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IMPACT OF INFORMATION TECHNOLOGY MANAGEMENT PROCESSES ON FISH FARMING

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Abstract. The information technology progress is an important factor that helps the electronic transactions, including the commercial ones, to evolve as quickly as possible. In a few years the facilities offered by information technology revolutionised management, trade, health, education and public administration. That is why may be considered that information technology could bring major changes in the evolution of agribusiness by opening new markets and reducing administration costs. The management information system for aquaculture activities provide a financial planning and analysis tool. The software can also be of assistance to land-based farmers who want to more thoroughly utilise their water resources by developing small-scale fish farm systems to provide supplementary income. Informational model has been enhanced to produce a comprehensive software package for aquaculture feasibility modelling, financial planning, sales and harvesting planning and management information tools.

Keywords: aquaculture resources, bussines plan, informational system, financial instrument for aquaculture activities, farm model, cash flow, performance and profitability measures, feed conversion rate (FCR).

AIMS AND BACKGROUND

The information technology progress was an important factor that helps the electronic transactions. In a few years the facilities offered by information technology revolutionised trade, health, education, management and public administration. That is why may be considered that information technology could bring major changes in the evolution of agribusiness.

Fisheries and aquaculture can provide a key contribution to food security and poverty alleviation. Productivity gains in fisheries do not always imply long-term increases in supply. In fact, in wild capture fisheries such gains can ultimately lead to the demise of stocks and reduced production.

Informational system provides the currently operating fish farmer and the potential new investor with critical information that will allow the user to model expected cash flows and associated profitability ratios and indices for a particular sized operation farming a particular species of fish.

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Fisheries management efforts are increasingly complicated by the impacts of a diversity of other activities – such as urbanisation, shipping, tourism, deforestation and industrial wastes – on the heavily interdependent elements of the aquatic environment. There is growing recognition that principles, policies and mechanisms for identifying and prioritising the uses of aquatic areas must be put in place so that the impacts of other sectors activities on fisheries can be addressed. The need to implement ecosystem-based fisheries management is also being emphasised.

Both in inland and marine fisheries, the pressures of intensified use, combined with other sectors intensified use of areas in which fisheries occur, are slowly but surely refocusing fisheries management on ways of allocating limited fisheries resources among growing numbers of stakeholders.

There is growing recognition that overfished resources can not serve as social security nets or food sources without creating civil strife over who can gain access to, and consume, the remaining fish and that overfished resources can not be used as a platform from which to promote the ongoing support of profitable industrial fleets. Conflicts and conflict management are becoming key elements of fisheries legislation and management rapidly expands to accommodate social, economic and environmental considerations.

In short, the demands of fisheries management has grown beyond the need to address purely biological issues, and must now address and attempt to resolve an array of social concerns and multiple-use issues. As a result, there is an urgent need to reconsider the use of many of the management approaches that have been used to date.

Current management is a steadily growing collective will in the international community of politicians and civil society to recognise and support the key role that fisheries play in economic development, food security, poverty alleviation and human health.

At present, in part because the incentives generated by many regulatory controls are not being considerate, fisheries management efforts regarding overcapacity are primarily concentrating on measuring, coping with and reducing it. Although such efforts are much needed, more emphasis should be placed on management strategies that prevent the initial development of overcapacitiy, thus avoiding the difficult and socially disruptive consequences of trying to reduce it.

Informational model is a financial planning, harvesting and sales management tool, which enables a person to plan his investment and determine the size of his commitment before he begins, taking the risk out of his investment. It allows to develop and evaluate sustainable aquaculture systems and management practices both at an operational and strategic level.

The bio-economic model used can be classified as a non-optimising budget simulation which uses the growth, and feed conversion rate (FCR) and mortality characteristics of a particular species and cash and accounting principles to arrive

at performance and profitability measures. Various scenarios (including farm size, species characteristics, harvesting and sales strategies) using different bio-economic inputs (including risk) can be compared and contrasted.

The system can determine potential profitability of the farm as investment levels and other key performance indicators vary. One can see how critical movements in the key elements of fish farming can affect the performance of his farm, enabling him to determine the amount of production required in relation to cost. Relevant data such as fish growth and mortality statistics are used to calculate key performance and profitability indicators.

The farm model is a 10-year account of the farm enterprise calculated from the various bio-economic inputs and the species characteristics. The software assumes that capital is purchased in year 0 and that the revenue streams begin in year 1, depending on the time taken for final grow-out.

The fish farm account assumes that once costs (except those costs associated with biomass such as feed, electricity, and product insurance) have been set in year 1, they remain the same throughout the 10-year cycle. The fish farm account therefore presents what is *expected* from the parameters. The farm is set up using a particular set of data relating to a particular species. These data include: cohort growth to final grow-out, mortality, FCR, recovery rates from fish[1].

This module shows the critical variables which affect production and financial performance of a person farm. The critical bio-economic data that interacts with the feasibility results includes data associated with the size of the farm and other crucial assumptions which impact on the feasibility of an aquaculture venture. These data items include:

• *Fingerling price*: This price is either taken from commercial reality or calculated from on-farm nursery costs associated with raising a fingerling to a certain size (RON);

• *Number of fingerlings*: The number of fingerlings for each stocking (1 to 12 times per year) will determine the size of the farm and the revenue generated from product sold;

• *Initial weight of fish*: This will determine what part of the growth table will be used to start the fish farm operating;

• *Feed price*: This is an average price of feed per kg over the grow-out period of the fish;

• *Stocking density* (*initial grow*): This is described in kg per m^3;

• *Stocking density* (*final grow*): This is described in kg per m^3;

• *Production sold live*: The proportion of fish production sold live;

• *Production sold HOGG*: The proportion of fish product sold HOGG (head on, gutted and gilled);

• *Production sold fillet*: The proportion of fish product sold filleted;

• *Price of fish*: The farm gate sale price (RON) of fish product (live, HOGG and filleted).

RESULTS AND DISCUSSION

The informational system feasibility results include the following performance measurements: internal rate of return, benefit cost ratio, profit margin, assets turnover, return on total assets, debt to equity, leverage return, return on equity, contribution to overheads, cost per kg (variable and total), harvesting strategy and cashflow[2].

The cash flow statement shows the calculated closing cash balance over the 10-year cycle. This balance is assumed to be reported as cash in hand after each period, and can be used to reduce debt faster, buy more capital equipment or place in special savings portfolios such as a superannuation fund[3].

The financial ratios module details the assets and liabilities over each of the 10 years. By inserting the year number at the top of the screen, the accounts will change depending on the depreciation and liabilities. The financial ratios calculated from this are: profit margin, asset turnover, equity, return on total assets, debt to equity ratio, leverage return, return on equity[4].

Profit planning module is included to assist the farmer in determining what volume (sales) is required to attain a particular gross profit. Fixed cost module is included to assist the farmer in determining the amount of additional sales required to cover an addition to fixed costs (e.g. a new pump). Variable cost module has been included to determine the impact of expected inflation and its impact on variable cost[5].

The Profitability linkage model is a screen which shows how return on equity (ROE) is calculated. The calculations take into account the following data from the various accounts: net income, total assets, total liabilities, equity, return on total assets, debt to equity ratio, leverage return.

Informational system produces a general report which summaries the farm scenario outlined in the assumptions laid down. Reports and graphics include: consolidated report, bio-economic variables, profit and loss account, financial ratios (assets and liabilities), trading results, cash flow account, internal rate of return analysis, volume cost analysis, profitability linkage model (return on equity), capital start up payback period bar chart, current costs pie chart, fish tonnage chart.

CONCLUSIONS

Fisheries and aquaculture can be developed in a sustainable manner to generate food and jobs and improve the income and livelihoods of rural and urban populations, thus alleviating hunger and poverty.

The engine for economically resilient and sustainable fisheries and aquaculture is the government will and resolve to establish sound policies to support and develop the sector.

The fisheries and aquaculture policies represent a component of rural development policies. The fisheries and aquaculture activites offer the perspective of multisectorial development in rural areas.

The informational model of business plan represents that an engine for economically resilient and sustainable fisheries and aquaculture is the government will and resolve to establish sound policies to support and develop the sector. The informational model allowed to analyse the influence of production system inputs to the farm yield and cost[5].

The input of fish farm production system (fingerlings, feed, water, etc.) determines yield and cost both in a direct and indirect way. When an input is used more intensively (for example, when more fish are stocked per ha) yield may raise enough to offset the increase in cost, resulting in a more profitable farm. As production intensity increases, however, the greater use of an input, such as feed, can have an indirect and negative effect on yield via changes in pond water quality. This can result in a lower yield and higher cost per kg harvested, reducing profit to the farm.

Full employment of productive factors, including human resources, continuous improvements in the legal and regulatory framework for the development of the sector, and scientific breakthroughs in production technologies will strengthen aquaculture and ensure its sustainability. There by making it a good contributor to the country overall economic growth through the supply of food, employment and foreign exchange and the creation of infrastructure, especially in rural areas.

The aquaculture represents a component of rural development policies. The aquaculture activites offers the perspective of multisectorial development in rural areas.

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