

Prawn (Macrobrachium rosenbergii) Project:

A commercial prawn farm was initiated in Western Samoa in 1980 under the direction of FAO expert Dan Popper, with the support of the Samoan Government and FAO/UNDP. The project is at Solaua and consists of three earthen ponds in operation, with production of 850 kg ^{per year} from 182,000 Post-Larvae (Kurahake 1982) in 1982.
for the first year.

In association with the prawn farm is the hatchery at the Fisheries Division which produces around 200,000 Post Larvae a year.

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(a) Hatchery:

The Fisheries Centre recently constructed (aid from the Government of Japan) is equipped with laboratory, 1000 and 500 litre plastic tanks, 2 x 200 litre conical larval rearing tanks (bought from Noumea, laboratory equipment, running fresh and sea water, compressed air, and 4 broodstock concrete ponds.

The hatchery for the fresh water prawn (*M. rosenbergii*) at the fisheries centre is able to supply the farm at Solaua.

The initial trials to propagate the giant Malaysian prawn was successful (Gundermann and Popper 1980) using broodstock which were imported from Tahiti early in 1979 as post larvae and reared to maturity in the brackish water ponds of the Vaitoloa baitfish project (Popper 1982).

The success of the spawning experiments led to the importation of 2 control bottomed fiberglass tanks of 2000 litre each from Noumea and construction of 3 plywood rectangular settling tanks of 3000 litre each, brine shrimp hatching tanks, and 5 rectangular plywood tanks used as biological filters.

The method presently employed is the clear water high density (Bell, Albert & Schuster 1983) after that used by AQUACOP, Tahiti with continuous recirculation and sand filtration. Two-third of the rearing water (Salinity 12‰ is changed every 3-4 days using pre-filtered water from settling tanks.

The total production from these 2 x 200 litre rearing tanks is 200,000 post larvae per year. The best survival rate to metamorphosis is 40% and rearing period of 35-45 days. This is adequate to supply the 3 grow-out ponds in operation. More rearing runs, thus leading to higher production can be achieved if the farm size is increased.

(b) Grow-out Ponds:

The only prawn farm in Western Samoa is privately owned and consists of three 2900m² and one 1740m² earthen ponds but one of the 2900m² ponds is not operational.

The plan for construction of the farm was divided into four phases. Phase 1, which was completed at the end of 1980, consisted of preparing three ponds with a total area of more than 10,000m². Phase 2 was aimed at addition of three ponds of 4,890m² each while phase 3 was anticipated to consist of 8.5 acres (25,000m²) of pond (a commercial size operation) and phase 4 was to be developed gradually to a target size of 50 acres (Popper, 1982). Phase 2 has not yet come into existence.

(c) Rearing Experiments and Production:

The initial stocking of the ponds was in November 1980 with juveniles from the Fisheries and post larvae imported from AQUACOP, Tahiti (Popper 1982). Importation was discontinued in mid 1981 when the Fisheries Division Hatchery was able to meet the demand.

Initial results demonstrated very high growth rates resulting in production of more than 1000 kg from 10,000m² in less than 6 months and survival rates of over 90 percent (Popper 1982).

The ponds were again stocked in 1981 with post larvae reared at the Fisheries Centre and harvested in 1982, after 9-10 months growing period. The production in 1982 was around 1,400 lb plus more than 40 kg of mollies. Mollies (*Poecilia Mexicana*) were introduced into the ponds together with prawns with the intention of eradicating the dragon fly larvae (Zygoptera) and water beetles (Dytiscidae) through predation on the newly hatched larvae; provide nutritious live food for the prawns which would feed on the newly spawned fish, and provide an additional cash crop from the ponds (Popper 1982). This didn't work as envisaged as the molly populations was impossible to keep under control.

The feed is the chicken pellets which are locally made. Popper 1982 reported that in comparison of results and expenditures with the yields and costs of similar operations in Hawaii, annual yields in Samoa could be 150-200 percent higher and cost lower as Hawaii's high cost of operation come mainly from high labour and land costs with the need to pump water out of drilled wells. Labour in Samoa is cheap, leased land cost low and water is gravity-fed into the ponds. Thus the only two major cost components in Samoa are pond constructions and feeds.

(d) Notes on the Project:

Natural conditions of the ponds are ideal for good fresh water prawn growth.

The total production in 1982 reflects the major problems the farm is experiencing, all of which can be solved. The most serious problem is management in terms of water control (due to problems with the inlet water pipe) and inconsistent feeding resulting from failure to employ suitable personnel. Pond leakage presents yet another problem in one pond. A recently developed technique is

USSR can solve this problem which involves making a layer of pig or cow manure on the bottom and sides of the pond, then covers this with banana leaves, cut grasses or any vegetable matter and then a layer of soil is put on the top. (Chakroff, 1976)

Poly-culture of prawns with mollies (Poecilia mexicana) did not prove healthy as the molly population grew very fast and consumed most of feed given to prawns. The harvest from the pond that was stocked with mollies (together with prawns) showed low prawn production and too much mollies. The mollies were not sold but served as food for brood stock kept at the Fisheries Division.

Locating a suitable binder for the pellets given to prawns presents yet another major problem. The present feed is known to breakdown in matter of minutes in the water where as normal prawn feed usually breaks down after hours.

Expansion of ponds to a normal commercial size of 8-9 acres, with the above mentioned problems solved, will no doubt make the project a successful venture.

(e) Notes on the Present Site:

The site is located in Solana, a valley some 20 miles east of Agri, and consists of about 200 acres of gently sloping land with 4-6 ft of virgin top soil and a fresh water creek running through. (Lopper 1969). French consultants in 1978 (AQUACOP) recommended the same area for prawn farming. They estimated by gauging the river, that the magnitude of flow was about 500 l/s. This was due to the heavy rain. Assuming that the real flow at low water was 250 l/s with coefficient of capture of 70%, they obtained the available flow for aquacultural use as 157.5 l/s which is sufficient for 38.6 acres of ponds. And if the top effects were taken into account, 74.13 acres of ponds can be envisaged which corresponds to a production potential of 90 tonnes per year (Samoa Mission 1978).

The same site was also recommended by Villahy (1972) for prawn industry.