

## AQUAFISH ALUMNI CORNER

### RECENT GRADUATE PROFILE: KHOP NARAYAN SHRESTHA

By **Susannah L. Bodman**  
*AquaFish Innovation Lab*

I'd been more than 30 years since Khop Narayan Shrestha earned his undergraduate degree in agriculture, but something about aquaculture drew him back to school.

For Shrestha, that something was a lack of development of aquaculture in the hilly and mountainous regions of Nepal despite abundant water resources. While 94% of fishponds are found in the plains of Nepal, there is a need to promote fish farming into the country's hills and mountains, he said. Overall, aquaculture in Nepal has been gradually growing since its origins with small-scale carp production in the 1940s.

Shrestha, whose graduate studies at Nepal's Agriculture and Forestry University (AFU) were supported by AquaFish Innovation Lab for two years, is executive director of the nongovernmental organization Manahari Development Institute (MDI)-Nepal, which has been involved in promoting small-scale carp and small-indigenous-species fisheries in rural areas of Central Nepal's Makawanpur District (400 m altitude) and aquaculture using common carp in Jumla District (2,500 m altitude). As director, Shrestha focuses on the MDI's proposals, coordination with donor agencies and supervising day-to-day operations.

Through his work with MDI-Nepal, Shrestha helps to promote development of rural and high-elevation fisheries, local fish conservation, and the use of various fish species for income. This work gave him insights into the wide-reaching benefits of aquaculture.

"I came to realize then that aquaculture and fisheries could be one of the reliable interventions to support livelihoods and nutrition in the rural areas," Shrestha said.



*Photo courtesy of  
Khop Narayan Shrestha*

**Khop Narayan Shrestha, who recently earned a Master's degree from Nepal's Agriculture and Forestry University thanks to AquaFish Innovation Lab support, is director of Manahari Development Institute, which promotes small-scale fisheries in rural central Nepal.**

A native of Khoplang-9, Gorkha District, Shrestha recently defended his Master's thesis for a Master of Science degree in aquaculture at AFU and earned a Bachelor of Science degree in agriculture from Nepal's Tribhuvan University in 1982.

His graduate thesis was titled "Growth and production of carp and tilapia in polyculture at different altitudes of Nepal." Major professors were Drs. Madhav Kumar Shrestha, Dilip Kumar Jha, and Sunila Rai — all AquaFish partners at AFU.

While tilapia cultivation is expanding worldwide, Shrestha said it is not commercially cultivated in Nepal. "Farmers are less aware of its importance. They grow only carps," he said.

Most of the fishponds that do exist in the country are located in Nepal's warmer Terai plains, he said. However, most of the country's land area is covered by hills and mountains with large, untapped water resources.

So Shrestha designed his research to test the growth patterns of carp and tilapia reared in polyculture systems at higher altitudes — 300 m, 700 m, and 1,870 m. The research was conducted from June to November 2014 and involved silver, bighead, grass, and common carps as well as Nile tilapia.

What he found was that growth and production of all species decreased with increasing altitude and that common carp performed better

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than other carps in all treatments. Also, Nile tilapia came in second after common carp for growth performance at all altitudes, and tilapia and common and grass carps outperformed silver and bighead carps at higher altitudes.

"(I)t can be concluded that these three species combinations, i.e., common carp, grass carp, and Nile tilapia, are suitable for culture at higher altitudes of Nepal," Shrestha said.

Another finding that emerged was that despite declining growth and production with increasing altitude, the gross margin for carp-tilapia remained positive, indicating polyculture is feasible at higher altitudes, he said.

Since then, Shrestha and other Master's degree students at AFU conducted work with carp at 2,566 m altitude in Jumla, along with other MDI projects.

"This year, we have been able to make a successful spawning of common carp, thereby a successful hatching, probably for the first time," he said.

Next steps in Shrestha's research could involve testing growth patterns through the year to compare growth performance in colder versus warmer months of the year. Shrestha said he hopes to secure funding by next year to make the research possible.

As for the future of Nepalese aquaculture: "Fisheries and aquaculture have emerged as potentially an important sector of Nepalese agriculture. It is among the fastest growing sectors in agriculture," he said, adding that aquaculture's annual growth rate in Nepal is 8.4%.

However, challenges remain in the form of competition from a large volume of imported fish, which creates pressure that keeps domestic per-capita production low (2.3 kg).

"Thus, increasing fish productivity as well as total production in the country is a challenging task and is necessary in order to meet increasing demand for fish without increasing import from neighboring countries," Shrestha said.

Other hurdles to developing Nepal's aquaculture sector include weak transportation networks in hilly areas, making the movement of seed fish and fingerlings difficult.

"We need to develop breeding centers at least for possible species in accessible areas so that people can get the seeds/fingerlings easily. I think this cost is low compared to building larger road networks only," Shrestha said.

As for feed production, Shrestha said Nepal has enough land to cultivate feed crops and therefore feeds likely won't be a limiting factor for the aquaculture sector.

Meanwhile, Shrestha plans to continue promoting aquaculture in Nepal's hilly and mountainous regions and keep researching various species (e.g., tilapia and common carp) and sustainable technologies that could be recommended to small-scale farmers. He said, in the next five years, he'd like to be involved in the promotion and development of fish-farming technology for smallholder farmers through MDI and the nongovernmental organization sector.

He also will likely be reading AquaNews, of which he said he was a regular reader. The benefit of the publication, he said, was that he "could learn some new innovative ideas in aquaculture science that has been practiced around the globe."



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