



Economic considerations in introducing integrated agriculture-aquaculture technology

by Mahfuzuddin Ahmed and Mary Ann P. Bimbao

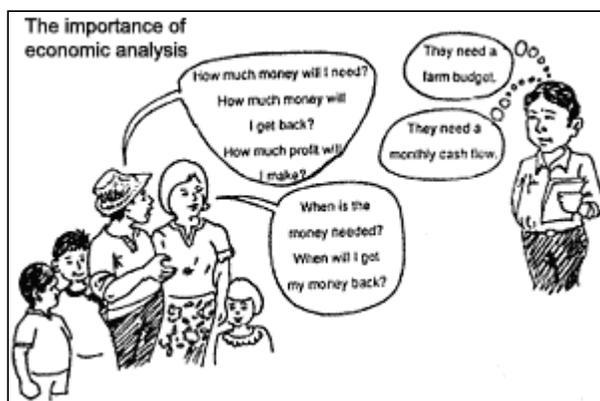
How to make your farm budget

First, make a cost sheet.

- List the things that are required for you to use the technology.
- Write down how much is needed, its price and the amount paid.
- Add all amounts paid to find out the total costs.

Second, make an *income sheet*.

- List all the products from the technology that were sold.
- Write down how much is sold, at what price and the amount received.
- Add all amounts received to find out the total income.
- Third, work out your *balance or profit sheet*.
- Write down the total income received from the technology.
- Write down the total costs that were required in doing the technology.
- Subtract the total amount paid for you to use the technology from the total amount received from the sales of the technology.



BALANCE OR PROFIT SHEET	
Total income	₱ 17,250
Total cost	- 3,170
Profit	₱ 14,080

COSTS SHEET	
Rice seeds (100kg at ₱ 6.20/kg)	₱ 620
Fingerlings (5,000 pcs. at ₱ 0.20/pc)	1,000
Inorganic fertilizer (2 sacks at ₱ 320/sack)	640
Rice bran (2 sacks at ₱ 55/sack)	110
Plowing and harrowing (4 man-days at ₱ 80/day)	320
Transplanting (2 man-days at ₱ 80/day)	160
Total costs = ₱ 3,170	

INCOME SHEET	
Rice (3,000kg at ₱ 4.00/kg)	12,000
Fish (150kg at ₱ 35.00/kg)	5,250
TOTAL INCOME = ₱ 17,250	

How to make your monthly cash flow

Cash outflow

- Work out your cash outflows. Note down the activities of the technology that required money and the cost involved and write these on the lower part of the calendar.
- Under January, the first month of the technology, record plowing and harrowing where hired labourers were paid P320 for four days. Record also the purchase of rice seeds, which cost P620.

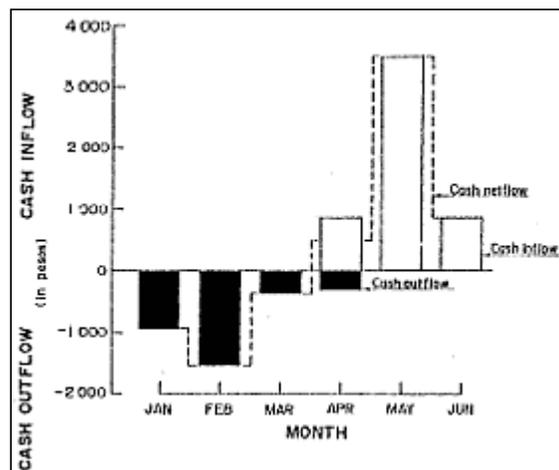
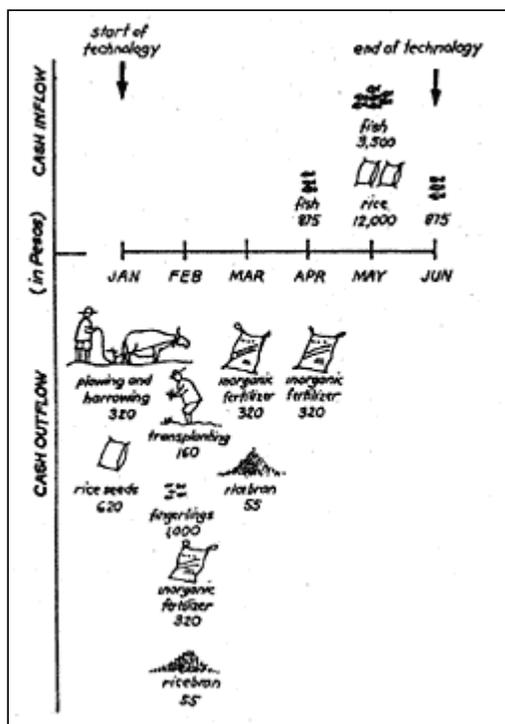
- For the second month of the technology, record transplanting activities, which required P160 as wage for hired labourers. Also, record the purchases and money paid for fingerlings, rice bran and inorganic fertilizer.
- Repeat recording on the calendar the activities of the technology that needed money and the amount paid for the succeeding months.

Cash inflow

- Work out your cash inflows. Note the products sold and the money received from these sales and write these on the upper part of the calendar.
- In April, the fourth month of the technology, 25 kg of fish were sold for P875.
- In May, 3 000 kg of rice were sold for P12 000 and 100 kg of fish for P3 500.
- Smaller fish were kept in the pond for further growout. A total fish harvest was done in June and 25 kg of fish were sold, getting P875 in receipts.

Cash netflow

- The previous illustration of activities of the technology and the cash flows can be summarized by: (1) adding all money required to do the technology in a particular month to get the total monthly cash outflow; and (2) adding all the money received from the sales of the product of the technology in a particular month to get the total monthly cash inflow.
- Draw another calendar showing each month included in the previous calendar.
- Plot the total cash outflow by month on the lower part of the calendar.
- Plot the total cash inflow by month on the upper part of the calendar.
- The cash netflow is computed by subtracting the cash outflow from the cash inflow.
- A negative cash netflow, particularly the case in the first few months of the technology, means that the farmer spends money to buy and pay for things that are required by the technology. If he starts getting cash inflows, a negative cash netflow implies that more cash is required to pay for the technology than what is received from the sales of his products.
- A positive cash netflow implies that the farmer receives money from the sales of the products of the technology. When there are cash inflows and cash outflows in a particular month, a positive cash netflow means that the farmer receives more cash from the sales of his farm products which are able to pay for the farm expenses at that particular month.



Other economic considerations

- The farmer may have several alternatives in using his resources such as labour, land or cash capital as shown in the diagrams below.
- Before adopting a new technology (for example, rice-fish farming), the farmer would like to know whether using his resources for rice-fish farming would give him better income than investing these in other alternative income-generating activities.
- When the farmer has alternative uses for his resources, he should choose the activities that will generate more income from using his resources.

Opportunity costs

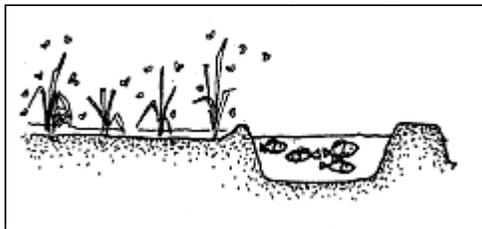
The opportunity cost of a resource (for example, labour, land or cash capital) is the value of the best alternative use of that particular resource. A new technology is worth adopting if the income earned from the use of the farmer's resources is greater than the opportunity cost (or what could have been earned) in other activities.

For example, a farmer's wife spends more time in the farm feeding the fish with rice bran and cleaning the dikes instead of cooking at home for the family. Children also help in the farm chores, thus spend less time studying school lessons.



Risks and market

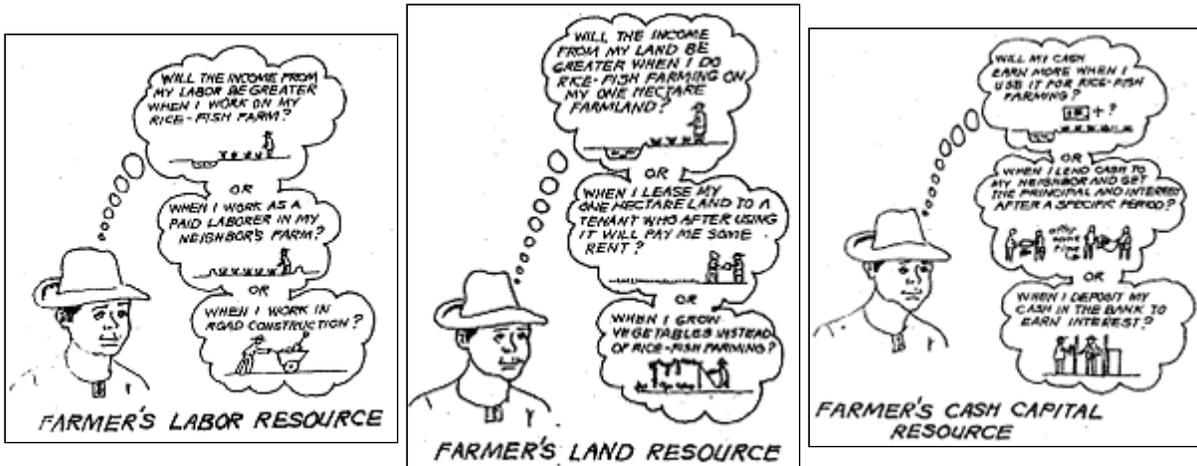
- Is the produce from the technology meant for household and local consumptions or for export?
- How diversified will the farm operations become when the new component technology is adopted? Will it increase/reduce risks in crop failure?
- Will the products of new technology be subjected to high degree of price uncertainty because of unstable market? How sensitive is the net return to changes in input costs and output prices?



Heavy insect /disease damage to the rice crop will result in poor yields. Income from rice may not even be enough to recover farm expenses. However, as the fish are kept safe in the pond refuge, sales from them relieve this situation.

Equity/income distribution

Is it going to place significant demand for labour time from family members? Who will meet such labour demand? What is the opportunity cost of additional labour hours in terms of leisure, children's schooling, household work by female labour force, etc.?



Issues for further consideration

Aside from the «cash» orientation of the example presented here, other types of assets are used or gained through the adoption of fish culture. For farmers, of further importance are the resources saved by integration of fish with livestock, i.e. savings for feed, labour, etc., or gains to livestock or crops by introducing fish. For example, this can mean that the pond's capital cost is shared in terms of an irrigation supply for vegetables and drinking water for livestock.

In terms of livelihood options for small-scale households, how can they assess what alternative ways are there to improve family income and nutrition with minimum possible investment, least dependency on purchased inputs and lowest risk? Proposed farming options need to consider these fundamental issues.

