

An Assessment of REP's Apiculture Program and
Methods For Future Research

J. Michael Pierce

Executive Summary

The Rural Enterprise Project's apiculture program is at an important juncture in its progression toward becoming a full scale RDP program. REP's goal is to develop businesses that can eventually be implemented across all of the RDP branches. After a full investigation, the possibility of full implementation is not likely.

After my initial research it became clear that the current program had needs that had to be met in order for expansion to be possible. The need was a different bee species that produced more honey, did not abscond from the hive, and required less land for VO members. If these cannot be met, then, expansion of the current program cannot be achieved to facilitate full RDP implementation.

The most promising alternative we found was the implementation of an artificial queen bee production center (AQPC). If implemented the AQPC would greatly increase the returns to VO members from a current average income of Tk 2500 per year to Tk 24,000.

Unfortunately however, while the financial benefit to VO members would be very positive, the investment required by BRAC coupled with a negative return mean that AQPC is not a good investment. There are also human resource and logistical demands that BRAC cannot currently overcome in order for AQPC to be achieved. AQPC requires a skilled and formally trained apiculturist in order for successful implementation to be achieved. Another problem is the time necessary for AQPC to be started.

The investment of TK 7,475,000 with income from honey production of at TK 2,640,000 yields a return on investment of a very disappointing .35. This is simply too low. The breakeven timeframe (exaggerated by the three-year startup period) is a lengthy seven years. This is simply too high. Other BRAC program investments such as sericulture and the BRAC dairy all have had significantly higher returns on investment and shorter payback periods.

From a human resource standpoint BRAC does not currently have access to an individual who can carry out the implementation of an AQPC. To do so requires a person who is skilled and trained in the raising and breeding of *apis mellifera* bees. There is currently no such person available in Bangladesh. The logistical and time demands are currently unacceptable. BRAC would have to wait a minimum of three years before an AQPC could be implemented. This is due to the time necessary to procure the necessary quantity and quality of *mellifera* bees.

What is important for BRAC beyond realizing that investing in artificial queen production, is how these conclusions were reached. Through the use of a business inquiry, as opposed to that of traditional social science, and fundamental financial analysis tools this conclusion was able to be reached quickly and effectively and with minimal research cost. If BRAC can replicate this type of research in its RED division BRAC and RDP will benefit from timely and cost effective information dissemination.

In sum, based on the above findings, I recommend that RDP management consider the possibility of continuing the existence of the apiculture program as a supplementary income generating activity, despite the impossibility of expansion and full implementation across all RDP branches.

Current Program:

Background:

BRAC's apiculture program is a business that is currently under the administration of the Rural Enterprise Project (REP), a group within RDP that is involved in the development, testing, and implementation of successful business models designed to help poverty reduction for VO members. Apiculture was started because there is a significant level of honey demand in Bangladesh, it is labor non-intensive, and as a business fits nicely with the social, economic, and environmental criteria put forth by RDP for any business carried out by VO members.

If a VO member invests in the apiculture program they take loans from BRAC and invest in a box and colony of bees. They then raise these bees so that the honey the bees produce can be collected and sold in the local market for a profit.

To date, the role and function of the apiculture program is one of a supplementary income generating activity. It has not "crossed over" and become a primary level of income for VO members. Upon review it became clear that the current performance of the program was not indicative of any forward or backward potential: forward meaning expansion, and backward meaning a reduction in performance. For a description of the current performance of the existing program please see attachment one.

The Need to Expand and Associated Problems

When the question of expansion was raised the next question was "why expand?" The answer was simple; because it is the role of REP to "develop successful models of

innovative enterprises that contribute to poverty reduction for VO member.” This means then, that every business that goes through REP is headed, if it proves to be successful, to full implementation across all branches within RDP

Unfortunately however, upon further inquiry it became apparent that the current BRAC program cannot be expanded to all of RDP for several reasons. The main reason is that the current species of bee being used by the apiculture program has several drawbacks that prohibit its ability to ever expand. Firstly because cerena bees are a slightly aggressive bee they cannot be positioned in their boxes close to one another. This makes the possibility of a VO member owning large numbers of boxes on her land (if she has any at all) impossible. Therefore, the availability of land becomes a critical issue. Secondly, the per box honey production levels of cerena bees compared to other bee species used by commercial bee keepers and NGO’s around the world is very low. *Apis mellifera*, for example, achieves 30 to 40 kilograms of per box honey production per year. *Apis cerena* on the other hand achieves only a modest 7 to 10 kilograms per box per year. Thirdly, cerena bees are notorious for absconding from their hives. One does not have to think too hard to understand the risk a VO member would be taking in order to invest in a box of bees only to find them all gone the next day because the bees decided to fly away. Lastly, cerena do not produce a sufficient amount of bee byproducts such as beeswax, royal jelly, and bee venom in comparison to other potential species.

How to Expand?

When it became clear that expansion could not happen under the existing program new questions about any potential expansion were raised, namely “how to do it.” The

answer is through the implementation of an artificial queen production center using the bee species *apis melifera*.

Artificial queen production is a highly technical activity that requires an apiculturist who is trained and skilled in the area of *melifera* rearing. The process, very simply, requires the apiculturist to raise any number of colonies over a period of three years and use the "box division" system of colony multiplication. During this period the apiculturist will track and observe the progress of the bee population and set aside the bees that are strongest and best suited for artificial queen production. During this phase the apiculturist artificially recreates an environment for which only queen bees can be born. At this point, after a period of 16 days, the apiculturist will then have up to 45 new queen bees and can then begin rapid and significant expansion of his or her bee colonies. All of this translates to enormous honey, queen, and bee byproducts production.

For the organization that includes artificial queen production in their apiculture program, the business is not just one of producing queen bees. What follows is a vertically integrated program that places the organization in a position to be in several businesses at once, while still being able to keep the needs of its VO members as its highest priority. The role of the VO member does not change. She would still take loans from BRAC and purchase a box and colony. However, because BRAC's role will change, her sales options are different. *Melifera* honey is superior to *cerena* honey and due to artificial queen production there will be an enormous increase in supply. Therefore BRAC could bottle and package this honey and sell it in grocery stores and local markets throughout Bangladesh.

If artificial queen production was implemented the process of queen production would produce honey for BRAC as well. This honey could also be packaged and sold. In

addition BRAC would have access to bee byproducts such as bee venom, royal jelly, and beeswax that they could package, market, and distribute.

Because BRAC would then be in the business of selling high quality honey and bee byproducts a honey-processing unit will be a necessary investment. Currently there is approximately 200 metric tons of annual honey production that comes from the Sundurbhans. This honey, however, is inefficiently collected, packaged, sold, and poorly processed. With a network of honey processing units in the major honey producing areas of Bangladesh BRAC would be able to have local honey collectors pay to have their honey processed so that they could in turn sell it themselves in the local market.

The last part of the vertically integrated apiculture business that BRAC could be in, if it were to implement artificial queen production would be the actual sales of its queen bees to other NGO's or commercial bee keepers. There are currently several other NGO's with apiculture programs that are trying to implement artificial queen production into their existing apiculture programs. BRAC could meet this demand by providing high quality melifera bees to those that wish to improve their existing program. Please see the below financial table for a description of the projected costs and revenues of the potential plan.

The Reason For Rejection Of Proposed Project

The reasons that BRAC should not implement an artificial queen production facility into the existing apiculture program are for financial, logistical, and human resource factors. For the financial reasons based on a set of indicators it is not a prudent investment for BRAC to make at this time, The logistical reasons come from the time it takes to begin artificial queen production and the availability of melifera bees in Bangladesh. Lastly from a

human resource standpoint BRAC does not currently have the necessary personnel to successfully implement this program.

The basis for determining that artificial queen production would be a poor investment financially comes from a set of two indicators of financial viability and the comparison of those figures to other BRAC investments. Based on REP's calculations and research there is a seven year payback period for artificial queen production. The payback method is a traditional method of capital budgeting. It is the simplest and perhaps most widely used quantitative method for appraising capital expenditure decisions. It tells us how many years it will take for the cash benefits to pay the original cost of an investment. In determining accept reject criteria for the payback computation we simply looked to other BRAC investments such as the fisheries program, sericulture, and poultry farming. All of these investments had payback periods of two to three years. Therefore before any further inquiry was done it was clear that this project would be a poor investment choice. But to further our case for choosing not to invest we calculated our return on investment, which came to a paltry .35%. While we have no other successful artificial queen production center investments as a benchmark this figure is woefully inadequate for an investment of any kind. For a description of the calculation of the ROI figure please attachment one.

The logistical reasons are that to begin artificial queen production will take BRAC a minimum of three years. It is during this time that the bees will be procured and raised so that queen production can begin. The issue of procurement is where BRAC will face the greatest challenge. *Melifera* bees are not currently available in Bangladesh. Having the bees brought in through the traditional import channels is not yet feasible. And after further inquiry it became clear that the organizations that are currently using *melifera* bees have procured these bees on the black market by having them smuggled in from India near the

Benapol border point. In short, if BRAC's needs were to obtain four to five colonies this could be a possibility. However, if BRAC were to implement artificial queen production it would require upwards of thirty colonies. This time issue deserves further attention as well. A three year waiting period before actual queen production and then an undetermined period following puts BRAC in a position to pay heavy opportunity costs. Opportunity cost being the cost of the next best alternative. If BRAC were to devote the necessary funds to implementing artificial queen production the possibility exists for other potentially more profitable businesses to be passed up.

Another, and perhaps more definitive issue which makes artificial queen production a poor investment choice is that there is currently only one person in all of Bangladesh who is qualified to artificially raise queen bees. This individual currently works for Proshika and has undergone more than a year of training in the United States and Canada in order to learn the highly technical techniques and procedures for successfully operating a vertically integrated apiculture program with artificial queen production. BRAC's current field staff is excellent. They are skilled and capable of running the existing program using the cerena bee but unfortunately lack the necessary skills to artificially produce queen bees with the melifera species.

Now that we have concluded that it is neither prudent nor possible for BRAC to expand its current apiculture program and implement artificial queen production it is important to understand how we got to those decisions. The most important part of this paper should be to understand that while these conclusions are good for the apiculture program and REP, understanding how these conclusions were reached is what will be good for the future of BRAC.

This paper and my work have been a business inquiry. In difference to a traditional

social science inquiry which rely on extensive sample size selection, methodology determination, and a predetermined and specified scope of the study, the business inquiry seeks to answer a much more straightforward question: how will a specific venture be profitable to the stakeholders of the business. In this case those stakeholders are BRAC and VO members. Unlike research carried out by social scientists business inquiries can be carried out quickly and effectively, without the need for lengthy pre-questioning, sample selection, research approval and funding, or data cleaning. In addition due to the focused scope of the business question, as BRAC and RDP shift its focus to specific business development they will find that these studies can be carried out quickly and with a markedly reduced work force. In the end this will serve towards getting viable business opportunities to the market faster, increasing returns to BRAC and VO members, and reducing the explicit and implicit costs of BRAC's research initiatives. These three effects, if realized, will work in concert with BRAC's and other NGO's efforts to continue to strive for more cost effectiveness and ultimately self sustainability.

How all of this applies to the apiculture program is quite simple. We determined very quickly that the program had needs that were not currently being met. We determined what those needs were and set out how to meet them. A performance report was not necessary because we became aware by default that better performance was possible.

The way we got to these conclusions in addition to the use of the business inquiry was through fundamental financial calculations and ratio analysis. Not all of these tools were used but in terms of what BRAC's RED division can take away from this report, they are all important because there will be other occasions when some of these tools will be appropriate and others when they are not. Another point of introducing these tools is to

introduce RED to a different way of determining profitability. Just because your revenues are greater than your costs does not mean that you are running a competitively profitable business or organization.

Financial Ratio analysis allows the analyst to take the information readily available in a financial report and calculate the ratios so that more concrete conclusions can be made about the performance and status of the enterprise. The reason analysts use ratios is that they make related information comparable. A single figure such as profit has no meaning when judged alone. However, if we consider how it stands in relation to sales, or assets, or capital, we can make a better conclusion in terms of their adequacy. Are the profits adequate? Are the assets being used efficiently? Is the enterprise solvent? These are all questions that can be answered through the use of financial ratio analysis

Financial analysis ratios can be divided into four types: liquidity, turnover, leverage, and profitability. For our purposes we will look at liquidity, turnover, and profitability. Liquidity ratios determine the ability of the enterprise, or the VO member, to meet current/short term obligations. To be sure, liquidity is a prerequisite for the very survival of the enterprise. This is of particular importance for BRAC's VO members participating in the apiculture program who rely very heavily on the extension of previously unavailable credit for the operation of their businesses. The first and most widely used liquidity ratio is the current ratio. Measured by dividing current assets over current liabilities, the current ratio is the figure that determines the firm's ability to meet its short-term credit requirements. It indicates the level of takas of current assets available for each taka of current liability. The higher the current ratio the larger amount of takas available per taka of current liability. This means that there is a safety net for both the VO member and the short-term creditor. The VO member knows she has a business that can meet her

obligations and BRAC knows that it has entrusted its money in a business that will pay it back. (For a description of the components of current liabilities and assets please see attachment A)

A second useful liquidity ratio that carries the current ratio a step further and is of particular use to us when analyzing VO member enterprise performance is the quick ratio or acid test. One defect of the current ratio is that it fails to convey any information on the composition of the current assets of the firm. A taka of cash is considered a taka of inventory or equipment. This not the case. A taka of cash is more readily available to meet current obligations than a taka of inventory for example. This impairs the usefulness of the current ratio. To overcome this we use the acid test. By dividing quick assets (quick assets refer to current assets that can be converted into cash immediately or at a short notice without diminution of value) by current liabilities. The acid test is a more stringent measure of liquidity because should an emergency arise, it gives the enterprise little or no time to meet its obligations. This certainly relevant to the VO member, as life in Bangladesh is frequented by sudden needs for money in the event of emergencies such as illness, death, or hunger. If BRAC insures that its VO members are operating liquid enterprises not only is its money safe but so too is the VO member and the survival of the enterprise. This has a further application in the realm of BRAC's vertically integrated micro-enterprises. If BRAC is better able to monitor the performance of the VO members who are running chicken farms, for example, then it will make certain that the poultry and livestock program on the whole is financially sound.

Turnover ratios, or activity ratios, explain the efficiency to which assets and inventories are used by the firm. While there is little application for these figures for REP enterprises they can find significant application for BRAC's larger RDP projects. The first

ratio, inventory turnover (calculated by dividing net sales over inventory), reflects the efficiency of inventory management. The higher the ratio, the more efficient the management of inventories. A second activity ratio is the fixed assets turnover ratio, calculated by dividing net sales over fixed assets. This measurement determines the efficiency to which fixed assets are employed. A high ratio indicates a high degree of efficiency in asset utilization.

Profitability ratios reflect the final result of any business operation. Having a clear understanding of the profitability of the enterprise insures that the VO member will be able to pay their debts to BRAC and earn their livelihood. The first profitability ratio is gross profit margin. Calculated by dividing gross profit by sales, the gross margin is the relationship between prices, sales volume, and costs. A high ratio of gross profits to sales is a sign of good management as it implies that the cost of production of the firm is relatively low. A low gross margin is a certain warning signal. Reasons for an inadequate gross margin could be a high cost of production reflecting acquisition of raw materials and other inputs on unfavorable terms, inefficient utilization of current as well as fixed assets, or a low selling price resulting from severe competition, inferior quality of the product, or lack of demand. Another important profitability ratio is net profit margin. Net profit margin measures the relationship between net profits and sales of a firm. The profit margin is indicative of a management's ability to operate the business with sufficient success not only to recover from revenues of the period, the cost of merchandise or services, the expenses of operating the business and the cost of the borrowed funds, but also to leave a margin of reasonable compensation to the owners for providing their capital at risk. A final measure of profitability we will discuss is return on investment (ROI). ROI is a measure of business performance that is not affected by interest charges and tax payments. It abstracts away the

effect of financial structure and tax rate and focuses on operating performance. Hence it is well suited for inter-firm comparisons.

Conclusion:

My work on the apiculture program has been primarily an assessment of needs and researching the best methods to meet those needs. Through the use of using the business inquiry and carrying out fundament financial ration analysis I determined that the apiculture program, in its current form, is not performing at a level that will lead to full implementation across all RDP branches. It will never be able to become a primary income generating activity for VO members. More importantly however is the non-viability of an alternative. Implementing an artificial queen production center is not a financially sound investment. Therefore, my final recommendation is for RDP management to discuss, taking into account the findings presented here, what the future for the apiculture program should be.

Attachment One

Current Performance of Apiculture Program

Number of Colonies	1729
Honey Production	11,961kg
Number of BeeKeepers	1264
Total Value of Honey Production	Tk164,320 (@ Tk 130 per kg)

Proposed Artificial Queen Production

Total Projected Cost of Investment	Tk 6,500,000
Total Honey Production	12,000 kg
Estimated Value of Honey Output	Tk 2,640,000 (Tk 220 per kg*12,000kg)
Interest paid to RDP on 6,500,000	- Tk 975,000
Return On Investment	Tk 2,640,000/7,475,000=.35