

P6. Study of bio-gas slurry in fish culture

Introduction

Cow dung is commonly used as a fertilizer for fishponds in India but fish production is limited to 1 500-2 000 kg/ha. These yields can, however, be more than doubled if the dung is first fed to a biogas plant and the digested slurry then used instead of the raw dung.

Methods

The following methodology for a 0.4 ha pond exemplifies the technology.

1. Prepare the pond using the urea-bleaching powder method or by draining-drying in June.
2. Stock the pond with 2 000 (5- 8 g) fingerlings of six Asiatic carps: catla, 20; rohu, 25; mrigal, 20; silver carp, 20; grass carp, 5; and common carp, 10.
3. Fertilize the pond daily with 30 litres of biogas slurry. The slurry is rich in nitrogen and phosphorus, and is free from toxic gases which are produced when cow dung decomposes in ponds. The slurry is not applied on a cloudy day or when the fish come to the surface to gulp air.
4. Surface feeders will have reached about 1 kg individual body weight in 6 months. All marketable fish are then harvested every 2 months and replenished with an equal number of fingerlings. A total of 2 000 kg of fish is obtained using biogas slurry as against 800 kg if raw cow dung is used.

Advantages

- Savings on inorganic fertilizers and feed (60 percent of operation costs)
- Environment-friendly, no oxygen demand
- Savings on fuel and electricity
- Cooking with biogas removes drudgery of women for fuelwood collection and helps in keeping the kitchen and environment clean.

Limitation

- Although widely promoted as an appropriate technique for use in aquaculture systems, there is very little evidence that biogas slurries have been used by individual households on a sustainable basis. The systems that were demonstrated were experimental. Biogas digester designs have evolved. The conventional types promoted in India were too capital intensive for adoption by poorer people. The low rates of adoption suggest that these digesters did not meet peoples' needs. Research at AIT in Bangkok, Thailand, suggests that the technical benefits from digesting waste were marginal or negative.

- The system, as described may be more useful for commercial-scale livestock farm operators intending to integrate aquaculture into their farming system.
- Experiences with biogas digester technology dissemination have been that this is a clustered technology which is best operated with several households sharing one system, to provide adequate levels and continuity of waste input. Recent developments in digester design have made simpler, very low-cost systems available. In southern Viet Nam, where these cheaper types of digesters were promoted and their adoption was monitored, the retention of the technology within aquaculture has been poor. Farmers prefer to use their livestock waste fresh.
- Additional benefits of the system will accrue to women by providing biogas for cooking.