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Critical Factors for Successful Diversification

Our experience at Caroni (1975) Limited has taught us that successful diversification requires very careful planning and execution of projects and an extremely high level of competence, hard work and dedication on the part of the work force - both management and workers.

It will be useful to look at the critical success factors in five stages.

A. Pilot Project

It has been said that the best way to teach someone to swim is to throw him in at the deep end of the pool. For successful diversification, the approach has to be the exact opposite.

In particular with crop diversification, it is important to proceed with deliberate caution. Variables such as seed varieties, soil conditions, water management, weed control, pest control, fertilising regimes and chemical application should be evaluated in the environment of a pilot project. The pilot project itself should be preceded by a careful search of the literature on the subject to develop basic competence in the crop. Pilot projects should aim to determine, as best as possible, the optimal mix of variables in the production equation.

Pilot projects should be executed in a very business-like manner. They must be well planned, their objectives must be clear, resource requirements and limits must be identified and information collection and evaluation procedures must be identified and communicated from the start.

B. Semi-commercial Stage

Should the results of the pilot project be encouraging, then projects should proceed to a semi-commercial stage. This is important. Many projects have run into difficulty by skipping this stage. A commercial sized project has requirements that are materially different from a pilot project

and which can only be properly evaluated in a semi-commercial project. The differences include managerial practices, resource requirements, and marketing plans. Caroni (1975) Limited for example discovered in its cassava project (and by bitter experience), that semi-commercial production is necessary to evaluate several critical variables.

The semi-commercial project gives a chance to confirm the results obtained in the pilot project and an opportunity to test critical commercial variables such as the appropriate organization, information system, the marketing environment, personnel requirements, monitoring systems and the behaviour of crops, pests, fertilisers, chemicals etc. under a larger scale of operation.

C. Feasibility Study

Commercialisation of any project should be analysed and proven before commercialization is initiated. These exercises should in addition.

- try to visualise the project to completion in order to minimise unforeseen problems;
- analyse the market and determine how products will be marketed;
- define action plans to ensure smooth implementation of the project i.e. production, marketing, financing, organization, staffing, resource procurement;
- set standards for production, marketing and costs of operation which will form a basis for subsequent performance monitoring and evaluation.
- have developmental impact on the human resources of the project by forcing management to think ahead and to approach implementation in an orderly and organized manner.

D. Project Implementation Plan

The way in which a project is organized is one of the critical factors that affects its success. The most important aspects of organization are:

- management authority must be clearly defined;
- relationships should ensure that accountability for action is unambiguous;
- decision-making must be unimpeded; and
- bureaucracy must be minimised.

While the appropriate organization varies from project to project, its importance must not be underestimated. The organization is the vehicle through which project implementation and operation is achieved. Any defect in the vehicle will impact negatively on results.

Staffing of the project is another variable that is critical for success. It will be no exaggeration to say that with the right people, any problem will overcome. While all the variables that are being identified are important for the success of diversification programmes, staffing is the most important. The right staff will ensure that all the other variables are properly managed.

Competence and commitment to duty are equally important in staff. It is important at the recruitment stage therefore, that both these variables are evaluated. In the early stages of a project's life, staff will be called upon to make tremendous personal sacrifices to ensure success. They should, when they are recruited, be left with no illusions about their output requirements. To attract and retain this kind of staff, obviously will require imaginative compensation packages and a working environment that motivates high performance.

E. Implementation Stage

At the implementation stage of a project, technical considerations are paramount. In Caroni's rice project, for example, it has been found that the project design critically affected results. Equally important have been equipment selection, variety selection and water management. Careful pre-planning and close monitoring of all these have impacted favourably on results.

Successful implementation requires:

- availability of adequate resources;
- competent designs;
- management ability to adapt designs to unforeseen circumstances;
- competence in the management of contractors; and
- specification of the levels of authority that are necessary to permit deviations from plans.

Once a project becomes operational, careful monitoring of performance, evaluation of results and taking of follow-up action become important. Information systems must be designed to collect and process data and provide reports on a timely basis. In addition, top management must show a very direct interest in the project and be prepared to make field visits as frequently as necessary. Quick and visible action on reports is essential or else reports will become bureaucratic rituals. It may often be necessary to obtain expert evaluation of results of operation and organizational arrangements, e.g., expert monitoring groups, may be necessary in the early stages of projects until they mature. Caroni (1975) Limited for example, utilizes the resources of a consultant for its citrus development project and the rice project is monitored by an in-house monitoring committee. Caroni's Livestock programmes also utilise the services of outside experts.

Finally, but by no means least important, the role of top management and often the state, is critical. Top management must have vision, drive, initiative and competence. Diversification of industries or economies requires leadership that is forward-looking and energetic. The state must create the economic and social environment that encourages initiative, entrepreneurship and a commitment to development. A judicious mix of all these factors fosters successful diversification.

EXPERIENCES OF CARONI (1975) LIMITED

The Company

Caroni (1975) Limited is a Private Limited Liability Company with the Govern-

ment of Trinidad and Tobago holding all the Issued Share Capital. The company was registered on the 26th March 1975. The Authorised Share Capital is 300m. and the paid up Share Capital is 172.2 m.

The company owns and controls 79,577 acres of Land. It has approximately 36,000 acres of its holding under sugar cane and has rented 10,700 acres to cane farmers. The company owns:

- a. Four sugar factories two of which ceased operations in 1982/83.
- b. A new modern sugar refinery with an annual rated capacity of 60,000 tonnes of refined sugar.
- c. A distillery with an annual rated capacity of 2 million proof gallons.
- d. Warehousing and bulk loading facilities for bagging, handling, storage and export of raw sugar.
- e. A complement of field, harvesting, transport and factory equipment and machinery to handle the entire range of sugar and diversification operations.
- f. A labour force of professional, para professionals, skilled, semi skilled and unskilled workers.

The Company has a Board of Directors which consist of representatives from the Trade Union, the Cane Farmers and from the public and private sectors. The company is managed by a Managing Director/Chairman, a General Manager and a team of Executive Managers who head various sections. There are no subsidiaries.

Diversification

The main activity of the company before 1983 had been the production of raw sugar for local consumption and for export.

During the period 1976 - 1984, cane acreage harvested fell from 42,289 acres to 32,527 acres. The total production of cane fell from 1,276,528 tonnes to 589,576 tonnes, while sugar production declined from 186,930 tonnes to 64,775 tonnes. Cane yield fell from 29.80 tonnes per acre to 18.13 and the TCTS increased from 11.07

to 13.37. The company lost 1,760.8 million dollars over the period. As the losses continued to increase the shareholder began to look for alternative ways to make the company viable. After many years of study in 1978, the committee appointed to consider the Rationalization of the Sugar Industry recommended inter alia:

- Diversification (page 310). The specific recommendations were:

1. Establish 3 - 500 acres rice farms to be operated and managed directly by the industry.
2. Establish 15 - 20 acre rice farms to be worked by farmers.
3. Establish 3 cattle farms each of 200-300 acres (each accommodating 300-500 animals) using imported cattle for a dairy/beef project to be managed and operated by the industry. These farms should include adequate holding and grazing acreages. The cattle are to be fed by cane mixed with molasses and other materials available locally.
4. Establish fifteen dairy/beef farms to be managed and operated by cane farmers, who now produce between 100 and 200 tonnes of cane preferably in the vicinity of the Company's dairy/beef farms. Each should be provided with 20-40 cattle.
5. Convert Orange Grove's present programme of intercropping into a crop rotation system using some of the crops identified (tomatoes, beans, onions, carrots, black eye peas, pigeon peas, red kidney beans, watermelon, sorrel and papaya) in the Report.
6. Implement Caroni's programme submitted to the Government in 1976 for the commercial production of food crops on between 1,000 to 5,000 acres. In the first year, 500 acres should be so used rising by 500 acres annually to a total of 5,000 acres.
7. Site the multi-purpose Food Processing Development unit at Orange Grove (and not at Centeno) and establish another such unit in the vicinity of Forres Park utilizing the shell of the buildings.

8. Amend the ordinance restricting farmers to the cultivation of vegetables to only 20 per cent of their holding to provide greater flexibility to them.
9. Contract CARIRI and/or U.W.I. to develop equipment for harvesting sorrel.
10. Establish wholesale facilities at San Fernando for food crops and vegetables.
11. Arrange for the developments proposed for expanded rice/vegetables/food crops and dairy/beef to be under the technical direction of the Ministry of Agriculture, the University of the West Indies and the proposed National Agro-Industrial Company (NAIC).
12. Expand the existing Research Division at NAIC to provide a wide range of research and development in sucrose chemistry, factory operations, by-product development and the use of field equipment.
13. Contract UWI to undertake, in collaboration with the Ministry of Agriculture, the Ministry of Works and the expanded research division at NAIC studies related to the soil and water management of the heavy clay soils.
14. Improve the product mix by
 - (i) establishing a plant to produce cane vinegar;
 - (ii) optimising and increasing the production of neutral blending spirits at the Caroni Distillery;
 - (iii) increasing the production of refined sugar by uncoupling of the refinery at Usine Ste. Madeleine from the sugar mill, thereby allowing the refinery to operate year round;
 - (iv) producing a range of syrups at the refinery to meet the demands of the local market. Such syrup production will constitute by-products of the refinery operations and as such is more economically feasible than production from cane juice.

The report was finally accepted in 1981 and Caroni embarked on its diversification programme.

In 1982, Caroni developed a plan to diversify its operations along the following lines:

- (i) to marginally reduce the acreage under sugar cane to 14,974 hectares (ha) by 1987;
- (ii) utilize former sugar cane lands to:
 - (a) grow 812 ha of irrigated paddy;
 - (b) produce 1,000,000 litres of fresh milk annually by expanding its dairy herd from 100 to 200 milk cows and followers;
 - (c) expand its beef production from the water buffalo by increasing its herd of "Buffalypso" cattle from 500 to 1,000 animals;
 - (d) produce pedigree stock of Buffalypso cattle for local farmers and export, by expanding its breeding unit;
 - (e) establish 405 ha of Robusta coffee
 - (f) establish 1202 ha of citrus mainly oranges for Trinidad's juice industry;
 - (g) cultivate annually 240 ha of high-yielding cassava to produce fresh and frozen tubers, and utilize the surpluses in the domestic animal industry.
- (iii) modernise the company's rum distillery operations;
- (iv) produce yeast; and
- (v) resuscitate Trinidad's bagasse-board production, by making operational its bagasse board plant.

To date, the company has developed and planted the acreage given in Table 1.

Table 1: Acreages of Crops Developed in Diversification Plan of Caroni (1975) Ltd.

Acreage	Crops
1700	Rice
1630	Citrus
60	Plantains
316	Coffee
21	Passion Fruit
25	Pigeon Peas
25	Cassava
20	Pawpaw

The company is conducting pilot studies with mangoes, cashew, white potatoes, peanuts and pineapple.

(i) Rice

The feasibility studies were based on the following parameters:

Yield per acre 2,500 lbs.
Cost of production per/lb. 43 cents

Total cost of project \$25,043 m

The project has obtained yields of 3,000 lbs. per acre, the revised cost of the project is \$18.5 m. and the project is planned to be completed well ahead of schedule.

(ii) Citrus

The feasibility studies were based on the following:

- a. Acreage 2,500 acres
- b. Cost of establishment up to the fifth year \$10,000 per acre
- c. Yield per tree by the 5th year of 1/2 crate
- d. Maintenance cost of \$11,650. per acre.

The project has achieved:

- a. establishment cost of \$8,500 up to the 4th year

- b. yield per tree in the 4th year 1/2 crate
- c. maintenance cost \$1200 per acre
- d. the target of 2500 acres will be achieved in the plan period.

(iii) Other crops and livestock

Details pertaining to the other crops in the diversification programme are given in Table 2.

The citrus and plantain projects were successful because they were properly planned and executed.

The cassava and pigeon peas projects were complete failures because the company assumed that it could have embarked on commercial production from the start. The experiences have taught the company that proper planning and implementation are essential ingredients for success. As a result the company is now engaged in a number of pilot projects with the objectives of determining whether commercial production should be undertaken.

In the case of the livestock projects they are still in the planning stages.

In the case of the new products, feasibility studies are being under-taken in order to determine whether the projects would qualify for inclusion in the company's diversification programme.

(iv) The Case of the Main Areas of Success-Rice

The company has been successful in the paddy projection because it took the necessary time and effort to plan the project properly. The Company realised that it did not possess any experience with the production of paddy and therefore decided that it would plan the project in detail and then execute the plan in stages.

The project was planned along the following lines:

1. Feasibility study
2. Identification of project area
3. Pilot project

Table 2. *Cost of Production and Selling Prices of Selected Crops in Caroni (1975) Ltd. Diversification Plan*

CROP	COST OF PRODUCTION PER/LB	SELLING PRICE /lb.
Passion Fruit	\$0.62	\$0.70
Pigeon Peas	\$1.08	\$1.15
Plantains	\$0.38	\$0.65
Pawpaw	\$0.38	\$0.90

4. Design of entire project
5. Financing
6. Implementation
7. Evaluation of progress

The pilot project enabled the Company to determine:

- a. the type of machinery for the large-scale cultivation of swamp paddy;
- b. the cultural requirements of swamp paddy under Trinidad conditions
- c. the water control requirements
- d. the feasibility of aerial application of pre-germinated seed, fertilizers and pesticides; and
- e. the indicator of yields.

The project was planned along the following lines:

1. Feasibility Studies

The Corporate Planning Department conducted feasibility studies which showed that the project on completion could produce rice at prices that would be competitive with the price that the Government was paying for the imported product from its CARICOM partners. The company decided that it would embark on commercial paddy production.

2. Project Area

The project area was identified after considering the soil and other characteristics and the availability of water for irrigation. Two thousand acres which were under sugar cultivation were earmarked.

3. Pilot Project

An area of one hundred and fifty acres was earmarked for the pilot project and the Research Department was asked to conduct the pilot project which commenced in 1982.

After a number of implementation delays associated with the development of the infrastructure, three crops of paddy were grown under upland conditions. Subsequently a crop of irrigated paddy was planted in June 1984 and harvested in October 1984. The average yield obtained was in the order of 3.8 tonnes/ha. These yields were considered satisfactory against a long established industry average for Guyana of 4.75 tonnes/ha. The pilot project has continued as a seed farm.

4. The Project Design

The Company decided to enter into large scale production of paddy using modern techniques for the following reasons:

- (i) the company had large tracts of suitable idle lands which could be converted to this enterprise;

- (ii) the technology for large scale mechanized paddy production was available and substantial technological modifications and transfer had evolved out of the results of its rice pilot project;
- (iii) some "in-house" expertise in paddy production was available to the company;
- (iv) The Rice Mill complex at Carslen Field, which was largely underutilized due to a shortage of throughput, was in close proximity to the proposed project site. (approximately five miles);
- (v) this crop could be grown and harvested with large inputs of mechanization thus reducing the use of expensive labour; and
- (vi) the use of irrigation by the Company would enable it to grow two crops of paddy/year.

The project consisted of the phased development of 812 hectares of rice on former sugar cane lands. It included the construction of physical infrastructure and the procurement of agricultural equipment for the irrigated production, transportation and storage of paddy for milling into rice. The project was to be developed in five phases comprising 12 ha, 130 ha, 270 ha, and 100 ha respectively. A description of the major components are as follows:

A. Infrastructure Works

- (i) the removal of existing vegetation from the project area;
- (ii) construction of water conveyance system consisting of a network of main canals, lateral canals and canal structures to supply and distribute water to the paddy fields;
- (iii) development of 157 basins ranging in size from 0.5 to 10.4 ha. This involved land levelling to produce the required grades, the construction of levees to form the basins and construction of inlet and outlet controls;

- (iv) rehabilitation of the existing drainage system in the project area; and
- (v) procurement of mobile pumps for raising the water from both the Guayamare and Caroni rivers into the irrigation canals.

B. Agricultural Equipment and Machinery

Procurement of:

- (i) land preparation, crop maintenance, harvesting and transport equipment, and
- (ii) paddy storage silos.

C. Engineering Services and Management

- (i) engineering services for the preparation of land surveys, designs and contract documents and the technical inspection and certification and construction; and
- (ii) project management

5. Financing

The Company encountered difficulty in funding the project. As a result, the Company approached the Caribbean Development Bank for a loan to finance the entire project. The Caribbean Development Bank took two and a half years to approve the loan. However, the Bank indicated at the outset that the project appeared viable and indicated that funds would be provided on condition that the Bank's condition were met. The Company, having been assured that the funds which it invested before would be credited as part of its contribution, proceeded with the first phase of the commercial production. The project was estimated to cost \$6.6m US. the Bank agreed to finance \$4.3m US and the Company \$2.3m. Phase I of the commercial production was completed and the tender for Phase II awarded before the loan was approved.

6. Implementation

The infrastructure work was undertaken by contractors. The supervision was done in-house by experienced persons who had been recruited on contract for the project. By this method the cost of implement-

ing the project was reduced considerably.

The cultivation of the paddy is now being undertaken by Caroni's staff. The project was mechanized as fully as possible. The first crop in Phase I was successful and the target yield of 2,500 lbs, surpassed. The project is being monitored by a multi-disciplinary team which reports to the General Manager.

Evaluation of Progress

The project has been evaluated by the Corporate Planning Department from time to time.

General Comments

This project has been successful for the following reasons:

- a. The Company recognized from the onset that it did not possess the expertise to produce paddy on a large scale, although it had extensive experience in the production of sugarcane on an extensive scale and that the experience could not be transferred without difficulty.
- b. The Company decided that it would plan the project in detail and take the necessary steps to introduce the known technology which was developed, and then adapt it to the local conditions. This it did by the route of a pilot project. The difficulties encountered in the pilot project were overcome at minimum costs.
- c. The Company did not rely on its experience in cane cultivation for the large scale production of paddy. It recognized the need for trained and experienced personnel in paddy production and recruited a project manager, a hydraulic engineer and an agronomist, all of whom had extensive training and experience in the production of paddy in the region. These people were employed on the project when the early difficulties were encountered.
- d. The Company did not design the project in phases. It designed the entire project which was done by a foreign firm.

e. The Company did not employ the foreign firm which designed the project to supervise the implementation. The foreign firm did not have any experience in the region in large scale paddy production. The Company used trained and experienced personnel from the region. By this method the company saved money and time and was able to adapt the technology to suit the local conditions. Had the Company used the foreign firm, then the firm would have used the technology with which it was familiar.

f. The Company has been able to adapt some of its equipment which it had in excess for its present and projected sugar operation to meet the needs of the rice production. Had the company used the foreign firm, then the firm may have recommended only equipment, with which it was familiar.

g. The project was implemented in phases. As a result, the equipment and machinery needed for a phased execution was available. Had the project been implemented in one phase, then equipment and may be contractors would have had to be imported. This would have increased the cost and would have prevented any modification of the project or the technology.

h. The detailed planning and phased implementation have prevented major bottlenecks in the project. The drying, milling, storage and transport facilities have all been carefully planned and steps taken to supply them as they are needed.

i. The Company has been engaged in conducting research on varieties etc., as well as in training the staff to meet the challenge of the project when it is completed.

The company has encountered several difficulties in achieving its target viz:

- a. Lack of capital
- b. Lack of trained manpower
- c. Delays in decision making

- d. Negative attitude towards the diversification effort
- e. Praedial Larceny
- f. The continuing dominance of the sugar operation in company's overall effort, and
- g. Scarcity of planting material