Entrepreneurial Management in Intensive Beekeeping

Constanta Laura AUGUSTIN, "Dunărea de Jos" University of Galaţi, Romania,
zugravulaura@yahoo.com

Maria Magdalena TUREK RAHOVEANU, "Dunărea de Jos" University of Galaţi, Romania,
mturek2003@yahoo.com

Daniela Ecaterina ZECA"Dunărea de Jos" University of Galaţi, Romania,
daniela.zeca@ugal.ro

Gheorghe Adrian ZUGRAVU, "Dunărea de Jos" University of Galaţi, Romania,
zugravuadrian@yahoo.com

Abstract

The aim of the paper is to present a model of informational system for intensive beekeeping activities, to provide a financial planning and analysis tool. The software can also be of assistance to land-based farmers who want to more thoroughly utilize their resources by developing small-scale intensive beekeeping systems to provide supplementary income. Informational model has been enhanced to produce a comprehensive software package for intensive beekeeping feasibility modeling, financial planning, sales and harvesting planning and management information tools.

Keyword: intensive beekeeping resources, bussines plan, informational system

Introduction

The objective of this article is to present an informational model of the business plan for intensive beekeeping activities. Policy-makers and development agents are increasingly viewing intensive beekeeping as an integral component of the search for global food security and economic development.

"Optimal foraging" theory claimsthat any animal that forages in an optimal way, or nearly so, maximizes its fitness (MacArthur and Pianka, 1966; Charnov, 1976). Thus, bees are expected to collect the maximal possible amount of nectar and pollen with minimal allocation of time and energy (Pyke et al., 1977; Pyke, 1978; Pyke, 1985; Pleasants and Zimmerman, 1979; Bertsch, 1987; Real and Rathcke, 1988). This holds in an ideal situation when a bee is foraging by itself with no constraints or other co-occurring activities such as mate searching, predator avoidance, or competition. In the presence of a superior competitor, when resources are limited, the inferior one is expected to change its foraging pattern in a way that will minimize the competition (Forup and Memmot, 2005). This can lead to a spatial shift to another food resource, or to a temporal shift, namely foraging on the same resource but at times when the superior competitor is less active (Parrish and Bazzaz, 1979; Carothers and Jaksić, 1984).

Lophantus Anisatus, which is native to Asia, it is a special bee plant, being quoted by American specialists in the first 4 honey plants in the world. Besides the melliferous characteristics, Lophantus Anisatus is also a medicinal herb, considering its therapeutic and calming properties. The aroma of the plant is a woven one, between anise and fennel, a flavor that gives it uniqueness and distinction. The flower of Lophantus Anisatus blooms for a long period of time, about 5-6 months, from June until the coming of frost that is October to November. In the second year of development it blooms even 10-15 days earlier. This characteristics has been specifically designed for intensive beekeeping technology.
Informational system provides the currently operating intensive beekeeping and the potential of the critical information that will allow the user to model expected cash flows and associated profitability ratios and indices for a particular sized operation species of bee.

The informational system has built into its program the ability to enter risk aversion details in order to more adequately depict the learning curve situation that new entrants experience at the beginning, and also build into the ten year production cycle the one in ten year production short fall that normally occurs in farm production due to unforeseen circumstances. As a result the ten year cash flow stream will more adequately depict reality by accounting for risk.

The intensive beekeeping informational system will be able to answer the following critical questions in relation to investment decisions or ongoing financial management of an intensive beekeeping operation:

• How much do I have to invest to attain a certain cash flow stream?
• What will be the return on that investment?
• How much will I have to borrow?
• What is the minimum sale price that can be accepted for the product?
• What is the profit margin?
• How much do I have to increase production by to maintain profit levels if sale prices fluctuate?
• Which harvesting and sales strategy maximizes cash-flow?
• How is profit affected by a learning curve?
• What is the current equity position?

Informational model is a financial planning, harvesting and sales management tool, which enables you to plan your investment and determine the size of your commitment before you begin, taking the risk out of your investment. It allows developing and evaluating sustainable intensive beekeeping systems and management practices at both an operational and strategic level.

The system can determine potential profitability of the farm as investment levels and other key performance indicators vary. You can see how critical movements in the key elements of intensive beekeeping can affect the performance of your farm, enabling you to determine the amount of production required in relation to cost. Relevant data such as bee growth and mortality statistics are used to calculate key performance and profitability indicators. Other key data information includes:

• Sale price of honey;
• Type of product (live or processed);
• Loan size and costs;
• Risk aversion (production assumptions incorporating learning curves);

The software provides easy-to-read accounts, giving you a concise summary of your farm's potential. You can see how critical movements in this key data can affect the performance and profitability of your farm, and demonstrate the feasibility of investing in this exciting new industry.
The software package is delineated into eight major modules, each capable of producing custom-built reports for business plan development and on-going farm financial management and monitoring. The modules include the following areas of Accounts:

• *General Report,* brings major variables together to allow scenario mapping;
• *Bio-economic Variables*, includes all the variables necessary to develop a intensive beekeeping;
• Intensive beekeeping *Model Accounts,* over a ten year period;
• *Internal Rate of Return Analysis;*
• *Cash Flow Statement,* describes opening and closing cash balance;
• *Key Financial Ratios, p*roduces accounts to calculate critical financial and profitability ratios;
• *Volume Cost Analysis, p*roduces fixed and variable cost accounts for volume planning;
• *Harvesting and Sales Strategy, p*roduces annual harvesting by product type;
• *Charts,* produces a series of charts and diagrams.

The Intensive Beekeeping Model

The farm model is a ten 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 intensive beekeeping account assumes that once costs have been set in year 1, they remain the same throughout the ten year cycle. The intensive beekeeping 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. This data includes:

• Cohort growth to final grow-out;
• Mortality;
• Recovery rates from bee.
This module shows the critical variables which affect production and financial performance of your farm. 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 Kilo (variable and total);
• Harvesting Strategy and Cashflow[1].

Intensive Beekeeping Feasibility Results

The **Intensive beekeeping Feasibility Results** are key profitability ratios and indices that have been calculated from reports and tables attached to the program. These include the following:

• ***Net Present Value (NPV):*** This is the discounted value of the ten year cash-flow stream. The NPV will depend on the discount rate (which is entered in the bio-economic variables input table); the value is usually equal to the current rate of interest.

• ***Internal Rate of Return[2]:*** The Internal Rate of Return (IRR) is the discount rate that equates the present value of net cash flows with the initial outlay. It is the highest rate of interest an investor could afford to pay, without losing money, if all of the funds to finance the investment were borrowed, and the loan was repaid by application of the cash proceeds as they were earned. Conventional projects involve an initial outlay followed by a series of positive cash flows. In this case, if the IRR is higher than the required rate of return then the NPV is positive.

• ***Benefit Cost Ratio***: Instead of showing the NPV as an absolute amount, the benefit cost ratio relates the present value of cash flows to the initial outlay. If the ratio (sometimes called the profitability index) is greater than one, then the project is acceptable.

• ***Profit Margin (PM)***: Profit Margin is the sales return *before* interest. The Profit Margin is equal to the Net Income (NI) before interest {NI + after tax interest expense (ATI)} (averaged over 10 years) *divided* Revenue (averaged over 10 years). This ratio indicates the percentage of sales revenue that ends up as income. It is a useful measure of performance and gives some indication of pricing strategy or competitive intensity.

• ***Asset Turnover (AT)*:** The Asset Turnover is equal to Revenue divided Total Assets (applicable to the year of the ten year production cycle). This ratio relates to the farm's dollar sales volume to its size, thereby

answering the question, "How much volume is associated with a dollar of assets?". This ratio tends to move in the opposite direction to the Profit Margin. Companies with high turnover tend to have low margins, and those with low turnover tend to have high margins.

• ***Return on Total Assets (ROTA)***: This is the operating return, which indicates the company's ability to make a return on its assets *before* interest costs. ROTA equals Profit Margin (PM) times Asset Turnover (AT).

• ***Debt to Equity Ratio (DER):*** This relates ratio reveals the extent of debt that is part of the venture's financing. The ratio equals Liabilities *divided* by Equity (Owners investment contribution plus the value of assets already owned that are used for the venture plus retained earnings).

• ***Leverage Return***: Measure the relationship between borrowings and equity. Financial leverage is measured by the Debt to Equity Ratio *times* {Return on Total Assets (ROTA) *minus* the Average Interest Rate after Tax (IN)}. The Average Interest Rate After Tax (IN) is equal to the After-tax Interest Rate Expense (ATI) *divided* by Liabilities.

• ***Return on Equity*** **(ROE)**: This is equal to Return on Total Assets *plus* Leverage Return. The company's return is made up of returns from operations and from borrowed funds. If there is a positive difference between the operating return and the cost of borrowing, a company may take advantage of this difference via using leverage to enhance its returns by borrowing relative to the owner's equity base.

• ***Hasegawa Index***: The Hasegawa index is a convenient way to obtain an indication of the profitability of an intensive beekeeping venture (given that detailed economic data may not be available). This index compares the *ratio* of the selling price and the price of feed to the *ratio* of the conversion ratio and the ratio of feed cost to total costs.

• ***Contribution to Overhead (CTO)***: CTO is the portion of revenue from each unit of sale that remains after variable costs are covered.

• ***Cost per Kilo***: The cost per kilo of bee is equal to current costs (minus depreciation) divided by total production (tones).

Cash Flow Statement[3]

The Cash Flow Statement shows the calculated Closing Cash Balance over the ten 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

Financial Ratios Module

This module details the Assets and Liabilities over each of the ten years. By inserting the Year number at the top of the screen, the accounts will change depending on the depreciation and liabilities.
Equity is calculated by subtracting total liabilities from total assets. It is calculated in the profit linkage model in a different way to show how the accounts interact.

Trading Results

The Trading Results Report summarizes the Assets/Liabilities and the resulting (Loss/Surplus) or equity and the trading results. This module is used to calculate the Cash Available for Debt Service (CAFDS) Ratio, which is used by financial institutions to determine the capacity of a proposed business to cover loan repayments. Financial institutions have certain performance measures that are used to determine the eligibility for a financial loan. For example, a bank may require that the minimum interest cover is a CAFDS which is twice the amount of an interest repayment. Equity is defined as the owner's capital investment for setup capital costs and the value of any assets contributed to the venture[4].

Volume Cost Analysis

This system module shows a breakdown of Fixed and Variable Costs and calculates the following major indicators:

• Contribution to overheads
• Breakeven Volume

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.

Conclusions

The intensive beekeeping 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. Developing an accurate and practical tool to predict plant and bee growth and monitor nutrient concentrations in water, will improve the adoption and implementation small or commercial scale of aquaponic systems as urban farming or as a business model for household food security.

The informational model of business plan represent an engine for economically resilient and sustainable intensive beekeeping is the government's will and resolves to establish sound policies to support and develop the sector. The informational model allowed to analysis the influence of production system inputs to the farm yield and cost.

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 intensive beekeeping and ensure its sustainability.

The intensive beekeeping represent a component of rural development policies. The intensive beekeeping activites offers the perspective of multisectorial development in rural areas.

References

Bertsch, A. (1987), Flowers as food sources and the cost of outcrossing. Ecol. Stud. 61: 277–293.
Carothers, J.H., Jaksić, F.M. (1984), Time as a niche difference: the role of interference competition. Oikos 42: 403–406.
Charnov, E.L. (1976), Optimal foraging, the marginal value theorem. Theor. Popul. Biol. 9: 129–36.
Forup, M.L., Memmott, J. (2005), The relationship between the abundances of bumblebees and honeybees in a native habitat. Ecol. Entomol. 30: 47–57.
MacArthur, R.H., Pianka, E.R. (1966), On optimal use of a patchy environment. Am. Nat. 100: 603–608.
Parrish, J.A.D., Bazzaz, F.A. (1979), Difference in pollination niche relationships in early and late successional plant communities. Ecology 60: 597–610.
Pleasants, J.M., Zimerman, M. (1979), Patchiness in the dispersion of nectar recourses: evidence for hot and cold spot. Oecologia 41: 283–288.
Pyke, G.H. (1978), Optimal foraging: movement patterns of bumblebees between inflorescences. Theor. Popul. Biol. 13: 72–98.
Pyke, G.H., Balzer, L. (1985), The effects of introduced honey bee on Australian native bees. New South Wales National Parks Wildlife Service Occasional Papers, 7 pp.
Pyke, G.H., Pulliam, H.R., Charnov E.L. (1977), Optimal foraging: a selective review of theory and tests. Q. Rev. Biol. 52: 137–154.
Real, L.A., Rathcke, B. (1988), Patterns of individual variability in floral resources. Ecology 69: 728–735.