System Cost of a Small Recirculating Tank Aquaculture System

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Enterprise Budgets

One of the most effective methods of increasing profits and reducing the risk of failure is good planning. A key planning tool for aquaculture/agriculture production is an summary or expected costs or an enterprise budget. Such budgets developed by Cooperative Extension, other agencies, or producers can serve both as a guide to recommended production practices and provide estimates of the expected production costs and returns for a prospective producer. But, for any producer, the most important budget to use in planning is the one that comes from that producer's own past records.

Recirculating tank based aquaculture systems are relatively new to the Pacific region. Presently there is only limited economic information on these systems available to potential producers. The purpose of this pamphlet is to provide information on system component and operating costs of a low input demonstration system run by the Guam Cooperative Extension. This information can serve as a guide to the development of component and operating costs for systems in the region.

Costs

Producers should understand that there are two different types of costs involved in their aquaculture operations, variable (operating or out of pocket) costs and fixed (system or capital) costs. Variable costs are those costs that can change during the production cycle. They are directly related to increases or decreases in production.

Examples of variable costs are labor, feed, electricity, packaging, marketing, and shipping costs.

Fixed costs are those expenses that do not change during a production cycle. Fixed costs remain the same, during the production period, even if production is stopped. Examples of fixed costs are tank costs, filter and other equipment costs. Fixed costs are frequently more difficult to calculate for a single production cycle because they are shared by many production cycles. For example it is difficult to decide how much of a tank's cost to allocate to a single production cycle. A basic methed of doing this is to divide the cost of the item by its expected life. Life can be in number of years or months. This gives you a cost that you can use for a production cycle. The first step in doing this is to identify the components and their costs.

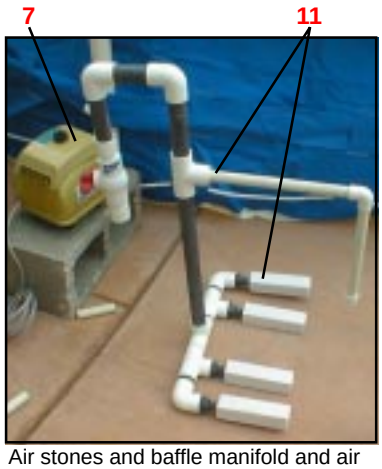
Parts used in the recirculating aquaculture system, including pool, plastic barrels for filtration tanks, air stones, pvc pipes and fittings, water pump and air pump

The System

The system consists of a culture tank, solids settlement filter, biological filter, water pump, air pump, airstones and baffle and necessary plumbing fittings and hose (Fig. 1). In looking at the cost of these systems two costs are important to a producer. The first is the total cost that is involved in setting up the system so that it is operational. The second is the portion of this cost that is charged to an individual production cycle. The expected life of the components of this system vary, from the pool liner which has the shortest life of approximately one and a half to two years to the plumbing fixtures, filters and tank that have a life of at least 5 years. It is useful to calculate the cost of the system components on a monthly basis. The calculations for this system are listed on the following page.

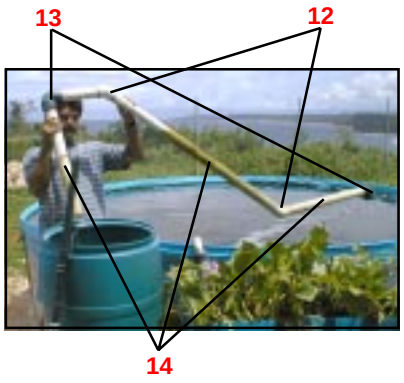
In these recirculating systems staying on top of your costs is critical for a profitable

Figure 1. Overview of recirculating tank system, showing culture tank, solids settlement filter, and biological filter.



Air stones and baffle manifold and air pump

operation. Many systems that yield high production levels may have system or operational costs that are so high a profit cannot be realized. In selecting system components it is important to consider the cost per time period in addition to the initial purchase cost. What may appear to be low cost because of a low purchase price may actually be expensive due to a short life.



Main siphon (using 2ea. 2" 45 deg. elbows; 2ea. 2" 90 deg. elbow and 2" PVC pipe) from culture tank to filter drum (solids settling tank)

System Costs for 12' Recirculating Sytem

Item	Cost	Expected Life in Months	Monthly Cost
1) Tank and Liner	$ 190.00	24	$ 7.92
2) Sand Base	$ 19.50	60	$ 0.33
3) Filter Drums (2)	$ 30.00	60	$ 0.50
4) Plexiglass Divider	$ 20.00	60	$ 0.33
5) Bio Barrels (300 sq.ft.Volume)	$ 162.66	60	$ 2.71
6) Water Pump (3.5 gal min)	$ 45.85	12	$ 3.82
7) Air Pump	$ 387.00	24	$ 16.13
8) Air Pump Repair Kit	$ 65.85	60	$ 1.10
9) Extension Cord	$ 12.00	60	$ 0.20
10) Surge Protector	$ 20.00	36	$ 0.56
11) Air Stones & Baffel	$ 115.00	60	$ 1.92
Plumbing			
12) 2 - 45 degree 2 inch elbows	$ 8.50	60	$ 0.14
13) 4 - 90 degree 2 Inch Elbows	$ 12.00	60	$ 0.20
14) 20 Feet 2 inch PVC	$ 10.00	60	$ 0.17
15) 2 inch Union Valve	$ 17.60	60	$ 0.29
16) 3 - 2 inch Caps	$ 6.60	60	$ 0.11
17) Hose 10 feet	$ 5.00	60	$ 0.08
18) Construction Labor	$ 160.00	60	$ 2.67
19) Deep Cycle Batteries (3)	$ 204.00	48	$ 4.25
20) Back Charge,	$ 325.00	60	$ 5.42
Inverter & Switch			
21) Water Test Kit	$ 189.00	24	$ 7.88
Total System Cost	$2,005.56		$ 56.70
Electricity	Kilo Watt Hr./Month		
Blower	56.88	0.13	$ 7.39
Pump	18	0.13	$ 2.34
Total Elec / Month			$ 9.73

Filter drum containing bio-barrels and submersible water pump

The information provided herein are general in nature. Additional information on aquaculture and recirculating aquaculture systems can be obtained by contacting the Guam Cooperative Extension, College of Agriculture & Life Sciences, University of Guam. Telephone numbers 735-2080/92/87 or by fax 734-5600.

• Special thanks to the AmeriCorps crew: Ted Nelson Jr., Melinda Prado, Roger Brown, Anthony Yatar, Donny Lizama, Robert Lenox, and Manny Cellaros for putting sweat equity into this system.

• Also, special thanks to James McConnell for assisting with digital graphics and A.J. Rosario & Dan De Finis of iCON Corporation for publication layout design.

• This publication was partially funded through grants under the Technology Transfer and Cooperative Development Program, USDA; the Sustainable Agriculture, Research and Education (SARE) Professional Development Program, USDA, grant No. 94-014; and the Children, Youth and Families at Risk Initiative, USDA.

AQ250 revised January 15, 1999