



# Participation of Women Farmers in an On-Farm Training of Sustainable Periphyton Enhanced Carp-SIS Polyculture System



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## Background:

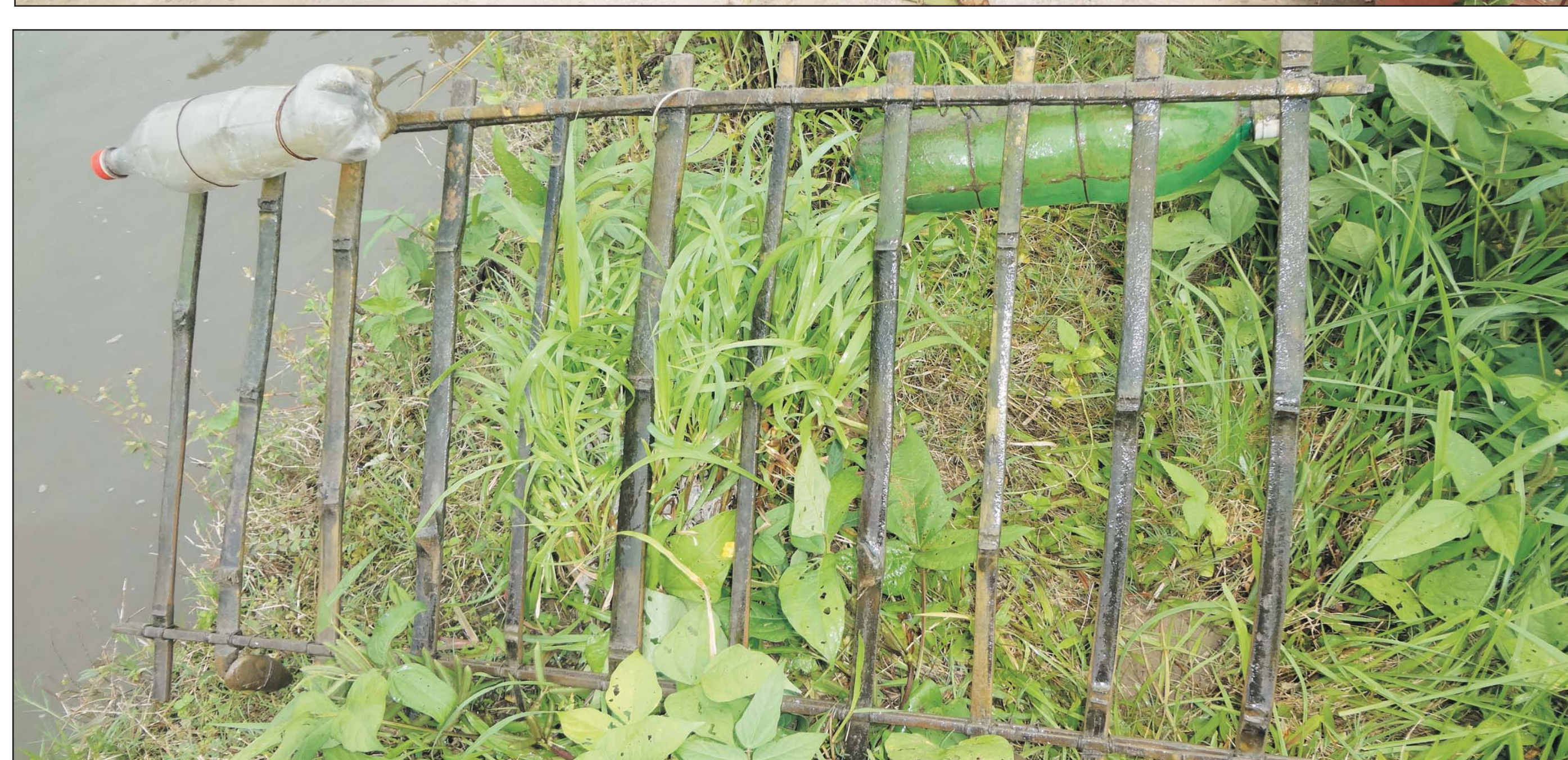
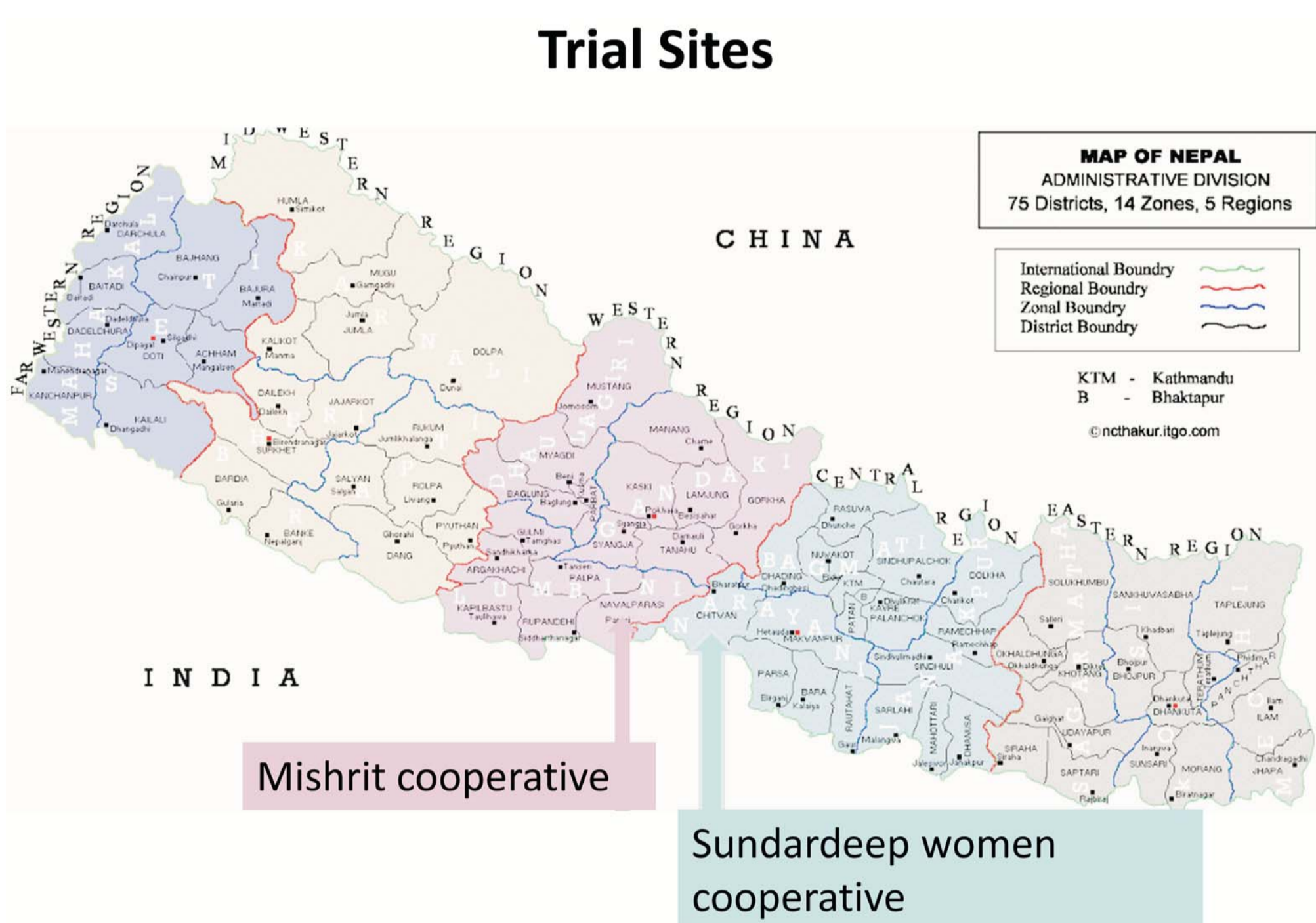
Since the combination of species and type of feed would influence the yield and income in a semi-intensive system, it is necessary to test the full combination of feed inputs, periphyton enhancement, and production to truly understand the best system to use for commercial production (Diana, 2012). Considering this fact, an experiment was carried out at Agriculture and Forestry University (AFU), Chitwan, Nepal to determine the best combination of carp, SIS, and periphyton enhancement to maximize net fish yield and profit in ponds. The best treatments obtained from the trial were extended to women farmers in 2 districts in Nepal.

## Objective

To extend a periphyton enhanced carp-SIS polyculture with reduced feeding technology to women farmers.

## Methods:

The two best treatments i) carp+100% feed and ii) carp+SIS+50% feed+bamboo substrate at 1 % of pond surface area obtained from on-station trial done at AFU were tested in household ponds of 15 women farmers from Sundardeep Women Cooperative in Chitwan and 22 women farmers from Mishrit Cooperative in Nawalparasi districts. Farmers stocked carp (rohu, silver carp, bighead carp, mrigal, common carp and grass carp) at 1500 fish per hectare and SIS (dedhuwa and pothi) 25000 fish per hectare in their ponds. Average pond size was 259 m<sup>2</sup>(145-500m<sup>2</sup>) in Chitwan and 412 m<sup>2</sup>(163-552m<sup>2</sup>) in Nawalparasi. Farmers fixed bamboo substrate in the form of mat to ponds at the rate of 1 % of pond surface area to enhance periphyton growth. Purpose of periphyton enhancement was to supplement natural food to carp and reduce feed cost. Farmers fed carp with dough of rice bran and mustard oil cake (1:1) and grass carp on banana leaves and grass every morning. The feeding rate was 3% carp biomass in ponds without substrates, and 1.5% in substrate ponds. Farmers were provided with a book to record fish that were consumed, sold, or died. Final harvest was conducted after eight months of culture in December 2015 by netting fish from ponds. Since farmers wished to keep fish for their biggest festival "Maghi" that fell on January 15, netted fish were counted, weighed, and returned to the pond.



## Workshop

Altogether 35 (7 men and 28 women) non adopters from Chitwan district received one-day training on periphyton-enhanced carp-SIS technology on 30 November 2015.

## Results

In aggregate, 84% of farmers consumed fish at home, and 41% of farmers sold carp. Carp + SIS + 50% Feed + Substrate farmers obtained 19.3% and 51.7% higher fish yield and gross margin than carp + 100% feed farmers. Farmers generally sold carp directly to neighbors in the village. Mishrit cooperative farmers sold carp at Rs. 20 higher price (Rs. 270/kg) than Sundardeep cooperative farmers (Rs. 250/kg), which is reflected in both income and profit.

**Table 1. Fish production, consumption, sale, and gross income per pond by farmers in 8 months for the two treatments in two cooperatives**

Cooperative	Treatment		Carp sold (kg/pond)	Carp consumed (kg/pond)	SIS consumed (kg/pond)	Total production* (kg/pond)	Gross Income from fish sale (Rs./pond)
Sundardeep women cooperative (n=15)	Carp+100% Feed (n=7)	Avg.	10.0	15.0	0.3	75.0	18761
		Max	60.0	35.0	2.0	150.0	37530
		Min	0.0	6.0	0.0	24.0	5974
	Carp + SIS + 50% Feed + Substrate (n=8)	Avg	31.0	23.5	2.6	109.6	27411
		Max	170.0	45.0	5.0	302.4	75598
		Min.	0.0	8.0	2.0	30.0	7510
Mishrit cooperative (n=22)	Carp+100% Feed (n=12)	Avg.	44.4	15.7	0.5	128.8	34766
		Max.	260.0	55.0	5.0	261.4	70575
		Min.	0.0	0.0	0.0	41.0	11062
	Carp + SIS + 50% Feed + Substrate (n=10)	Avg.	25.8	8.7	2.2	164.0	44290
		Max.	155.0	20.0	10.0	275.8	74454
		Min.	0.0	0.0	0.0	107.5	23055

\*Includes carp left in the pond and not consumed or sold at harvest.



## Conclusion

Periphyton enhanced Carp-SIS polyculture with 50% reduced feeding is suitable to small scale rural farmers because it is a low cost technology giving higher fish productivity compared to existing carp polyculture and supports family nutrition and income. The technology utilizes local available bamboo to enhance fish production.

## Acknowledgement

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