

*Research into developing farming methods for giant clams at the ICLARM Coastal Aquaculture Centre in the Solomon Islands has proceeded in parallel with a program of village-based trials. This program is an attempt to involve the envisaged recipients of the technology at a very early stage. Here, the considerations, design and initial implementation of this program from 1988 to 1990 are described. The expansion, impact and results of the program will be the subject of future publications by the scientists involved.*



Village trial site, Toa, Florida Islands  
(Photo by J. Munro)

The Solomon Islands are particularly suited to such trials as a large variety of marine habitats is available and there is great sociocultural diversity.

### Selecting Participants

The prospect of farming giant clams generated much local interest not only due to the perceived economic benefits, but also interest in the animals themselves due to their traditional prominence in diet and custom and concern about the depletion of clam stocks.

The first problem addressed was the selection of participants. A constant, albeit low, level of labor input was needed for possibly more than five years before clams reached harvest size and reasonable returns could be expected. Requiring participants to show their commitment financially was out of the question due to the unknown risks involved in clam farming, the uncertain markets and the administrative complications that could arise. Paying participants could obscure results in terms of the "appropriateness" of the technologies developed.

The focus of work at the ICLARM Coastal Aquaculture Centre (CAC) in the Solomon Islands has been the development of farming methods for giant clams (family Tridacnidae) to provide food and cash for low-income users and to reverse the trend of the larger tridacnid species towards extinction. Hatchery operations started in late 1987 and a year later the first batches of spat of the largest species (*Tridacna gigas*) were large enough to be transferred from the land-based tank system to ocean nurseries. At this size (2-3 cm) clams are still very vulnerable to predators ranging from fish to small snails and have to be kept in cages and monitored.

The aims of the village trials were: a) to assess growth and survival of juvenile clams in relation to a wide range of ecological habitats; and b) to identify suitable farming systems and husbandry techniques with particular application to small-scale village farmers in a range of social contexts.

# Participatory Research in Giant Clam Farming

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Although the trial program was not widely publicized, many verbal inquiries were received. These were reduced to a manageable number by requesting written applications. To avoid some of the bias

towards literate applicants, it was stressed that applications need not be in the applicant's own hand. A simple strategy was adopted whereby prospective participants agreed that if the operation was deemed a failure due to factors under the participant's control, the materials and clams would be returned to ICLARM; otherwise, they became the property of the participant who could count on the full support of ICLARM for a limited start-up period.

### Site Surveys

Sites proposed by applicants were surveyed to establish that they met certain minimum ecological requirements such as shelter from excessive wave action, no freshwater input, sufficient water movement and low turbidity. Other practical requirements for the trial sites were their proximity to the participant's house allowing ease of access and security against poaching.

Social factors affecting the potential trials were assessed through village meetings or discussion with chiefs and major reef owners. Factors examined were compatibility of the proposed trial with the traditional marine tenure and uses of the site, acceptability of the trial and of the participant to the community, and the traditional and current role of giant clams in that community. During these discussions the terms and conditions of the trials and their investigative nature were emphasized.

### Implementation

Participants at each selected trial site constructed a simple wire-reinforced cement cage from locally available materials supervised by ICLARM staff. Two to three hundred seed clams (about 30-40 mm long) from the CAC were given to the participant. These were placed in the cage located in the previously selected

shallow locations (wading depth) on the seabed. Diving goggles and cleaning brushes were provided where necessary. Work involved in the maintenance of the clams such as cage cleaning and predator removal was explained by ICLARM staff, who usually remained for two or more days. Participants received simple leaflets in both English and Solomon Island Pijin explaining the work involved and potential problems. A calendar was included to help maintain regularity.

Sites were visited and progress checked every 2-3 months and if appropriate, more clams and cages were introduced. Reply-paid envelopes and report forms in English and Pijin were provided which participants could use to report on progress or any problems arising. After approximately one year, participants were interviewed and completed a basic questionnaire regarding their input and future plans.

### The Village Trials

Twelve village trials were established by mid-1989 (Table 1) covering a variety of habitats.

All applicants were male although most envisaged family involvement. The initial lack of female applicants was not surprising as past experience in other projects had shown that men were almost invariably the first to try new commercial ventures. The participation of women's groups showed



Village trial participants. (Photo by H. Govan)

promise but attempts to involve them actively at this first stage were difficult to pursue vigorously without compromising the principle that applicants show sufficient commitment.

Nine trials were run by applicants with family help. Trial participants were almost all involved in subsistence agriculture and fishing. Three trials were started by groups: a youth group; church group; and a land-owners' cooperative.

All participants readily grasped the concepts involved in the cage culture of clams and were soon able to construct their own cages and make suggestions for improved designs more suitable to their own situations.

The explanatory leaflets were accepted with interest initially but after six months almost all had been mislaid or used for other purposes.

Most participants returned one or two of the reply-paid report forms. In most cases they were returned to report unusual

Table 1. Ecological and social details of the twelve village-based ocean-nursery trials in operation during 1988-1990.

Site code	Method of access to program	Participant unit	Occupation of main participant	Habitat	Water exchange/wave action/turbidity
CMB	Personal application	Family	Subsistence	Sand/sheltered bay	Low/low/low
CNG	Letter of application	Family	Subsistence	Live coral/reef flat	Low/medium/low
GGH	Letter of application	Family	Teacher	Rubble/reef flat	Fair/medium/high
GMA	Letter of application	Family	Fishing	Sand/deep channel	High/low/low
GRS	Letter of application	Land-owners Coop.	Copra	Exposed reef flat	Fair/high/low
IKI	Letter of application	Employee/Family	Politician	Reef flat/deep channel	High/low/low
ISA	Letter of application	Two individuals	Copra/fishing	Exposed reef flat	Fair/medium/low
ITA	Approached by ICLARM	Church group	-	Sheltered sea grass	Low/low/medium
MAL	Letter of application	Family	Fishing	Lagoon/sea grass	Fair/low/medium
MMN	Approached by ICLARM	Youth group	-	Sheltered reef flat	Fair/low/low
WBU	Approached by ICLARM	Individual	Copra/Subsistence	Deep passage	Fair/low/low
WTI	Letter of application	Family	Copra/farming	Lagoon/reef flat	Low/low/medium

**Table 2. Summary of results from the twelve village-based ocean-nursery trials in the Solomon Islands by 1990, observed and reported via questionnaire.**

Site code	Duration (months)	Number of cage checks/week (duration)	Clam growth/survival	Prospects envisaged by participants
CMB	> 12	0.5 (30 min)	Poor/fair	Possibly expand number of cages
CNG	14	-	Fair/bad	Trial closed due to emigration of participant
GGH	14	1 (30-60 min)	Fair/fair	Trial closed due to storm
GMA	12	2-7 (1 or more min)	Good/fair	Very keen to expand
GRS	10	-	Fair/poor	Trial closed due to storm and neglect
IKI	> 12	2-3 (30 min)	Good/fair	Keen to expand
ISA	> 12	2 (30 min)	Fair/fair	Moderately keen to expand
ITA	7	-	Poor/poor	Trial closed due to neglect
MAL	6	7 (10-15 min)	Fair/bad	Trial closed due to excessive predation
MMN	6	-	Fair/bad	Trial closed due to neglect and predation
WBU	> 12	1-2 (10 min)	Poor/fair	Wait and see before further expansion
WTI	> 12	1 (10-20 min)	Bad/good	Wait and see before further expansion

occurrences or high mortality, although some were returned as routine reports.

Participants made suggestions during the questionnaire survey about cage design, site location and husbandry techniques. Almost all regarded the work involved as easy although most performed less than the recommended three checks a week (Table 2).

Just over half the participants requested a scaling-up of the trial, although some of these trials subsequently closed. No serious reef ownership or poaching problems were expected. Women were reported to be involved by half the respondents while the rest saw potential for women's involvement.

Clam growth rates varied a great deal between sites, highest growth being achieved at sites with high water exchange, low wave action, and low turbidity. All trials achieved lower than expected survival rates, mainly due to biological courses but

often compounded by inadequate husbandry or initial experimentation with cage location and design. At least four species of previously unreported gastropod predators of clams were found and the importance of frequent monitoring (3 or more times per week) the cages was evident.

Six of the 12 trials were closed within a year. Three of these closures were due to circumstances outside the control of participants (storms, excessive predation). The remaining three closures were due to neglect caused either by the prolonged absence of key participants or confusion over the assignment and scope of responsibilities by members of groups (the three group trials failed).

Despite high mortalities in all trials, participants rarely maintained the optimum levels of monitoring. Poor growth or high mortality of clams often caused participants to lose interest.

## Conclusions

Although trials involving groups failed, they show great potential. A different approach is required, probably with greater involvement of the research staff in the internal dynamics of the groups.

The advantage of this participatory research approach was clear. In effect, twelve "mini-research stations" provided a wealth of data covering a wide range of conditions. The applicability of developing giant clam farming technology to coastal villagers in the Solomon Islands was gauged directly. The concept of giant clam farming was judged and explicitly stated by participants to be highly appropriate in this context.

The advantages for the participants are not quite clear until after three years when the clams are large enough to provide modest returns if sold or eaten. The small scale of the individual trials and the low level of labor input meant that poor performance or even failure of a trial did not represent much of a loss. The program did have an impact in terms of the conservation of clam stocks, not by restocking but by raising awareness of conservation and management issues in coastal areas.

A word of caution is appropriate. By involving the recipient at an early stage, the possibility of disappointment is high and this may adversely affect local attitudes to later projects. Without constant and clear reminders to the contrary, participants (and even researchers) may come to perceive the participatory research approach as "development" and expectations of benefits be unrealistically raised.

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**Reef flats in the lee of barrier islands formed by uplifted coral reefs in Marovo Lagoon, Solomon Islands, are suitable sites for giant clam cultivation. (Photo by J. Munro)**

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