SUGARCANE FEEDING FOR CATTLE PRODUCTION - IS IT A BANKABLE PROPOSAL?

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Introduction

The Sugarcane Feeds Centre was established in late 1976 on 60 hectares of State lands as a joint project of the Canadian International Development Agence (CIDA) and The University of the West Indies (UWI), with McGill University as the Executing Agency. In October 1981, the project was handed over to the Government of Trinidad and Tobago who appointed as new Executing Agency, Caroni (1975) Limited.

The purpose of the Centre is restated in its Plan of Operations Phase III as follows:-

1. To establish and demonstrate, on an ongoing basis, the technical feasibility of feeding cattle on rations consisting primarily of sugarcane-derived feeds;
2. To determine the commercial and economic viability of using sugarcane-derived feeds for beef and dairy production systems, and to assist in bringing about the commercial application of sugarcane feeding systems; and
3. To develop the sugarcane feeding technology in Trinidad and Tobago, and to facilitate the transfer of such technology within Trinidad and Tobago and to other countries where appropriate.

Applied research forms an integral part of the Centre's work along with the development of a livestock production system.

The Centre has, between October 1981 and December 1983, marketed approximately 600 head of animals mainly for beef. It is involved in dairy heifer replacement and buffalo heifer rearing schemes in collaboration with the Ministry of Agriculture, Lands and Food Production and Caroni (1975) Limited, respectively. A small dairy with an average of 35 cows in milk has produced approximately 165,000 kg in the time period concerned. The Centre's animal population averages 500 head over the year.

The approach of quantifying labour and equipment usage by hour or unit time, instead of by cost solely, allows for application to circumstances other than the Centre's specific operations. Social cost/benefit analyses are also a part of the assessment of the technology in attempting to promote its wider application.

In this paper however, in keeping with the topic given, sugarcane feeding for beef production will be first examined in relation to the ability of a production system to qualify for financing by way of a bank loan, and to satisfactorily liquidate such a loan. Subsequently, sugarcane feeding as it relates to other basic economic and development circumstances will be touched on. Certain data need to be kept in mind. In 1981, 7.3m kg. of bovine meat valued at TT$57.2m were imported into Trinidad and Tobago. The figures for 1982 were 9.3m kg valued at TT$63.1m. Domestic production of beef, however, decreased from 1.7m kg in 1981 to 1.4m kg in 1982. A fivefold increase in local production is needed to satisfy the present local

demand.

Factors Affecting the 'Bankability' of a Sugarcane Feeding Intensive Beef Feedlot

The factors to be considered can be grouped under six major areas - technical, managerial, organizational, commercial, financial and economic.

1. *Technical Considerations* - The feedlot examined is one feeding freshly chopped whole sugarcane to 500 animals under an intensive management system. The assumption is that available baby bull calves, by-products of the dairy industry, are purchased at 5 days of age and 35 kg liveweight. With an average lifetime weight gain of 0.80 kg per day, animals should be sold at an average 18 months of age at approximately 450 kg liveweight.

   Feedlot buildings are designed to allow for mechanical feeding of animals and the handling of manure as a solid. Other buildings include feed storage, office, garage and feed processing area.

   The machinery utilized is shown in Table 1 and includes equipment for cane transportation, harvesting, chopping, mixing of feed, feeding of animals, a truck and a pickup.

   The sugarcane will be grown on 38 ha of land, hand harvested but mechanically loaded and fed fresh to the animals.

   There tends to be a negative relationship between percentage cane in the diet and animal performance in that the higher the level of sugarcane inclusion, the lower is the animal response. A standard diet with a 30 per cent energy protein supplement, 45 per cent cane, and 25 per cent molasses (dry matter) is used. This is arrived at by starting the animals on the 20 per cent cane diet and increasing to a 55 per cent level, just before sale.

   The Centre, in developing its production system, has worked out the feeding of diets of different composition to the different weight categories of animals. The diet composition is based on physiological need and potential performance for each given weight range. In effect, it means that in the early ruminant stage of life, forage (and fibre) fed is at a lower level, 15 to 20 per cent dry matter (DM) of the total diet, while in the higher weight categories animals are fed diets with sugarcane contributing up to 55 per cent DM of the total diet.

2. *Managerial /Considerations* - In order to operate the feedlot considered, the manager must, among other things, have a sound knowledge/experience in (a) sugarcane cultivation, (b) feedlot management (nutrition and health particularly), (c) human resource management and leadership. The manager must possess organisational ability to plan and implement coordinated activity on what is essentially a complex operation. These characteristics among others are necessary if the required animal performance is to be achieved. A technically feasible project may be unworkable if the management is not capable of organizing the smooth and efficient operation of the enterprise. Whether the feedlot is privately, company or State owned, the manager must have the ability *and* the authority to effectively run the operation.

   Table 2 shows the quantity and type of labour required by the operations and cost based on a 40 hour week. Effective use of labour and other resources is an important consideration. It includes flexible use of the individual worker.

3. *Organizational Considerations* -

This relates to the relationship between the project and other agencies; advisory, training, utilities, marketing, credit and health. For purposes of this paper, only the area of credit will be examined.

Of primary importance when considering the *bankability* of a project are the lending policies of bank or finance institutions. Issues which need special attention are security arrangements, interest rates and the period of moratorium which will determine the repayment schedule and the timeliness of loan disbursements. Where the project cannot satisfy these requirements of the lending institution, it will not be *bankable*. In addition to these considerations, it should be borne in mind that the higher the client's contribution, the more bankable the project becomes.

4. *Commercial Considerations* - Proper arrangements for the purchase of inputs and the sale of output (beef) are important in ensuring that the enterprise receives adequate and timely supply of inputs, (especially feed and medication) while providing for a reliable and good market price for its output.

   The possibility of specialised arrangements for purchasing of inputs may exist due to high levels of usage. On the other hand, selling to specialised markets - supermarkets or hotels, for example, may be arranged to improve income. In fact, this should be the normal goal for the higher quality animal produced. While there is a ready market for the live animal in Trinidad and Tobago, the price to the producer is hardly ever a rewarding one.

5. *Financial Considerations* - The cost-return relationship, or the viability of the project is now considered; since if a project is unprofitable, a bank will not lend financial support. The financial characteristics of the project will determine which type (if any) of the lending institutions will be willing to undertake the financing. Generally, for agricultural projects, especially beef and milk, which have a long gestation period), long term loans with relatively low interest rates are needed. This suggests the need for development bank funds for the feedlot project under consideration.

Table 3 shows a cash flow statement for an estimated 20 year operation of the feedlot. Year zero (Yr_0) refers to the period of establishment of capital facilities, and in this period an estimated TT$800,000 are invested in building construction and purchase of equipment. It is estimated that this period is a maximum of one and a half years, and no cash flows are incoming to the project. Calf purchase begins in Year one (Yr_1) and animal sales begin towards the end of Year 2 (Yr_2).

During Yr_1 however, income from sale of manure is realized. The estimated time taken for sale of first crop of calves, from start to establishment is three years. This means therefore that the enterprise would not be able to support loan repayments during this period. The project as a result requires a moratorium of three years, during which time no interest or principal loan repayments would be payable.

It is important to note that it is assumed that the land required for the project is already owned by the investor/project owner, and animal rearing starts from the purchase of baby calves. The total loan therefore is approximately $2m which would

require finance for the establishment and operation of the project to the end of Yr_2, when sale of animals is expected to begin.

Estimated loan repayment is calculated over 20 years, at a six per cent rate of interest, as offered by the Agricultural Development Bank of Trinidad and Tobago. Surplus income after loan repayment averages approximately $50,000 from year two until the end of year 19. From this surplus, a manager has to be paid a salary. It is therefore seen that (assuming a salary of $36,000 per annum) the project is only marginally viable.

From the analysis, it is seen that the project is bankable in that it could repay a loan of $2m in 20 years at 6 per cent interest. It is questionable whether an investor would be prepared to contract a loan of such magnitude, which would yield an annual surplus of approximately $48,000 from which his farm manager's income must be derived. Indeed, this is not a very attractive proposition.

Improvements in the viability and thus bankability of this project could occur due to any of the following:-

(a) *Reduction of feed cost* - Essentially, the major problem facing the viability of cane feeding to beef animals under the conditions examined, is the high cost of the protein supplement ration. At the Centre, where the supplements (custom made SFC 40/40 which is 40 per cent crude protein with 40 per cent contributed by urea) used are relatively unsubsidised, purchased feeds account for about 50 per cent of the total operating cost. Of this 50 per cent, over 80 per cent is due to the cost of the protein supplement (SFC 40/40). Thus utilization of cheaper sources of protein would improve the project's viability e.g. subsidised dairy ration. It should be stressed that the sugarcane used should also be efficiently grown for high yields, so reducing the cost per tonne.

(b) *Improvement of animal performance* would also have a positive effect on the viability of the project due to both improved feed conversion efficiency and increased throughput. These are obtainable through improved husbandry practices, and the purchase of older animals. Sale of animals at a lower liveweight (350 kg) would also increase throughput and profitability. At existing feed costs in 1983, it has been noted that the drop in feed conversion efficiency beyond 350 kg tends to negatively affect overall returns.

(c) *Utilization of manure* for vegetable or other crop production would also result in higher returns to the project than is achieved by the sale of the manure. At the Centre, manure is used through the effluent irrigation system or as a solid in sugarcane cultivation. This enhances yields, but becomes more important if the operation is on very marginal agricultural soils.

(d) *Mechanisation of cane harvesting and processing* is being done at the Centre. This has improved operational efficiency and more importantly reduced

the cost of processed cane at the feed trough by over 50 per cent.

(e) An important operational feature at the Centre is *silage making*. Studies at SFC have indicated that mechanically harvesting cane during the dry season, and ensiling it for use in the wet season reduces the annual cost of chopped cane, since wet season harvesting by hand is less efficient due to weather and transport conditions.

6. *Economic Considerations* - Although the returns from the proposed project are low, this must be seen from the point of view that in general, livestock industries in Trinidad are heavily subsidised. It is however not proposed that similar levels of subsidies be applied. An important factor in the development of both the poultry and the pig industries has been more organised marketing facilities. The marketing system for beef has been mentioned earlier and is now amplified.

Even after the preceding improvements to the feedlot as originally proposed under *Technical Considerations*, are made, there is need to improve the price of live animals. Presently, over 40 per cent of an animal is wasted at slaughter; the hides and offal are dumped or bring little further financial returns. If the utilization of these were organised and carried out, the selling price per kg liveweight could be increased, resulting in improved viability of the project. This, however, requires proper slaughtering facilities from which the development of industries such as *leather making* and *rendering* would possibly follow.

The conversion of an agricultural product of beef is generally an inefficient operation, especially if that agricultural product could be consumed directly by human beings. Beef production industries are generally based on the use of low cost inputs either of extensive systems or through large scale production of forage or grains. Neither is immediately possible under local circumstances. The development of an agricultural sector producing rice, pigeon peas, cassava, citrus, etc. for human consumption will provide by-products for the livestock feed industry. At the Centre, poultry by-product meal and broken rice are being substituted for imported soyabean and corn in the diets. Trials are also being done with *Leucaena* forage meal. The need for greater linkages within the agricultural sector and the general economy cannot be over-emphasized. In this regard the current state-inspired drive to increase local food production takes an even greater significance.

The loss situation of the sugar producing sector is widely known. Utilisation of some of the sugarcane already established suggests itself as one partial solution to the existing situation. In fact, the State organization concerned has the land, the crop and animal herds. With proper organization, efficient utilization of the necessary resources and development of the management skills and structures, there is the possibility that initial steps already taken could be furthered. This would improve local production.

A Regional Perspective

This paper deals with sugarcane feeding for beef production in the local context and its specific circumstances. Other possibilities exist. In fact, in many Caribbean territories local feed supplement

sources - energy and/or protein, may be available for use in sugarcane based diets.

Additionally, the larger territories e.g. Jamaica, Belize and Guyana have the beef type animal resource base which can supply weaned feeder calves for feedlot purposes. This is favourable in that locally the cost of the artificially reared calf, despite mortality under 10 per cent and use of milk replacers, is easily the highest cost period in terms of the marketed animal.

The approach of breaking down and quantifying labour and equipment usage by unit time for the various operations which is adopted under our Enterprise Resource Analysis Sub-project, facilitates application of the Centre's work to circumstances other than its own. Based on this work, models applicable to Regional territories other than Trinidad and Tobago could be prepared. These models will take into account different input-output cost relationships. The utility of this approach is illustrated by the two examples above.

The bankability of sugarcane feeding depends on the several factors discussed and others. Our West Indian agricultural circumstances have always called for the utilisatoin of resources for the best economic benefit for our territories and populations. It is a call to which few territories have made adequate response. The use of sugarcane as a cattle feed provides one instance where real potential exists.

REFERENCES

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TABLE 1: Equipment Requirements, Prices and Wear-out Life for 500 Head Feedlog Model (TT$'000)

Item	Quantity	Unit Price $	Wear Out Life (yrs.)
4 WD 70 hp tractor	2	60,000	10
Hydraulic loadster	1	55,000	5
Cane chopper	1	20,000	4
Feed mixer wagon	1	25,000	5
5-ton truck	1	75,000	10
1-ton pick-up	1	20,000	4
Cane trailers	2	7,000	10
Fertilizer spreader	1	3,000	5
Moulding disc plough	1	15,000	20
Boom sprayer	1	2,500	5
Scraper blade	1	3,000	20
Solid manure spreader	1	12,000	5
Plough	1	7,000	20
Harrow	1	5,000	20

TABLE 2: Labour Type and Cost/Month (TT$'000)

Category	No. Required	Salary/ Mth. $	Totals
Unskilled for feedlot	3	1,200	3,600
Unskilled for cane activities	3	1,200	3,600
Calf labour	3	1,200	3,600
Foreman with livestock training	1	2,500	2,500
Driver/Operator	3	2,000	6,000
Mechanic/Handyman	1	2,500	2,500
No. of Workers	14		21,800

TABLE 3: Cash Flow (TT$'000/annum)

Cash Flows	Yr_0	Yr_1	Yr_2	Yr_3	Yr_{4-10}	Yr_{11-19}	Yr_{20}
Outflows	800	600	600	600	770	770	700
Inflows:							
Animal sales	-	-	560	810	810	810	1600
Manure "	-	50	100	150	150	150	150
Net cash flow (before loan repayment)	-800	-550	60	360	190	190	1050
Loan repayment	-	-	-	150	150	150	150
Net cash flow (after loan repayment)	-800	-550	60	210	40	40	900

Assumptions
- Av. daily gain = 0.8 kg
- Mortality rate = 10%
- Wt. of animals at sale = 450 kg
- Manure sale price = $106/m^3$
- Outflows in Yr_0 include building and equipment purchase = $800,000
- Land already planted with sugarcane is either leased or already owned

NB. Net cash flow (after loan repayments) represents source of income for farm manager and/or investor.