resources in Vietnam enables natural water exchange in most ponds, which maintains oxygen concentrations and reduces electricity costs for pumping water. High yields can be expected with high culture densities and pond depths ranging from 2.5 to 5 metres. In the domestic market, the snakehead fish is very popular among the Vietnamese. There is no international pricing for this fish.

There are now approximately 1,000 ha of ponds used for snakehead farming in Vietnam. In recent years, more farmers have turned to snakehead farming following large losses in catfish farming. However,

only 15% of the production is fed with extruded feed, and about 40% of the farmers are unfamiliar with this new type of feed. Thus there is a potential for this extruded feed, not only in Vietnam but also in nearby Cambodia.



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