

Hatchery economics

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- Small-scale freshwater finfish hatcheries require low capital investment and are relatively cheap to operate, so they suit many farmers or investors with limited capital.
- The following economic analysis is based on one simple freshwater hatchery system.

Economic assumptions

The capital required for initial investment and annual operating costs estimated for the first year's operation.

- ? production cycles per annum (each culture cycle ?? days)
- ? full time workers employed
- ? broodstock ponds
- ? spawning tank
- ? egg hatching tanks
- ? larval rearing tanks
- depreciation rate is ?% per annum (20%)
- interest rate from the bank is ??% per year
- Production per year of ??????? Hatched larvae
- Hatched larvae price is Dong ?? Each
- Production per year of ??????? fry
- Fry price is Dong ?? Each
- cash for capital investment is borrowed from the bank in full
- the standard lease/rental fee for the hatchery land is 10% of net annual sales.

Calculations

To assess the various components of starting and operating a small-scale fish hatchery, the economic analysis is split into:

- Capital Investment,
- Operating Expenses,
- Non-operating Expenses,
- Profit and Loss.
- Profitability measures

Capital Investment

- Capital investment involves all the expenses on the construction and infrastructure for the hatchery.
- The cost items generally have a life span longer than one year, and they are used to generate income for the hatchery.
- These include
 - Buildings
 - Ponds and tanks
 - Infrastructure (electricity, telephone, roads)
 - Piping, drains
 - Large equipment (pumps, blowers, etc)
 - Small equipment (weighing scales, etc)
 - Vehicles

Capital Investment

Capital Investment Items	Dong
Roofed building	
Tanks, spawning tank, egg hatching jars, fry and nursery tanks	
Pumps	
Power installation	
Emergency generator set	
Air blowers – 1000 watt	
Water filtration and treatment	
Egg recirculation system	
PVC piping	
Miscellaneous	
Total Costs	

Operating Expenses

- This component is for the expenses that are generated during each production cycle and are essential for the routine operation of the hatchery.
- The items included in this component are:
 - Broodstock feeds
 - fertilised eggs (from a larger hatchery)
 - Starter feeds electricity
 - workers salaries
 - land lease costs
 - miscellaneous (e.g. fertilisers, chemicals, accessories, etc.,)

Operating Expenses

Operational expenses	Dong
Broodstock feeds	
starter feeds	
electricity	
workers salaries	
land lease/rent costs	
miscellaneous (e.g. fertilisers, chemicals, accessories, etc.)	
Maintenance (3% of capital cost)	
Total Costs	

Non operating expenses

- The expenses classified under this component do not directly relate to day-to-day operating expenses but rather they are related to the capital cost and investment write-off.
- There are two items under this component for small-scale hatcheries:
 - depreciation
 - interest rate expenses

Income

Income	Dong
hatched larvae	
fry	
Total annual revenue	

Profit and loss

- Profit and loss consists of the income generated from sales of hatched larvae or seed minus all the operating and non-operating expenses.

Profit (or loss)	Dong
Income	
Annual cost	
Annual profit (income - annual cost)	
Non operating expenses	
Profit (or loss) after depreciation	

Profitability Measures

- Payback Period
- Internal Rate of Return (IRR)
- Equivalent Annual Return

Payback Period

- Payback period is the time required for the investor to payback his original investment made.
- It is a measure of how attractive project is for making an investment.
- The project with the shortest payback period is preferred.

Payback Period (PP)

- Payback period =
- (Capital Investment / Profit)
- (50,000,000 / 20,000,000)

For example:

- Payback Period = (50 million / 20 million)
- = 2.5 years

This assumes that the hatchery operation is running smoothly and the price of the fingerlings and cost of expenses remain stable during this period.

Payback period

To be able to understand the return on investment, we can use Payback Period to measure how rapidly the small-scale hatchery can provide a return to the farmers or investors.

	Dong
Payback period	
Capital investment	
Profit	
Payback period (years)	

Internal Rate of Return (IRR)

- The discount rate at which the project has an NPV of zero is called the internal rate of return.
- The IRR represents the maximum rate of interest that could be paid on all capital invested in the project.
- If all funds were borrowed, and interest charged at the IRR, the borrower would break even, that is, recover the capital invested in the project.

Equivalent Annual Return

- The NPV is the difference between the present value of cash inflows and the present value of cash outflows over the life of the project. If the NPV is positive the project is likely to be profitable.
- When the NPV is converted to a yearly figure it becomes annualised.
- In this report the annualised return is called the equivalent annual return.
- It is a measure of annual profit after deducting capital, operating and labour costs generated over the life of the project expressed in today's dollars.