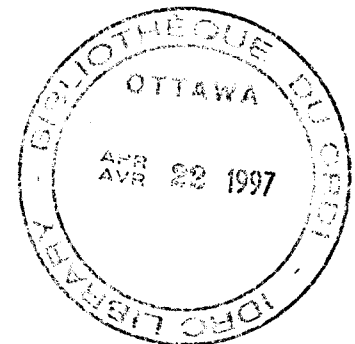


**CARIBBEAN INDUSTRIAL RESEARCH INSTITUTE
ORGANIZATIONAL AUDIT AND RECOMMENDATIONS
VPIN-94-008
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VOLUME 1 : REPORT**

MARCH 1994

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Sainte-Foy, March 21st, 1994

EXECUTIVE SUMMARY

CONTEXT

The Caribbean Industrial Research Institute (*CARIRI*) is a national organization whose mission is to advance the economic and social development of Trinidad and Tobago and other countries in the Caribbean Region by providing technical and technological support and creating and transferring technology to the producers of goods and services. Since its establishment in 1970, *CARIRI* has accumulated a vast experience working on projects for clients in Trinidad and Tobago, the Caribbean Region and abroad. These projects have been in the area of technical information, analytical services, technical consultancy, R&D and techno-economic feasibility studies.

The business environment in which *CARIRI* operates is now characterized by global competition. This competition rivals both the Institute's services and its clients' products and services. With the arrival of trade liberalization, industry in Trinidad and Tobago and indeed in the wider Caribbean is now striving to become more competitive and must focus on export activity. As well, like most countries of the world, Trinidad and Tobago is facing reduced public expenditures and must focus on the private sector for the generation of economic activity.

So, the Institute must align itself more closely to the private sector and become more market-driven and sensitive to the needs of industry. It must increase its income through projects and contracts from its clients.

MANDATE AND OBJECTIVES

In February 1993, Mr. Denis Gosselin, International Project Co-ordinator at CRIQ, travelled to Trinidad to conduct a preliminary assessment of *CARIRI*'s needs. He met with members of the organization's management and Dr. Clement K. Sankat, the Chairman of the Board. He felt that *CARIRI* could benefit from an organizational audit that would recommend ways to become more business-oriented.

This project was submitted to the International Development Research Centre (IDRC) and its objectives were:

-
- a) to evaluate *CARIRI*'s existing plans and direction;
 - b) to evaluate the opinion of *CARIRI*'s clientele on the research activities and services offered;
 - c) to evaluate *CARIRI*'s installations and equipment;
 - d) to evaluate the technical know-how and qualifications of its personnel;
 - e) to evaluate the efficiency of operational systems used by *CARIRI* to help industry in the region; and
 - f) to present a completed report by April 2, 1994 to Mr. Sitoo Mukerji, Director of the Program on Innovation Systems Management (PRISM) of the IDRC's Corporate Affairs and Initiation Division.
-

Our evaluation for each of these aspects is presented at length in section 4. In the following pages, we present the same conclusions in a different way. First the facts that we observed while we did our surveys and studies and which we called "Observations". Secondly, we describe the strengths and the advantages of *CARIRI*. Finally, we list the actions that we think should be taken to make of *CARIRI* a more business-oriented and more efficient organization. The most important actions are listed first. We believe that these recommendations represent "*CARIRI*'s challenges" for the years to come.

The reader interested in knowing more about the methodology of the study should refer to section 2.3 of this report.

OBSERVATIONS

As a result of this audit, we made the following observations :

- (1) Industry in Trinidad and Tobago and perhaps in the whole Caribbean Region definitely need **CARIRI**'s services in particular testing, chemical analysis, food technology and information.
- (2) Some of **CARIRI**'s activities do not answer the needs of the marketplace, i.e., electronics and information as given now to clients. Clients need to know not only the potential of their products in Trinidad and the Caribbean Region but also in the U.S.A, Canada and Latin America. This information may only be obtained from the databanks of the respective countries. Clients also need to know product standards from these countries.
- (3) The present organizational structure is adequate but needs to be implemented on a firm basis as soon as possible to enable the unit leaders to assume their responsibilities in their respective units. The activities of each unit must be reevaluated and rationalized in light of customers needs in the market place.
- (4) Because of the Institute's recent restructuring, clients do not know where **CARIRI** is going. They have begun to lose confidence in **CARIRI**'s ability to fulfil their needs. Management must try hard to regain that confidence by having a period of stability, good public relations and by rebuilding the Institute's image.
- (5) The Board is largely composed of people coming from academic, government and other milieus rather than from industry. The opposite would make of **CARIRI** an organization which is more business-oriented and more directly in line with its mission and clientele.
- (6) There is an overall problem of management in the Institute. For one thing, there is no Human Resource Unit and no policy of equipment purchase and maintenance. The project management system in place (ref. Strategic Plan) is not being implemented. Management does not seem to have a clear vision of where they want **CARIRI** to go.

- (7) There is a definite need for a BDU in *CARIRI* but its role, its limits and its function must be clearly defined, explained, and communicated to the Institute's staff. The BDU must be implemented quickly in the Institute so that there could be a better teamwork and a cross selling effort undertaken by both the technical and the marketing staff.
- (8) TIS needs overhauling to make it more efficient and increase its performance. TIS has to answer market needs. Customers at present are not happy with the quality of services provided to them to date by TIS.
- (9) In general, the technical capabilities of *CARIRI* unit leaders and staff are very good but they seem to operate in isolation without interaction with other units and without taking into consideration the needs of the clients and the market, especially timeliness of delivery and quality of reports. The management capabilities of the unit leaders, however, are dubious. They do not seem to go along with the top management's plans and vision. With that in mind, it might be difficult for them to implement management decisions.
- (10) The Institute seems to have the necessary equipment to answer the immediate needs of its clients. Unfortunately, much of the equipment is old, takes time to operate and upgrading to take in an autosampler or computer commands is impossible. This equipment will have to be replaced if the unit is to operate efficiently and lower the cost of analyses.

There is also a lack of equipment maintenance which results in frequent breakdown. The technicians do not have the necessary training to repair or maintain them.

- (11) The staff is willing to go along with management's plans and vision provided that:
 - (a) the mission is clearly stated and explained to them;
 - (b) management takes actions that concur with that mission;
 - (c) management gives them the proper tools, equipment, infrastructure, etc. and the proper training to enable them to function efficiently;
 - (d) good management practices are implemented to motivate them to do their work more efficiently;
 - (e) management sets more realistic objectives with their participation and appraises them fairly;

- (f) management gives them some feedback and follow-up after they have been appraised;
 - (g) management rewards high achievers in appreciation for their work.
- (12) There is obviously a lack of funding for the Institute's activities but as this is linked with good management organization and practice, **CARIRI** must solve its management problem first before developing a funding strategy. **CARIRI** must set up a means of measuring the impact of its activities on the country's overall economy and the market needs of its services.
- (13) The internal climate is poor because of low staff morale and lack of motivation. Management has a major role in restoring staff confidence by providing direction and a sense of purpose.

CARIRI's strengths and advantages

CARIRI as an organization has many strengths and advantages :

1. Clients surveyed consider the Institute to be a vital organization for the business and economic development of the country.
2. Clients surveyed want to know more about the Institute's services and expect a lot from **CARIRI**.
3. Clients surveyed agree that a fair price should be paid for services rendered. No one felt that the services should be free because they come from a government agency.
4. Clients surveyed said that information services are important for them.
5. **CARIRI**'s expertise is recognized by the market in the sectors of food, quality control, tests and analyses.
6. **CARIRI**'s staff is technically competent.
7. Even if the staff made negative comments on the organization and its management, it wants to cooperate to the overhauling of the Institute.
8. Even if the Institute has to invest for the buying of new equipment in specific sectors, it has a lot of valuable equipment as in the pilot plant for example.

CARIRI's challenges

In order to fulfil its mandate, **CARIRI** faces many challenges:

- (1) Recruit a CEO as quickly as possible, preferably from the Caribbean Region, who would have the following profile:
 - a good technical background to be able to understand the nature of the business **CARIRI** is in;
 - proven management experience at an operational level and coming preferably from a technically-based industry such as Food Technology, Pharmaceutical, Petro-chemical and/or Petroleum industries;
 - a good knowledge of the industries in the Caribbean Region, a clear vision of where an institute like **CARIRI** should go and an ability to make firm decisions to position **CARIRI** for the future.
 - good communication skills; must not be racially biased and must be honest and committed.
- (2) The new CEO must be able to build his or her team from among competent people within the Institute or through personal contacts outside to be able to implement faithfully the Board's decisions and his or her own vision. The team composition should preferably consist of a human resource manager, a financial manager, a marketing manager, a technical manager and a TIS manager (once TIS becomes more viable and important).
- (3) Unit leaders should be appointed from staff who are not only technically competent but also share the same vision as the executive committee and the Board and have the same personality profile as its members.
- (4) The initial mandate of the CEO will be to revise the Strategic Plan and develop, in conjunction with unit leaders, ways to implement the plan.
- (5) The new executive committee will have to reevaluate the Institute's mission and, with the help of the Board, renegotiate it with the appropriate government department. They will have also to rephrase its wording to ensure it is well understood by staff and clients alike.
- (6) To be more business-oriented, the composition of the Board will have to be reviewed in order to contain a larger majority of business people recruited from the island's main ethnic communities.

- (7) The executive committee and unit leaders, with the support of the Board, will have to review all services presently offered by the Institute, unit by unit, and eliminate those that are not profitable or not required by the market. Activities that represent the national interest should be retained or introduced and supported in a planned manner to acquire new knowledge or to develop new technology.

The selection or the introduction of new activities should be based on the following criteria:

- (a) capabilities of the staff to do the job;
 - (b) the number of projects realized in each category over the last two to three years;
 - (c) market needs;
 - (d) competition by other similar institutions in the private sector;
 - (e) interrelationship between the services offered and the support available in the Institute;
 - (f) physical capacity to do jobs (equipment, infrastructure, computers, etc.).
- (8) Environment and Biotechnology

Environment

CARIRI was asked by government to offer services in the sectors of environment and biotechnology.

Based on the available facilities at *CARIRI*, we would recommend work in the following areas of the environment:

- (1) biodegradation studies on the final product such as detergent, soap, washing liquids, packaging, etc.;
- (2) monitoring and diagnostic work relating to the quality of drinking water, air, wastewater and sludge. These may be done at two levels:

Level I

determine the following parameters: pH, ThOD, TOD, TOC, BOD, COD, turbidity, total counts, fecal coliform, colour and such ions as Pb^{++} , Hg^{++} , Al^{+++} , Na^+ , K^+ , Ca^{++} , Mg^{++} , Cl^- , SO_4^- , NO_3^- , NH_3 , etc.;

Level II

organic pollutants by HPLC, GC and GC-MS.

(3) Treatment

- search for appropriate technologies for the treatment of water, wastewater and air from international databanks;
- select one or two technologies pertinent to the climatic conditions as well as the nature of the waste water to be treated;
- carry out comparative testing of the various technologies on a laboratory scale to determine the best technology;
- recommend the best technology to clients;
- implement the technology with or without modifications to suit conditions in Trinidad.

- (4) Development and supply of microbial inoculants to existing treatment facilities. *CARIRI* has already got experience in that area in enhanced recovery of oil, mushroom inoculum, and starter culture in wine-making.

CARIRI should avoid the following areas:

- synthesis of CFC substitutes except for testing purposes;
- development of new treatment processes unless the idea is original and has not been studied elsewhere;
- environmental impact studies such as toxicology, measurement of CL₅₀, allergies, respiratory distress;
- any interference in existing processes because of industry conservatism, unless *CARIRI* wants to improve the efficiency of the treatment process by optimizing the utilisation of the plant.

(5) Valorization Area

Liquid recycling, wastewater treatment, raw materials for making microbial inoculants.

Solid composting, raw materials for making inoculants, sugars etc.

Biotechnology

As far as biotechnology is concerned, *CARIRI* should concentrate its efforts in fermented foods or the production of certain food additives such as food colours, certain flavour ingredients, etc. It should also look at the application of enzymes to increase yield in existing food transformation processes such as juices, beer, wine, extraction of natural products, etc..

- (9) *CARIRI* will have to revise its position towards TIS and view it as a matter of national importance because we are living in an information era. The western nations are already thinking in terms of an INFORMATION HIGHWAY. TIS should link up with industry and government to set up a more efficient and updated TIS either within *CARIRI* itself or as part of a National Information Centre. This should include the Caribbean countries, Latin America and part of North America. By doing this, it will enable TIS staff to acquire a certain degree of specialization as the customers request.

(10) BDU faces many challenges:

- (1) make inventories of the capabilities of the Institute both in terms of staff and equipment with the participation of unit leaders;
- (2) carry out with the help of TIS a thorough market study of the entire Caribbean Region in the field of environment and other potential areas;
- (3) interact with unit leaders to develop and implement a marketing plan to sell *CARIRI*'s capabilities to institutions and industries in the entire Caribbean Region;
- (4) reassess both the composition and the abilities of its staff to sell the Institute's services;
- (5) develop, with the participation of the finance manager and the unit leaders, a pricing policy.

- (11) **CARIRI** will have to set up a Human Resources Division as soon as possible to boost staff morale, develop a policy of work ethics and exclusivity of services, develop and implement a training program for both the managers and staff of the various units and improve staff working conditions (motivation, internal communication and the performance appraisal system).
- (12) Our opinion is that a project management group to oversee the progress of projects is unnecessary. **CARIRI** will have to delegate authority to project leaders responsible to oversee the status of their own projects in terms of budget, delivery of results, informing the customers, signatures of reports and purchases. This would improve on the timely delivery of results, customer confidence and budget overrun provided the necessary tools are available. Project leaders would have a better organization of their work and be able to set priorities. Project leaders will also provide some interpretation of the results and tell the customers what to do with them.
- (13) **CARIRI** will have to make an inventory of all equipment, keep equipment that is relevant to its new direction and discard that no longer useful; acquire new and more up-to-date equipment and have a maintenance policy (service contract with new equipment).
- (14) There should be only one **CARIRI** located preferably on campus. This would enable the Institute to rationalize both space and activities. TIS would then be able to make better use of the UWI library and databanks and better service both internal and external clients.
- (15) The Institute will have to take its communication problems seriously and consider installing a 1-800 line. In fact, the Institute is lacking in all communication equipment, international fax machines, televisions, videos, cameras and so on.
- (16) For internal purposes, project and unit leaders should charge the real costs for doing a particular project. However, to sell to customers, **CARIRI** should have a pricing policy taking into account, for example, discounts for regular customers in good standing, the element of risk in the project, the amount of stock to hold on site and a good equipment maintenance program. If it is too expensive or too risky to do the project, management will be able to make a decision as to whether to continue in this line of activity or stop it altogether. Because the Institute charges its customers at an hourly rate, management will have to decide where and how to spread the overhead costs.
- (17) **CARIRI** will have to make a study of all funding possibilities and develop a strategy of how to acquire funding. This may take the form of:
 - (a) negotiation with the government for more funds to finance some of the Institute's activities and give more incentives to industry to invest in R&D;

- (b) foreign aid from developed countries like Europe, Japan, U.S.A. and Canada;
 - (c) form an association of industries working in similar or connected fields, whereby **CARIRI** will be an associated laboratory doing R&D for each of its members;
 - (d) public funding such as selling shares in the stock market. For this to succeed, **CARIRI** must be innovative in identifying projects that will pay off;
 - (e) joint ventures, like the mango project, with partners abroad;
 - (f) a loan from the International Monetary Fund or from Regional Banks although this would require a good management team, the backing of the government and a good project;
 - (g) recuperation of bad debt from customers;
 - (h) rescheduling of **CARIRI**'s debt and interest payment.
- (18) **CARIRI** will have to play an active role in the regional and international networks (e.g. Waitro).

CONDITIONS

In order to meet those challenges, **CARIRI** will have to fulfil the following conditions:

- (1) a good management team and practices;
- (2) a clear vision of where **CARIRI** is going;
- (3) good leadership;
- (4) a professionally run organization;
- (5) a highly motivated and loyal staff;
- (6) stability while making the changes;
- (7) a planned implementation of managerial decisions;
- (8) improvement of the Institute's image in the marketplace;
- (9) a good marketing strategy;
- (10) willingness to form partnerships with other organizations;
- (11) willingness of staff to work as a team;
- (12) willingness of unit leaders to cross-sell the activities of other units.

Many stimulating challenges await **CARIRI** and we sincerely believe that all its efforts will be rewarded because Industry needs **CARIRI** and will readily support it in that new direction.

TABLE OF CONTENTS

PAGE

VOLUME 1 :

EXECUTIVE SUMMARY	i
1.0 CONTEXT OF THE STUDY	1
2.0 PRESENTATION OF THE STUDY	2
2.1 Introduction to the Study	2
2.2 The Study's Objectives	2
2.3 Methodology	3
2.4 Limits and Constraints	5
3.0 STUDY RESULTS	6
3.1 In-depth interviews with the Institute's Management	6
3.1.1 The Board of Management	7
3.1.2 <i>CARIRI</i> 's Mission	7
3.1.3 The Strategic Plan	7
3.1.4 The Organization, Management and Unit Leaders	8
3.1.5 Equipment and Materials	9
3.1.6 Pricing and Cost Estimates	9
3.1.7 Delivery of Results	10
3.1.8 The Project Management System	10
3.1.9 Quality Control	10
3.1.10 Finance and Infrastructure	11
3.1.11 Human Resources	11
3.1.12 The Business Development Unit (BDU)	12
3.2 Survey on the Institute's Internal Climate and Management	12
3.2.1 <i>CARIRI</i> 's Mission	13
3.2.2 Objectives	14
3.2.3 Organization and Management	15
3.2.4 Support	17
3.2.5 Feedback and Appreciation	19

TABLE OF CONTENTS (CON'T)

	PAGE
3.3 Market Perception — Customer Replies	20
3.3.1 Consulting Services in Trinidad and Tobago	21
3.3.2 Knowledge of <i>CARIRI</i> 's Services	22
3.3.3 Customer Satisfaction of <i>CARIRI</i> 's Services	22
3.3.4 <i>CARIRI</i> 's Reputation	26
3.3.5 Improvement of <i>CARIRI</i> 's Services	27
3.3.6 Ways <i>CARIRI</i> Can Become Better Known	28
3.3.7 Information Sources to Select Consultants	29
3.3.8 Conclusion	29
4.0 DISCUSSION OF THE RESULTS	30
4.1 The Institute's Plans and Direction	30
4.1.1 General Observations	30
4.1.2 Selected Observations on the Institute's Plan and Direction	31
4.2 Customer Perception of <i>CARIRI</i> 's Operations and Services	34
4.2.1 General Observations	34
4.2.2 Selected Observations on Customers Perception of <i>CARIRI</i> 's Operations and Services	34
4.3 Installation and Equipment	36
4.3.1 General Observations	36
4.3.2 Selected Observations on Installation and Equipment	37
4.4 Staff Competence	38
4.4.1 General Observations	38
4.4.2 Selected Observations on Staff Competence	39

TABLE OF CONTENTS (CON'T)

	PAGE
4.5 Operational Systems	40
4.5.1 General Observations	40
4.5.2 Selected Observations on operational systems	41
4.6 Internal Climate	44
5.0 CONCLUSION	46
6.0 RECOMMENDATIONS	49

LIST OF APPENDIX

VOLUME 2 :

APPENDIX A:	Act of incorporation of CARIRI
APPENDIX B:	Procedures manual
APPENDIX C:	Revenues and expenses
APPENDIX D:	Strategic plan update
APPENDIX E:	List of persons interviewed
APPENDIX F:	In-depth interviews with the management of the Institute
APPENDIX G:	Survey on the Institute's internal climate and management
APPENDIX H:	Perception of the market study
APPENDIX I:	Examples of forms used in CARIRI
APPENDIX J:	Collective labour agreement 01-01-1990 to 12-31-1992
APPENDIX K:	Human resources development manual, August 1991
APPENDIX L:	CARIRI's management structure

1.0 CONTEXT OF THE STUDY

The Caribbean Industrial Research Institute (*CARIRI*) is a national organization whose mission is to advance the economic and social development of Trinidad and Tobago and other countries in the Caribbean Region by providing technical and technological support and creating and transferring technology to the producers of goods and services.

Since its establishment in 1970, *CARIRI* has accumulated a vast experience working on projects for clients in Trinidad and Tobago, the Caribbean Region and abroad. These projects have been in the area of technical information, analytical services, technical consultancy, R&D and techno-economic feasibility studies.

The business environment in which *CARIRI* operates is now characterized by global competition. This competition rivals both the Institute's services and its clients' products and services. With the arrival of trade liberalization, industry in Trinidad & Tobago and indeed in the wider Caribbean is now striving to become more competitive and must focus on export activity. Moreover, like most countries of the world, Trinidad & Tobago is facing reduced public expenditures and must focus on the private sector for the generation of economic activity. Since January 1992, *CARIRI* has had a 14.6% funding cut from the government's ongoing subsidy to the Institute. Added to inflation, this amounts to about a 22% cut in funding. In addition, contributions to capital for plant and equipment upkeep have been dwindling since 1985.

The impact of this new economic order on *CARIRI*'s activities is critical. The Institute must align itself more closely to the private sector and become more market-driven and sensitive to the needs of industry. It must increase its income through projects and contracts from its clients. To do so, *CARIRI* must meet challenges such as customer satisfaction, quality of service, respect for deadlines, relevancy and so on.

2.0 PRESENTATION OF THE STUDY

2.1 Introduction to the Study

In February 1993, Mr. Denis Gosselin, International Project Co-ordinator at CRIQ, travelled to Trinidad to conduct a preliminary assessment of *CARIRI*'s needs. He met with members of the organization's management and Dr. Clement K. Sankat, the Chairman of the Board. He felt that *CARIRI* could benefit from an organizational audit to evaluate its strategic plan and direction, the perceptions of the market regarding the Institute and the services it offers, the physical plant and equipment, the technical know-how of the Institute's staff and the systems in place to support operations. The results of the organizational audit would become the basis of *CARIRI*'s strategy and action plans for the coming years and lead to an increase of its revenues from the private sector.

This project was submitted to the International Development Research Centre (IDRC) in the spring of 1993 and was approved in the weeks which followed. Because of internal changes at *CARIRI* at that same time, the project start-up was postponed until November, 1993. The present report is the result of the organizational audit.

2.2 The Study's Objectives

In accordance with the contract drawn up between IDRC and CRIQ, the study's objectives were:

- a) to evaluate *CARIRI*'s existing plans and direction;
- b) to evaluate the opinion of *CARIRI*'s clientele on the research activities and services offered;
- c) to evaluate *CARIRI*'s installations and equipment;
- d) to evaluate the technical know-how and qualifications of its personnel;
- e) to evaluate the efficiency of operational systems used by *CARIRI* to help industry in the region; and

- f) to present a final report by April 2, 1994 to Mr. Sitoo Mukerji, Director of the Program on Innovation Systems Management (PRISM) of IDRC's Corporate Affairs and Initiation Division.

2.3 Methodology

The project was conducted in three stages over a period of three months. The three stages are described below.

- Stage One: Preparation

Preparation of the organizational audit began by the reading and analysis of all available documentation: the Strategic Plan update, the Operational Plans for 1993, the Collective Labour Agreement, the Annual Report and correspondence between *CARIRI* and *CRIQ* (Appendix A to D and Appendix I to L). Mr. Denis Gosselin, *CRIQ*'s Project Co-ordinator, was also consulted.

A questionnaire on the internal perception and managerial practices in use at *CARIRI* was then prepared (see appendix G for the complete analysis). We had the employees fill out the questionnaire when we were in Trinidad & Tobago. We wanted to see if our evaluation of the Institute's management would be confirmed by the employees' perceptions.

A perception study of actual and potential clients for *CARIRI*'s services was also prepared. This was carried out in collaboration with *CARIRI*'s Business Development Planning & Co-ordination Manager. Because of the kind of information we were looking for, we felt that personal interviews done at plant sites would best serve the purpose. These

interviews were done by a marketing research specialist from **CRIQ**. **CARIRI** worked with **CRIQ** to:

- establish a list of actual and potential clients;
- make the appointments with manufacturers.

To draw up the list, a cross section of the different industrial sectors in Trinidad & Tobago (petroleum and gas, petrochemicals, agro-industry, environment) was selected. **CRIQ**, in collaboration with **CARIRI**, prepared a questionnaire to gather information during the interviews (see Appendix H for study results).

To prepare our interviews with the Management of the Institute, a schedule was established with the help of **CARIRI**'s liaison officer Ms Rhonda Wilson (see Appendix E for the list of those interviewed).

■ Stage Two: Assignment at **CARIRI**

Our initial task was to visit the Institute (both on Campus and at Magoya) and contact the **CARIRI** staff members involved in the project. Next, our marketing research specialist, Ms Louise Laflamme, started interviewing the Institute's actual and potential clients, according to the schedule drawn up by the Business Development Planning & Coordination Manager. A total of 31 interviews were conducted. The two other specialists, Mr. Dominique Beaulieu and Mr. Roger Tsé, began the organizational audit (technology and management).

As mentioned earlier, we also did an internal perception study. **CARIRI**'s liaison officer helped **CRIQ**'s specialists organize this activity. One important aspect of this study was confidentiality. The process was

done in such a way that people would feel totally free to express their opinions. The questionnaire covered elements such as: management style, internal communication and vision of the future of the organization. A total of 96 questionnaires with return envelopes were distributed to the Institute's employees (staff and management). The response was excellent with 75 questionnaires completed.

Our assignment at *CARIRI* lasted two weeks (10 working days).

- **Stage Three: Analysis, Recommendations and Report**

Firstly, we analyzed the results of our studies: the internal perception, the perception analysis of the market and the interviews with the Management. Then we drew up some conclusions. After, we concentrated our efforts on the objectives of our mandate as described above. Finally, this report presents our conclusions and the recommendations that we see fit.

2.4 Limits and Constraints

The mandate was carried out by means of interviews with the Institute's management, personnel and existing and potential clientele. One must bear in mind that the validity and reliability of the results presented are in function of the good faith of those surveyed and that any information gathered from those sources was accepted from the outset as being truthful.

3.0 STUDY RESULTS

This section of the report contains the highlights of the results of the three studies undertaken while we were at *CARIRI*:

- the in-depth interviews with the Institute's Management;
- the survey on the Institute's internal climate and management;
- the survey on market-customer perception.

Readers interested in more details on any of the studies can refer to the report's appendixes.

3.1 In-depth interviews with the Institute's Management

During our assignment at *CARIRI*, we conducted 15 in-depth interviews with the Institute's managers (see Appendix E for a complete list). Our questions were on their perception of :

- the Board of Management;
- *CARIRI*'s mission;
- the Strategic Plan;
- the organization Management and Unit Leaders;
- equipment and materials;
- pricing and cost estimates;
- the delivery of results, quality control, the project management system;
- Finance and Infrastructure;
- the Human Resources Division and the Business Development Unit.

Appendix F of this report contains the transcription of all comments gathered during interviews. A brief summary of those comments is found below.

3.1.1 The Board of Management

The Institute's management is very critical of the Institute's Board of Management. The criticism pertains mainly to:

- the absence of the Board in 1992;
- the composition of the Board which has too many academics and not enough business people. The nomination process is also questioned;
- the lack of support by the Board for the existing management;
- the perception that there are conflict of interest situations within the Board;
- the absence of clear policy guidelines coming from the Board;
- interference from politicians.

3.1.2 CARIRI's Mission

The managers of *CARIRI* say:

- they don't know where *CARIRI* is going. They need vision and the proper understanding of where they are heading;
- according to them, clients view *CARIRI* the same as they do;
- *CARIRI* must decide what business it is in. Does it offer consultancy services? If so, *CARIRI* must have the structure to deliver;
- *CARIRI* is not very Caribbean;
- the uniqueness of *CARIRI* is in providing laboratory-based services.

3.1.3 The Strategic Plan

The following comments were made about the Strategic Plan:

- **CARIRI** needs a Human Resources Unit;
- **CARIRI** must redefine its services. The Institute is too unfocussed. It must reduce the number of activities because it is too spread out;
- there is a new mandate in environment. First, **CARIRI** must define what the environment is all about;
- the Strategic Plan was done by Dr. Ali and there is no sense of real input by managers and unit leaders;
- for funding, **CARIRI** must make or design something to sell or market and become innovative with something out of the norm;
- the Caribbean Region is not in the Strategic Plan;
- **CARIRI** has no policy of equipment updating nor of intellectual property;
- **CARIRI** has no policy on exclusivity of services. Many professionals offer the same services on their own account outside;
- **CARIRI** must have targets in monetary terms. There is a need for more accountability, more knowledge on the output and the financial revenue of each unit;
- **CARIRI** should have a selection policy for its internal projects and a measurable output for them.

3.1.4 The Organization, Management and Unit Leaders

The managers of **CARIRI** say:

- the Institute has not provided the necessary infrastructure to function efficiently;
- people are fed up with too many restructuring efforts;
- there is no consultation of or feedback to staff by management;
- management must provide good leadership and exert management practices. **CARIRI**'s management does not seem to know what the staff is doing and what sort of equipment it has. There is no contact with employees at all;

- the staff morale is very low. To boost up staff morale and develop the right staff attitude, *CARIRI* must have the right management team and members of the Board that will be able to make proper decisions and do more for the Institute;
- Unit leaders have all the responsibilities but no authority.

3.1.5 Equipment and Materials

The following comments were made about equipment and materials:

- *CARIRI* has no policy or criteria for the purchasing of equipment. There is no meeting with unit leaders to decide on equipment and this results in duplication. The perception is that those who can push the hardest get the equipment;
- all materials, like chemicals, agents, solvents and so on, must be imported project-by-project which results in delays in work;
- there is a lack of support and maintenance of the equipment in general. A lot of them simply do not function;
- since it is not possible to upgrade it, there is a need to acquire new equipment and train people to use it;
- Trinidadians do not have the same service or training from the suppliers of equipment as Canadians or Americans have due to lack of competition;
- the actual situation regarding equipment and materials is one of the reasons why *CARIRI* charges high costs to its clients.

3.1.6 Pricing and Cost Estimates

Managers' comments on pricing and cost estimates are:

- generally, prices are too high;
- there has been no re-evaluation of rates despite the devaluation of the TT dollar and the lowering of oil prices;

- **CARIRI** does not know its real costs. It has a major problem with the pricing of services;
- there is often a 200% to 300% overrun of budget at the end of the work due to certain inefficiencies and lack of a project management system;
- there is an urgent need to develop a pricing system.

3.1.7 Delivery of Results

The managers of **CARIRI** say:

- main complaints from clients are about the length of the delivery time, high costs and the absence of interpretation of results;
- project timely delivery is not very good due to: the lack of a good project management system, the bureaucracy in the process of signature of reports, the delays with foreign shipments, the breakdown of equipment, the quality of equipment and the bureaucracy in purchasing procedures.

3.1.8 The Project Management System

The following comments were made about the project management system:

- there is a project management system in place but it has broken down and needs to be reviewed. This system should allow access to multiuser activity;
- at this point in time, reports are sent each month to managers and project leaders never see them. **CARIRI** must provide project leaders with the means to do their job.

3.1.9 Quality Control

The following comments were made about quality control:

- **CARIRI** must improve the quality of its output, i.e., reports and quality of relationships with clients;

- interpretation of results is not adequately done due to a lack of a consultancy policy.

3.1.10 Finance and Infrastructure

The managers of *CARIRI* say:

- *CARIRI* had a big problem with receivables (TT\$2 million not billed and absence of follow-up). It seems to be getting better now;
- purchasing procedures are long (many steps and signatures);
- the telephone system is a major problem. Clients complain about it;
- there is only one international fax machine and it is in the CEO's office;
- there is no link between the Institute's information systems (HR, CASS, Finance).

3.1.11 Human Resources

The comments of managers on human resources are:

- the internal climate is a big problem. Staff morale is low. Nothing has been done with the staff since cuts;
- the Institute has never emphasized the importance of human resources. UNDP procedures have never been upgraded and there is no follow-up;
- *CARIRI* needs a training program: technical, interaction with clients, management techniques, human relations, industrial relations;
- there is no performance appraisal system in use actually. There are no real objectives, there is inconsistency across the organization, no follow-up, no incentive to change, no rewards, no development and no progress in the Institute;
- the negotiation of the last collective agreement was done directly by the former CEO. That collective agreement was made around people, not around jobs;

- *CARIRI* needs to clearly define the role of every person. It must have the right people in the right place. Everybody must understand his or her role and the roles of the other people in the organization;
- there is an absence of lateral communication within the Institute. People do not know what others are doing.

3.1.12 The Business Development Unit (BDU)

The following comments were made about the Business Development Unit:

- BDU is too involved in selling and has not come up with a marketing strategy;
- BDU cannot sell technical projects not being technical themselves. They must visit clients accompanied by a technical person;
- there is a role for the BDU in *CARIRI* but it must first familiarize itself with all the capabilities of the Institute, foresee market potential, develop the market for *CARIRI*'s services, define what is to be done to answer the needs of various sectors of the market, make inventories of the Institute's capabilities and spend more time with technical people on its own initiative;
- BDU must set priorities by working closely with unit leaders;
- the staff of BDU must improve its ability to understand the needs and problems of clients;
- BDU lacks communication equipment to carry out PR functions;
- BDU has no budget for publicity.

3.2 Survey on the Institute's Internal Climate and Management

This section is a summary of *CARIRI* employees' perception and comments on the Institute's internal climate and management. These comments were gathered by means of a questionnaire prepared ahead of time and then distributed to employees when we were at *CARIRI*. We also included envelopes to ensure that replies would remain confidential. A total of 96 questionnaires were given out and 75 completed questionnaires were returned. We consider this a very good rate of response. The results and some excerpts of the overall comments are presented in the following pages. Complete survey results can be found in Appendix G.

Survey results, statistics and their interpretation are presented in the following order:

- *CARIRI*'S Mission;
- Objectives;
- Organization and Management;
- Support;
- Feedback and Appreciation.

3.2.1 *CARIRI*'s Mission

CARIRI's mission statement is : "To advance the economic and social development of Trinidad and Tobago and other countries in the Caribbean Region providing technical and technological support and creating and transferring technologies to the producers of goods and services".

	Disagree completely	Disagree somewhat	Sub-total	Agree somewhat	Agree completely	\$
This statement truly reflects <i>CARIRI</i> 's reality	14.9%	18.9%	33.8%	41.9%	24.3%	
The Institute's activities concur with this mission statement	9.6%	28.8%	38.4%	49.3%	12.3%	
Adhering to this mission is an important personal source of motivation	19.4%	12.5%	31.9%	33.3%	34.7%	
This mission is clear and understood and accepted by the whole staff	33.3%	27.5%	60.8%	30.4%	8.7%	
I feel comfortable with this mission	9.5%	10.8%	20.3%	25.7%	54.1%	
The Institute's present management and the decisions it makes concord with this mission	31.9%	36.1%	68.0%	25.0%	6.9%	
This mission is realistic with respect to the means the Institute has at its disposal	26.4%	29.2%	55.6%	31.9%	12.5%	

Interpretation: Based on the staff's replies to the question of mission, the following comments can be made:

- 1) the mission is not clear and understood and accepted by the whole staff;
- 2) the Institute's present management and the decisions it makes do not concord with the existing mission;
- 3) the mission is not realistic with respect to the means the Institute has at its disposal.

3.2.2 Objectives

	Disagree completely	Disagree somewhat	Sub-total	Agree somewhat	Agree completely	Sub-total
The Institute sets realistic and measurable objectives with regards to :						
■ Customer satisfaction	23.2%	23.2%	46.4%	44.9%	8.7%	53.6%
■ Staff development (training, up-grading, advancement)	49.3%	29.3%	78.6%	18.7%	2.7%	21.4%
■ Development of new services	49.3%	23.3%	72.6%	23.3%	4.1%	27.4%
■ Technological innovation and development	32.4%	28.2%	60.6%	35.2%	4.2%	39.4%
■ Economic productivity and self-financing	43.2%	35.1%	78.3%	18.9%	2.7%	21.6%
■ Respect to commitments made to customers (deadlines, budgets, confidentiality, personalized approach)	17.8%	23.3%	41.1%	45.2%	13.7%	58.9%
■ Development of strategic alliances	27.7%	29.2%	56.9%	40.0%	3.1%	43.1%
The objectives set are within my reach and I feel I am participating in the Institute's advancement when fulfilling them	27.5%	13.0%	40.5%	40.6%	18.8%	59.4%
I participate in setting my yearly objectives with my immediate supervisor	38.2%	7.4%	45.6%	38.2%	16.2%	54.4%
My immediate supervisor takes my comments into consideration when setting my objectives	31.7%	12.7%	44.4%	38.5%	19.9%	58.5%
I am satisfied with the process in place for setting objectives	50.7%	23.9%	74.6%	20.9%	4.5%	24.4%

Interpretation: Based on the staff's replies to the question of objectives, the following comments can be made:

- 1) the Institute does not seem to set realistic and measurable objectives with regards to staff development, economic productivity and self-financing, development of new services, technological innovation and development of strategic alliances;
- 2) to a certain extent, the Institute seems to set realistic and measurable objectives with respect to commitments made to clients (deadlines, budgets, confidentiality, personalized approach) and customer satisfaction;
- 3) the process of setting objectives is very dissatisfying for the staff and many are not involved in that process.

3.2.3 Organization and Management

	Disagree completely	Disagree somewhat	Sub-total	Agree somewhat	Agree completely	Sub-total
ORGANIZATION OF WORK						
The Institute's organizational structure makes reaching objectives feasible	27.1%	28.6%	55.7%	40.0%	4.3%	44.3%
The way work is organized in each of the divisions is considered important by the management	16.4%	38.8%	55.2%	35.8%	9.0%	44.8%
Support services (finance and administration, business development and human resources) facilitate work done in the operational divisions	31.0%	21.1%	52.1%	35.2%	12.7%	47.9%
The management encourages collegiality and team work	22.9%	21.4%	44.3%	41.4%	14.3%	55.7%
Work is organized to make maximum use of resources	49.3%	27.4%	76.7%	19.2%	4.1%	23.3%
INTER-DIVISION COOPERATION						
There is concrete evidence of the management's desire to promote inter-division cooperation	23.9%	28.2%	52.1%	36.6%	11.3%	47.9%
My immediate supervisor clearly explains how we can best meet other divisions' requirements	29.7%	34.4%	64.1%	20.3%	15.6%	35.9%
My immediate supervisor makes certain that the other divisions understand the roles and functions of our division within the organization	41.9%	19.4%	61.3%	25.8%	12.9%	38.7%
The employees are well aware of what is going on in other sectors	38.4%	32.9%	71.3%	24.7%	4.1%	28.8%

	Disagree completely	Disagree somewhat	Sub-total	Agree somewhat	Agree completely	Sub-total
TOOLS						
The management has tools for judging and tracking the Institute's performance	31.0%	35.2%	66.2%	22.5%	11.3%	33.8%
Tools put into place by the management make room for corrective measures if needed	41.0%	34.3%	76.1%	16.4%	7.5%	23.9%
The management regularly gauges customer satisfaction	40.3%	36.1%	76.4%	19.4%	4.2%	23.6%
The management uses specific tools for measuring the quality of services provided	48.6%	28.6%	77.2%	18.6%	4.3%	22.9%
IMMEDIATE SUPERVISOR						
My immediate supervisor is able to coordinate our work team's activities	26.2%	20.0%	46.2%	30.8%	23.1%	53.9%
My immediate supervisor knows how to animate our work group	38.5%	23.1%	61.6%	21.5%	16.9%	38.4%
My immediate supervisor is acquainted with problem-solving techniques	38.5%	16.9%	55.4%	24.6%	20.0%	44.6%
EMPLOYEES						
The employees willingly cooperate to improve work organization	9.7%	22.2%	31.9%	45.8%	22.2%	68.0%
The employees favour team work	6.9%	13.9%	20.8%	52.8%	26.4%	79.2%

Interpretation: Based on the staff's replies to the question of organization and management, the following comments can be made:

- 1) work is not organized to make maximum use of resources;
- 2) the organizational structure of the Institute does not make reaching objectives feasible;
- 3) support services (finance and administration, business development and human resources) do not facilitate work done in operational divisions;
- 4) there seems to be no collaboration between divisions;
- 5) the employees are not aware of what is going on in other sectors;
- 6) the management does not have the tools for measuring quality of services provided, customer satisfaction, tracking the Institute's performance or making room for corrective measures if needed;

- 7) immediate supervisors seem to have difficulty animating their work groups, using problem-solving techniques and, to a certain extent, in coordinating their work team's activities;
- 8) the employees favour team work and are willing to cooperate to improve work organization.

3.2.4

Support

	Disagree completely	Disagree somewhat	Sub-total	Agree somewhat	Agree completely	Sub-to
SUPPORT FROM MANAGEMENT						
The management provides the means and support necessary to reach the objectives it sets for employees	38.0%	39.4%	77.4%	22.5%	0.0%	22.5%
The management provides the information and appropriate tools to do quality work	28.4%	45.9%	74.3%	21.6%	4.1%	25.7%
The management allocates necessary amounts for staff training	52.8%	34.7%	87.5%	8.3%	4.2%	12.5%
The management allocates necessary amounts for following through on staff suggestions	47.9%	43.7%	91.6%	8.5%	0.0%	8.5%
The management helps employees increase their productivity	45.8%	37.5%	83.3%	12.5%	4.2%	16.7%
The management encourages employees' suggestions for improving productivity	37.5%	33.3%	70.8%	26.4%	2.8%	29.2%
The management is available to assist employees in solving day-to-day problems in their sectors	36.1%	30.6%	66.7%	27.8%	5.6%	33.4%
The management is well enough acquainted with the work to help employees find solutions when problems arise	43.7%	31.0%	74.7%	16.9%	8.5%	24.4%
The management helps employees identify problems before they arise or before they become critical	60.8%	20.3%	81.1%	16.2%	2.7%	18.9%
The management is knowledgeable of staff training techniques	52.3%	24.6%	76.9%	18.5%	4.6%	23.1%
SUPPORT FROM EMPLOYEES						
Employees are willing to do other tasks to help their colleagues	7.0%	9.9%	16.9%	57.7%	25.4%	83.1%
Employees make an effort to help each other out	6.9%	6.9%	13.8%	58.3%	27.8%	86.1%
Employees ask colleagues their opinions and ideas about work	1.4%	12.3%	13.7%	50.7%	35.6%	86.3%
When a problem crops up, employees get involved even if the problem does not directly affect their work	11.1%	22.2%	33.3%	38.9%	27.8%	66.7%

Interpretation:

Based on the staff's replies to the question of support, the following comments can be made:

1) The management:

- does not allocate necessary amounts for following through on staff suggestions;
- does not allocate necessary amounts for staff training;
- does not help employees to increase their productivity;
- does not help employees to identify problems before they arise or before they become critical;
- does not provide means and support necessary to reach the objectives it sets for employees;
- is not knowledgeable of staff training techniques;
- is not well enough acquainted with the work to help employees find solutions when problems arise;
- does not provide the information and appropriate tools to do quality work;
- does not encourage employees' suggestions for improving productivity;
- is not available to assist employees in solving day-to-day problems in their sectors.

2) Employees:

- ask colleagues their opinions and ideas about work;
 - make an effort to help each other out;
 - are willing to do other tasks to help their colleagues;
 - to a certain extent, when a problem crops up, get involved even if the problem does not directly affect their work.
-

3.2.5 Feedback and Appreciation

	Disagree completely	Disagree somewhat	Sub-total	Agree somewhat	Agree completely	Sub-to
FROM MANAGEMENT						
The management makes an effort to emphasize certain employees' outstanding contributions in reaching the objectives set	49.3%	19.7%	69.0%	22.5%	8.5%	31.0'
The management encourages employees to develop ideas to improve quality of service and customer satisfaction	35.2%	25.4%	60.6%	33.8%	5.8%	39.4'
The management informs employees of the Institute's successes	23.9%	14.1%	38.0%	52.1%	9.9%	62.0
The management makes an effort to give feedback on employees' suggestions	38.9%	36.1%	75.0%	20.8%	4.2%	25.0
The management promotes company policies rewarding high-achieving employees	70.0%	24.3%	94.3%	4.3%	1.4%	5.7'
I am satisfied with the feedback I get from my immediate supervisor	37.7%	17.4%	55.1%	37.7%	7.2%	44.9
When the division's objectives for productivity are not reached, the management looks jointly for solutions with the employees	51.4%	26.4%	77.8%	19.4%	2.8%	22.2
The management spends more time looking for employees' mistakes than congratulating them on their accomplishments	20.3%	20.3%	40.6%	24.6%	34.8%	59.4
FROM EMPLOYEES						
Employees encourage their colleagues in working toward greater quality in their work	8.2	21.9%	30.1%	54.8%	15.1%	69.9
Employees are adept at recognizing their colleagues' efforts	8.5%	25.4%	33.9%	49.3%	16.9%	66.2
For the employees, the group's performance is as important as individual performance	8.5%	33.8%	42.3%	29.6%	28.2%	57.8
The employees readily accept criticism from their colleagues	16.7%	34.7%	51.4%	36.1%	12.5%	48.6
The employees are not afraid of giving their opinions to colleagues	5.5%	20.5%	26.0%	46.6%	27.4%	74.0

Interpretation:

Based on the staff's replies to the question of feedback and appreciation, the following comments can be made:

1) The management :

- does not promote company policies rewarding high-achieving employees;
- does not look jointly for solutions with the employees when the division's objectives for productivity are not reached;
- does not make an effort to give feedback on employees' suggestions;

- does not make an effort to emphasize certain employees' outstanding contributions in reaching the objectives set;
- does not encourage employees to develop ideas to improve quality of service and customer satisfaction;
- to a certain extent, spends more time looking for employees' mistakes than congratulating them on their accomplishments;
- informs employees of the Institute's successes.

2) Employees

- are not satisfied with the feedback they get from immediate supervisors;
 - are not afraid of giving their opinions to colleagues;
 - encourage their colleagues in working toward greater quality in their work;
 - are adept at recognizing their colleagues efforts;
 - to a certain extent, value group performance as much as individual performance;
 - to a certain extent, do not readily accept criticism from their colleagues.
-

3.3 Market Perception — Customer Replies

This section of the document is a summary of the results of the survey which was conducted among 27 companies, three consultants and one government organization. Readers who would like more details are asked to consult the complete report in Appendix H. These results are presented here by theme:

-
- Consulting Services in Trinidad and Tobago;
 - Knowledge of **CARIRI's** Services;
 - Customer Satisfaction of **CARIRI's** Services;
 - **CARIRI's** Reputation;
 - Improvement of **CARIRI's** Services;
 - Ways **CARIRI's** can become better known;
 - Information sources to select consultants.
-

3.3.1 Consulting Services in Trinidad and Tobago

- There are no competitors in the country or the Caribbean Region offering as wide a range of services as *CARIRI*. The consultants most often mentioned are:
 - University of West Indies
 - Institute of Marine Affairs
 - Food and Drug Agency
 - Bureau of Standards of Trinidad and Tobago

Companies mostly use the testing and analysis services of these competitors.

- Overall, the companies surveyed rank *CARIRI*'s competitors higher *CARIRI* and the main reason for that is the length of time it takes to conduct projects at the Institute.
- The number one reason for calling on the services of an outside consultant is lack of expertise and equipment within the company. Entrepreneurs consider that the cost of specialized equipment compared to the frequency of use does not justify its purchase. Companies are often required to get the opinion of independent experts from outside their companies to enable them to present objective results of tests and analyses of their products.
- The selection criteria used by companies when retaining consultants are:
 - personnel's expertise and technical competence;
 - consultant's reputation, references, curriculum vitae;
 - respect for deadlines;
 - price.

Although price was mentioned by most companies, it is important to note that it ranked in last place. Clients take into account the quality-price ratio of a project.

- None of the companies surveyed used offers for tender for selecting consultants to do work. They contact the consultants or are contacted by the consultants who propose their services.

3.3.2 Knowledge of *CARIRI*'s Services

- Throughout the survey, it became evident that Trinidad companies are not aware of *CARIRI*'s services. As a matter of fact, most companies had only used the Institute's testing and analysis services. Only a few companies mentioned having ever used technical information, engineering, quality control, product development or training services.

3.3.3 Customer Satisfaction of *CARIRI*'s Services

This section presents the degree of customer satisfaction on the different aspects of services offered by *CARIRI*. More details and comments made by companies can be found in Appendix H.

	Very dissatisfied									Very S
The first time enterprises spoke to an employee of <i>CARIRI</i> regarding their project, what did they think of:										
■ the quality of <i>CARIRI</i> 's welcome	1	2	3	4	5	6	<u>7</u>	8	9	
■ the amount of time that elapsed between the initial contact and their first contact with the person responsible for the project	1	2	3	4	5	<u>6</u>	7	8	9	
To what extent was the enterprise's problem or request understood by the personnel involved in the project at <i>CARIRI</i> ?	1	2	3	4	5	<u>6</u>	7	8	9	
Are enterprises satisfied with the way they participated in:										
■ defining their role and that of <i>CARIRI</i> personnel responsible for their project	1	2	3	4	5	<u>6</u>	7	8	9	
■ the negotiation of the contractual conditions for their project	1	2	3	4	5	6	<u>7</u>	8	9	
Based on the agreements made with the person responsible for the project at <i>CARIRI</i> , how do enterprises evaluate :										
		TIS					Other			
■ the quality of the technical results	1	<u>2</u>	3	4	5	<u>6</u>	7	8	9	
■ the usefulness of the technical results	1	<u>2</u>	3	4	5	<u>6</u>	7	8	9	
■ the meeting of deadlines	<u>1</u>	2	3	4	5	6	7	8	9	
■ their involvement and the information they received during the project	1	2	3	4	5	<u>6</u>	7	8	9	

On the whole, how do enterprises rate *CARIRI* personnel who worked on their project in terms of:

■ competence (technical expertise)	1	2	3	4	5	6	<u>7</u>	8	9
■ professionalism (integrity, confidentiality)	1	2	3	4	5	6	<u>7</u>	8	9
■ attitude and behaviour (openness, empathy)	1	2	3	4	5	6	<u>7</u>	8	9
■ personalized approach	1	2	3	4	5	6	<u>7</u>	8	9

What is the enterprises' evaluation of *CARIRI*'s equipment for use on projects?

1	2	3	4	5	<u>6</u>	7	8	9
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Generally speaking, how do enterprises rate the quality of *CARIRI*'s service?

1	2	3	4	<u>5</u>	6	7	8	9
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Would enterprises recommend *CARIRI*'s R&D, technical assistance or industrial information services to another firm?

- () yes
() non
(X) maybe, it depends on...

Would enterprises turn to *CARIRI* again for future projects?

- () yes
() non
(X) it depends on the type of project

Throughout the survey, it became increasingly clear that *CARIRI*'s main problem is in respect to deadlines and the time it takes to complete projects. In many cases, project deadlines were not respected. Clients say that the time *CARIRI* takes to do a project is so long that going outside the country is faster.

According to the companies surveyed, *CARIRI* takes a long time to start a project and send out an offer of service. What is worse is that this problem of respect for time is common knowledge among potential clients.

According to the people surveyed, the Institute is far too bureaucratic and does not adapt quickly to changes in economic conditions. With customer satisfaction rated average and a reputation to rebuild, it is not surprising that companies claim that the reason they do business with *CARIRI* is because they have no choice. *CARIRI* is the only organization to offer a range of services to the country's companies and they have to live with its shortcomings.

There is one other problem as serious as that of the delays and deadlines and it is the quality of information and customer service in the Technical Information Services (TIS). Companies judged it severely saying that the information and data given to clients is out-dated and that the employees of the TIS do not do research for them. Clients have to go and do their own research in documents. This poor reputation of the TIS is found both among present and potential clients. People surveyed thought this service was important for business and that it should be focussed on needs and customer satisfaction.

Companies feel satisfied with their project involvement although they would like to be able to get more information, be it on work progress or preliminary results, throughout the project.

Most companies consider *CARIRI*'s personnel technically qualified, depending on individual employees and departments. Companies believe that expertise varies from one person or one department to another. Companies do not recognize the Institute's competence in all sectors of activity. *CARIRI* is recognized in the sectors of food, quality control and tests and analyses.

Companies' opinions are divided on the question of price of services. Some people find the Institute's prices reasonable while others think they are too high. All agree that a fair price should be paid for services rendered. No one felt that the services should be free because they come from a government agency. The opinion is quite divided as to whether *CARIRI* meets the needs of business. Some mentioned that the reports put out by the Institute are incomplete. People would like to find more comments, conclusions and recommendations with the project results. Companies request that project leaders help guide their business by giving out more information than just tables and charts. The Institute needs to play a consulting role to entrepreneurs.

Companies need other types of tests and analyses as well as other services. They mentioned the following:

- Analysis and testing:
 - investigative work such as failure analysis;
 - impact testing;
 - physical properties;
 - testing of welding.
- Technical information on:
 - equipment;
 - materials;
 - processes, technological information on what exists elsewhere;
 - new chemicals and materials;
 - properties and uses of products;
 - technological information;
 - scientific literature.
- Product development and product improvement.
- Equipment:
 - identification of suppliers;
 - assistance in buying the adequate equipment (used or new); "check if it can do the job";
 - technological information on equipment;
 - modernization;
 - trouble shooting.
- Environment :
 - treatment of effluents;
 - disposal or valorization of residues;
- Training in quality control and processes.
- Marketing research.

- Joint venture: *CARIRI* should play the role of economic lever by creating links with international organizations and companies in order to attract investors to Trinidad and Tobago as well as bolster technology transfer. *CARIRI* should also have links with foreign companies who could offer business opportunities locally.

Finally, companies mentioned that they would use *CARIRI* again for tests and analyses but that for other types of projects, their decision would depend on the nature and complexity of work to be carried out. People do not think the Institute is able to carry out major projects nor projects in all sectors of activity.

3.3.4 *CARIRI's* Reputation

Many comments on *CARIRI* were made by the companies surveyed from the point of view of services, management image, reputation and the importance of the Institute to business. This summary contains the comments most often repeated. All the comments can be found in Appendix H.

It is important to note that while a great many negative comments were made, companies nevertheless consider that a "good *CARIRI*" is vital to the business and economic development of Trinidad and Tobago. Many people think that over the years *CARIRI* has lost its course from its mission and main objective which is to help business technically and technologically. Companies think that the Institute's employees are not concerned by their problems and do not consider them as clients which is why project time is too long and deadlines are not respected. In the business community, this is intolerable since for them, time is money.

Many people say *CARIRI* is a big machine which cannot adapt quickly enough to changing economic conditions and they think it is because of its massive bureaucracy. In addition, they feel that the Institute has become too politicized and that businesses do not have their proper place as *CARIRI's* clientele. To sum up, the Institute is neither business nor client-oriented. There must be changes in attitude as much on the part of management as of

employees. Companies are well aware that the Institute is experiencing management problems at this time.

Comments were also made about the employees who work on projects. Many companies think that one of the main reasons for employees not being in touch with the business world is that in many cases the employees have had no experience in business. Employees have come directly from universities or other training centres. According to some people, their approach to projects is somewhat academic rather than based on their experience in business.

Finally, companies say the range of services offered by the Institute is much too wide. They believe *CARIRI* should focus on the sectors it knows best and is best able to serve.

3.3.5 Improvement of *CARIRI*'s Services

According to the companies, the services which should be improved include: technical information, testing and analysis and marketing information. The different aspects to be improved include:

- Technical Information
 - update information;
 - obtain better service from *CARIRI*'s employees;
 - provide information on R&D;
 - provide information on equipment.
- Testing and Analysis
 - add different types of testing;
 - ensure a shorter analysis time and less delays;
 - improve presentation of results.

- **Market Information**

- provide local and international market information;
- identify partners for joint ventures;
- commercialize information;
- help exporters.

3.3.6 Ways **CARIRI** Can Become Better Known

Companies regret that the Institute is not more proactive on the market. Most of the companies are not aware of the services offered by **CARIRI**. In reality, it is only recently that the Institute has established the Business Development Unit that takes care of the Institute's representation. According to the people we met, the best way for an organization like **CARIRI** to become known is for its representatives to make visits to companies. Not only should the representatives be able to answer the needs of companies, they should also be able to identify problems and other needs that **CARIRI** could fulfil.

Publicity in the different media (magazines, newspapers and television) and mailings of brochures and corporate documents can also be used by the Institute to promote its services.

Companies also mentioned the following ways of becoming better known:

- workshops in different sectors;
- letters and business letters to companies;
- success stories; publishing their clients success stories in newspapers and interviews with the company;
- more PR;
- training and courses by **CARIRI**;
- services to the rest of the Caribbean outside Trinidad & Tobago; **CARIRI** should work with the Caribbean Development Bank who is involved in projects in the whole region; this market must be more exploited;
- more interaction between **CARIRI**'s staff, companies, chambers of commerce, associations and higher learning institutions;
- selected direct mailing to companies according to what a particular enterprise does;
- phone calls;

- open houses and visits by sector;
- needs analysis for current clients.

3.3.7 Information Sources to Select Consultants

The main sources of information used to select consultants are:

- personal contact at the consultant's;
- business and professional associations.

3.3.8 Conclusion

The results of the survey are not entirely negative and can serve as an excellent guide for directing and planning *CARIRI*'s services. The people surveyed consider the Institute to be a vital organization for the business and economic development of the country. They have every interest in a high performing organization focussed on the needs of business. However, it is clear that companies require quality services which take their needs into account. Companies expect more from *CARIRI* than has been delivered in the past considering the wide variety of resources at its disposal.

4.0 DISCUSSION OF THE RESULTS

Our objectives at the outset were:

1. To evaluate the actual Strategic Plan and the orientations of the Institute;
2. To evaluate the perception existing and potential customers have of the Institute's operations and image;
3. To evaluate the Institute's installation and equipment;
4. To evaluate the know-how and competence of the Institute's staff in carrying out its duties;
5. To evaluate the efficiency of the operational systems that the Institute has put in place to better serve its customers, i.e., industry.

The results will be discussed under each item listed in the objectives, illustrated by selected comments of managers and staff and followed by our own observations.

4.1 The Institute's Plans and Direction

4.1.1 General Observations

The 1990-1994 Strategic Plan, updated in 1993 in light of the reduction in government funding, is well done and realistic. This plan was based essentially on four premises: level of government funding, customer satisfaction with *CARIRI*'s services, market potential and rationalisation of the Institute's activities and structure. By thoroughly adhering to these four premises, *CARIRI* was able to identify certain sectors of the market in which to position itself. These sectors included: food, drink and tobacco; export agriculture; domestic agriculture; chemicals and non-metallic minerals; miscellaneous manufacturing and wood and related products. As part from food and drink sector, *CARIRI* does not seem to

have positioned itself in other well identified sectors and has not yet identified the nature of the services it could offer to each sector in order to meet their needs.

Information services have been identified by customers as being of vital importance to them and yet they have been neglected by management to the point of inefficiency where quality of material in store, computer facilities and databanks are sadly lacking. There is nothing in the Strategic Plan aimed specifically at upgrading that unit. Moreover, the staff is not trained to answer the needs of the market through market studies, information on equipment, suppliers and standards prevailing in the countries to which products are exported.

The Institute's Strategic Plan and direction have not been well explained and communicated to staff. It is therefore not surprising that the staff would have such a negative response to the Plan. No matter how well a plan is made, unless it is explained unambiguously to staff and fully implemented in an institute, it will fail along with staff morale.

4.1.2 Selected Observations on the Institute's Plan and Direction

The Board

- There are too many academics and government officials on the Board (refer to "the Act of Incorporation of *CARIRI*"). If *CARIRI* wants to be more business-oriented, there should be a majority of industrial members on its Board.

The role of the Board is not well defined. It seems to interfere too much with the running of the Institute rather than providing policy guidelines.

- The chairman should preferably come from industry rather than from a university.
- The CEO of the Institute should also act as the Chairman of the Board as this would enable him to effectively implement the Board's decisions.

- There should not be a consultant on the Board. The consultant will be more useful in helping the executive committee in implementing the Board's decisions.

The Mission

- The mission is too vast and is subject to a lot of misinterpretation. In fact, everybody seems to have his own interpretation of the mission. The wording of the mission should be more precise and focussed.
- In the actual context in which *CARIRI* is operating, is this mission still valid?
- The mission does not state the means that *CARIRI* will be putting in place to achieve its goals, neither does it state where the emphasis will be placed, human resources or customer satisfaction.
- Because of the presence of various ethnic groups on the island and in the Caribbean as a whole, should not the mission also contain a racial equity component?

Based on staff replies to the question of mission, our conclusions are:

- (a) the mission is not clear nor understood nor accepted by the whole staff;
- (b) the Institute's present management and the decisions it makes do not concur with the mission;
- (c) the mission is not realistic with respect to the means the Institute has at its disposal.

CARIRI must without delay explain its mission clearly and without ambiguity to the whole staff.

The Strategic Plan

- Should the Strategic Plan not cover the entire Caribbean region instead of just Trinidad and Tobago in order to broaden the customer pool?
- There is a need to provide consultancy services.
- The services offered by *CARIRI* are too broad and too thinly spread. There is therefore a need to rationalize and to concentrate on a few activities only, e.g., Food Technology, Testing and Analysis and Information.
- The electronics department should be eliminated as there is not much going on in it. There is a lack of personnel, equipment and projects.
- Many of the testing activities at Macoya could be eliminated as well such as ceramics, for example. *CARIRI* should maintain tests that are needed by the customers only. In this way a lot of space could be recuperated for the introduction of other much needed tests.
- TIS must be updated and its importance must be reviewed based on customers' comments. We are living in an information age and customers want to know their market both at home and abroad. So TIS must be given better tools to function efficiently and its data banks updated and enlarged.
- There is also an urgent need for a Human Resources Unit as the requirement of training at all levels has been identified a top priority by staff.
- There is also an urgent need for equipment replacement and a maintenance policy. The outdated equipment and its lack of maintenance are causing long delays in the execution of the work, which consequently also increase the prices of the analyses.
- The activities in biotechnology and the environment are not yet defined.
- A lot of work needs to be done before the Institute could obtain ISO 9000 accreditation.
- There is also no equipment upkeep developed by *CARIRI* and no intellectual property policy.
- There is no policy on exclusivity of services for the staff of the Institute.

4.2 Customer Perception of *CARIRI*'s Operations and Services

4.2.1 General Observations

Based on interviews with regular and potential customers and on the replies that Mr. Ramnasibsingh received in his own study, customers do indeed have a bad perception of *CARIRI*'s operations and services, except in some selected areas such as food technology and testing and chemical analysis. The main complaints were:

- high cost;
- poor timely delivery;
- lack of interpretation of results and recommendations;
- lack of involvement in their project until the very end of the project;
- lack of understanding by *CARIRI*'s staff of their problems due to lack of industrial experience;

Although management is aware of these problems, nothing is being done to improve the situation. For instance, TIS is viewed very poorly by customers due to the obsolete information it provides. Customers also complain that the TIS staff does not help them at all in looking for information. They are often asked to research themselves in the library, something they do not have time to do.

4.2.2 Selected Observations on Customers Perception of *CARIRI*'s Operations and Services

Customer Complaints

- The customers complain that there are long delays in start-up of work, its realization and delivery of results. This may be attributed to many factors such as the purchasing procedure, suppliers, equipment breakdown, long shipment, and the signatures of reports.

- The customers also complain that they are not informed of the progress of their work until the end of the project. They would like to have an interim short report every now and then during the realization of the work.
- Reports often take the form of charts and numbers without any comments, interpretation or recommendations. Customers do not know what to do with the results. There is a definite need for improvement in that aspect.
- There is a need to improve the purchasing procedures to counteract delays in shipment and find suppliers with a line of credit to the Institute instead of needing cash with purchase order.
- To cut delays, **CARIRI** should keep a basic stock of current materials, regularly maintain its equipment and have the testing and analysis methods readily at hand.

Pricing and Cost Estimates

- There is a lack of a pricing policy. Pricing is currently done in a punctual manner and not based on any criteria.
- Some prices are high because of the high cost of equipment, manpower, and materials.
- The customers complain that **CARIRI** charges the same price per sample irrespective of the number of tests being done even if the tests are repetitive. The same comments apply to the chemical analysis.
- There is an urgent need to review the pricing policy, e.g, hourly rate, type of customers, degree of risk in the work and so on.
- According to managers, the perception of customers is that **CARIRI**'s services should be free or that they are too high. However, based on our customer survey, we found that some customers may be willing to pay high prices providing the services are of good quality with timely delivery of results and adequate interpretation and recommendations.

Delivery of Results

- The main complaints concern the length of time projects take, costs and inadequately explained results.

Customers report that there are long delays:

- between the order or requisition and the beginning of the job;
 - during the execution of the job;
 - in the delivery of the reports.
- Customers also complain that there is too much bureaucracy in *CARIRI* and there is no delegation of signatures. The CEO must sign every report that leaves the Institute. What is the role of unit leaders? They do not seem to have any authority.

4.3 Installation and Equipment

4.3.1 General Observations

Being at *CARIRI* enabled us to have an on-site assessment of *CARIRI*'s installations and equipment. In our opinion, the Institute has the necessary space and equipment to meet customer demand. However, much of the equipment is either old and cannot be upgraded or not working due to lack of maintenance and breakdown. Such equipment should be replaced or repaired as identified in the Strategic Plan 1993-1995 pages 50 to 53⁽¹⁾ to cut down on delays in the delivery of results or to develop new services in environment and biotechnology. If *CARIRI* is to fulfil its commitment to the environment, additional equipment such as a Hach COD measurement apparatus, a Hach manometric BOD metre, a new atomic absorption spectrophotometer, a new GC-MS spectrophotometer, a new HPLC and other testing equipment are required. Space must be allocated to develop services to the environment.

1

As regards X-Ray spectrophotometer, there is a new one being installed in the testing laboratory at Macoya. Whether this equipment is the same as the one stated in page 52 is not known.

4.3.2 Selected Observations on Installation and Equipment

Materials

- There is no stock of basic common laboratory materials such as acids, alkalis, minerals, organic materials, etc.. They have to be ordered each time for each project.
- Books and reference materials are not regularly updated.
- Most of the materials have to be purchased abroad due to lack of local suppliers or to the high prices charged by the latter if available.
- Most foreign suppliers need cash in foreign currencies with purchase order, a commodity in short supply in Trinidad and Tobago.

Equipment

- Much of the laboratory equipment is not in working order due to lack of proper maintenance and frequent breakdown. It is very expensive to call in an engineer to carry out repairs. Often the engineer repairs the electronic component of the machine but, as they have no knowledge of chemistry, it leaves the operator to fend for himself.
- Many equipment models are old, purchased second-hand or given to the Institute as a gift with no instruction manuals. When the person who knows how to operate the machine leaves the Institute, it is difficult to get the machine operating again. They cannot be updated to take in computer commands or fitted with an auto sampler. Samples have to be injected manually one at a time, with a recalibration of the equipment after each analysis.
- Due to the fact that everything has to be done manually, analysis takes a long time and consequently the cost goes up. For example, **CARIRI** charges \$TT300 per sample to determine total nitrogen using Kjeldahl's method compared to \$TT120 in Canada. That is why customers send samples abroad for analysis. The reason for the high price is because **CARIRI** bases their costs on an hourly rate and the cost of agents is also high.
- There is a need to acquire better and more modern equipment and to provide the necessary training of staff to use it properly.

- Foreign suppliers of equipment do not treat Trinidadians in the same way as they would treat Canadians or Americans due to lack of competition.
- *CARIRI* has got too many equipment makes. It is expensive for each supplier to maintain an engineer in Trinidad to look after equipment. *CARIRI* should have only one or two equipment suppliers.

Pilot Plant Equipment

- As far as the pilot plant is concerned, *CARIRI* is fully equipped to answer its customers needs.

Information

- The computers available at TIS are too old and not powerful enough to take in modern programs. They need to be upgraded if TIS is to be efficient.
- There is a need for an international fax machine in addition to the one available in the CEO office.
- TIS should be linked up with several world databanks to meet the needs of the Institute's customers for both technical and commercial information.

4.4 Staff Competence

4.4.1 General Observations

CARIRI has over 100 people on staff divided into four main categories: managers, professionals, technicians and office workers. All professionals have at least a B.Sc., M.Sc. or Ph.D. in their appointed field and experience in research institutes, universities and industry. However, most of the staff do not have any industrial experience or business training.

Although there is no doubt the staff carries out its technical duties efficiently, professional training is lacking. Because of the nature of the business *CARIRI* is in, technical competence is not enough. A good understanding of industrial needs acquired through experience or training is a must. These training needs have gone unmet due to the lack of a Human Resource Unit and training policy.

When selecting unit leaders and managers, there should be criteria other than technical competence or qualifications. Leadership qualities, management capabilities, ability to motivate staff, knowledge of market sector and sharing top management's vision are equally important.

CARIRI lacks a human resource policy, a budget for training purposes and criteria for promotion or appointment of staff and managers.

4.4.2 Selected Observations on Staff Competence

Human Resources

- There is no continuous training program for management and staff.
- There is a lack of communication among different units and with top management.
- There is no performance appraisal system in place.
- The Institute has no policy or means in place to motivate staff performance.

4.5 Operational Systems

4.5.1 General Observations

Despite managers' comments, there is an operational system in place but it must be updated in light of customer comments to render the system more efficient and productive. Changes to the operational system must be implemented carefully and staff trained to use it efficiently.

The areas for improvement are:

-
- purchasing procedure;
 - project management through delegation of authority;
 - regularly updating of information on time sheets, project status reports, informing the client;
 - regular equipment maintenance;
 - customer involvement in project from beginning to end;
 - telephone and communication system both internally and externally;
 - billing system;
 - pricing and cost estimates;
 - public relations with customers and industrial relations with staff;
 - more interpretation of results and recommendations.
-

With improvement in these areas, *CARIRI* has a reasonable system in place to deliver high quality products and services to customers on time.

4.5.2 Selected Observations on operational systems

Infrastructure

- There are two locations in **CARIRI** - at Macoya and on campus. The testing facilities, electronics and TIS are at Macoya and the rest is on campus. Facilities at those two sites must be rationalized as quickly as possible. Better still, there should be, in a very short term, a re-evaluation of the relevancy of maintaining these two separate sites.
- Layout of laboratories should be rationalized and laboratory space redistributed. Offices should be regrouped so that personnel doing the same type of work are close to each other to facilitate communication. For instance, industrial chemistry and analytical chemistry laboratories should be close to each other; biotechnology, food technology and microbiology laboratories should be together. There should be a separate space allocated as an environmental testing laboratory.
- There are only two telephone lines accessible to customers who complain that **CARIRI** is very difficult to reach. The communication system could be improved with additional equipment such as telephone lines and an international fax machine.
- Policies regarding the acquisition of equipment and its maintenance should be elaborated and implemented by unit leaders with the collaboration of the division managers.
- Unit leaders should be responsible only for the maintenance of the laboratories, management of staff duties, allocation of resources (both human and physical) and staff performance appraisals.
- TIS should be on campus instead of at Macoya as most of the work that requires information is done on campus. TIS could also benefit from the vast libraries and databanks of UWI.

Organization of Activities and Work

- The present structure of **CARIRI** is adequate for **CARIRI**'s immediate needs but there is an urgent need for implementing good management practices. The 1993-1995 Strategic Plan contains all the necessary elements for the Institute's success but has not been well implemented.

- Authority is too centralized and there is a lack of accountability. The CEO has to sign almost every report that leaves the Institute. There should be a delegation of authority to project leaders who should be made accountable for all the expenses relating to their projects. Project leaders should oversee all aspects of their projects such as budget, timely delivery of results, interpretation of results and recommendations. Unit leaders should oversee all the other expenses such as main laboratory equipment, maintenance and overhead. They should sit on committees to make marketing plans, introduce new services, promote the services of the unit both internally and externally, make the budget at the beginning of the year and do staff appraisals. Unit leaders should only rubber stamp reports leaving their units.
- There is a need to implement a costing system and elaborate a policy about pricing.
- There is a need to implement a human resource policy for all staff across the board as regards training, promotion, job description, delegation of authority, public relations and communication, etc..
- There is no cross selling because each unit does not know what the other is doing due to lack of inter-unit communication and lack of team work.
- If project leaders were given more responsibility and authority as described above, there would be no need for a project management group. Project leaders must be adequately informed of the status of their projects and be given the necessary tools so they can decide what action to take to prevent a budget overrun or delay in delivery time and when to negotiate with the client for extra time or money if required.
- A project management system does exist in **CARIRI** but it is not implemented. It seems that:
 - (a) there is no regular update of important information coming from time sheets. Consequently, project leaders have no idea how much time is being charged to their projects by different project participants and cannot take appropriate action;
 - (b) information is not sent to the right people (project leaders) but to unit leaders or managers who either put them aside or throw them away;
 - (c) there has been a cut in the staff who would have implemented the system.

- The purchasing procedure is too long and needs reforming.

Finance

- There is a lack of funding strategy, and incentives by the government to encourage industries to do R&D. *CARIRI* management does not know where to look for funds to finance the Institute's activities.
- The authorization of purchases should be done by project leaders provided that these purchases have been included in the budget during the cost estimation of the project. In this case, there would be no need for three signatures as is currently practised in *CARIRI*.
- Receivables are getting better. We have had a lot of problems over the years (TT\$ 2 million not billed and no follow-up).
- There is no link between the information systems such as HR, CASS, and finance causing problems to get information to do job cost analyses.

Business Development Unit

- It is good to have a BDU within *CARIRI*. The role, limits, and the level of responsibility are well defined in the 1993-1995 Strategic Plan although are not yet fully implemented.
- Unit leaders and staff have not entirely understood the BDU's role and the many negative comments about BDU stem no doubt from that. The fact that technical unit leaders did not participate in the marketing plan has not helped either. Another reason is that to date the BDU has been a one man situation, unable to interact with all staff and unit leaders before making the marketing plan.
- The BDU staff needs to have the right personality and the right training to do the job. That is not so obvious at present.
- The executive committee must have BDU work with the technical staff as soon as possible within the Institute.
- The technical staff must be told and taught the role of the BDU and how to interact with it. They must be involved in the process of making a marketing plan for their services. The BDU manager must overcome the problem of communication between himself and the technical staff so

that they could work as a team. Consequently, there would be more cross selling of different unit capabilities.

- *CARIRI's* capabilities are not well known due to lack of communication and publicity. There are no communication tools such as cameras, videos, television, etc.. There are no open house activities to allow customers to visit the institute.
- It appears that the PR officer does not have the necessary tools to carry out her function. There is a need for a budget for her to acquire such tools.
- It must be made known to the technical staff that there will be only one person on the BDU staff to look after environment and that he is there for marketing purposes only and to prepare the ground for future projects in the environmental sector.
- Because of lack of communication and the noninvolvement of the technical staff in the marketing effort in the environmental field, it would appear that BDU is marketing something that *CARIRI* does not have the capabilities to deliver, i.e., the CFC project. In our investigation we notice that *CARIRI* has neither the know-how, the personnel nor the equipment to do work on CFC substitutes. There is no testing equipment either.

4.6 Internal Climate

Based on staff replies to the questionnaire, staff morale is very low and the internal climate poor. The staff have expectations that go unfulfilled and have lost their trust in management. The main reasons for their discontent may be summarized as follows:

- they do not quite understand the mission because it is not clear and too broad;
- the Institute's present management and the decisions it makes do not concur with the actual mission;
- the mission does not concur with the means the Institute has at its disposal;

- realistic and measurable objectives with regards to staff development, economic productivity and self financing, development of new services, technological innovation and development of strategic alliances are not set;
- the process of setting objectives does not involve the staff;
- work is not organized to make maximum use of resources;
- the Institute's organizational structure does not make reaching objectives feasible;
- support services do not facilitate work done at the operational level;
- there is little collaboration between divisions and no knowledge of what is going on in other sectors;
- the management does not have the tools for measuring the quality of services provided, customer satisfaction, tracking the Institute's performance and making room for corrective measures if needed;
- immediate supervisors lack ability to animate work groups and coordinate their work team's activities;
- support from management in terms of staff training, problem solving, increased productivity, etc. is lacking;
- management does not reward high achievers, give any feedback for work well done, inform staff of the Institute's successes and so on.

Not only is staff disenchanted with management, neither do they see a very bright future for *CARIRI* in its present state. They want management to do something to take *CARIRI* out of its poor state so that the Institute may move forward. Such negative attitudes may be explained by the fact that *CARIRI* is in transition and has not fully redefined itself yet. Moreover, the whole management team from top executives to unit leaders are only acting and not firmly in place. In addition to this, *CARIRI* has recently laid off staff due to the decrease in financial support from the government and the rationalization of its activities. When the questionnaire was handed out, *CARIRI* had no idea of how much funding it would be receiving from the government and most of the staff was worried about their own future in the Institute.

5.0 CONCLUSION

As a result of this audit, we have come to the following conclusions:

- (1) Industry in Trinidad and Tobago and perhaps in the whole Caribbean Region definitely need **CARIRI**'s services in particular testing, chemical analysis, food technology and information.
- (2) Some of **CARIRI**'s activities do not answer the needs of the marketplace, i.e., electronics and information as given now to clients. Clients need to know not only the potential of their products in Trinidad and the Caribbean Region but also in the U.S.A, Canada and Latin America. This information may only be obtained from the databanks of the respective countries. Clients also need to know product standards from these countries.
- (3) The present organizational structure is adequate but needs to be implemented on a firm basis as soon as possible to enable the unit leaders to assume their responsibilities in their respective units. The activities of each unit must be reevaluated and rationalized in light of customers needs in the market place.
- (4) Because of the Institute's recent restructuring, clients do not know where **CARIRI** is going. They have begun to lose confidence in **CARIRI**'s ability to fulfil their needs. Management must try hard to regain that confidence by having a period of stability, good public relations and by rebuilding the Institute's image.
- (5) The Board is largely composed of people coming from academic, government and other milieus rather than from industry. The opposite would make of **CARIRI** an organization which is more business-oriented and more directly in line with its mission and clientele.
- (6) There is an overall problem of management in the Institute. For one thing, there is no Human Resource Unit and no policy of equipment purchase and maintenance. The project management system in place (ref. Strategic Plan) is not being implemented. Management does not seem to have a clear vision of where they want **CARIRI** to go.

- (7) There is a definite need for a BDU in *CARIRI* but its role, its limits and its function must be clearly defined, explained, and communicated to the Institute's staff. The BDU must be implemented quickly in the Institute so that there could be a better teamwork and a cross selling effort undertaken by both the technical and the marketing staff.
- (8) TIS needs overhauling to make it more efficient and increase its performance. TIS has to answer market needs. Customers at present are not happy with the quality of services provided to them to date by TIS.
- (9) In general, the technical capabilities of *CARIRI* unit leaders and staff are very good but they seem to operate in isolation without interaction with other units and without taking into consideration the needs of the clients and the market, especially timeliness of delivery and quality of reports. The management capabilities of the unit leaders, however, are dubious. They do not seem to go along with the top management's plans and vision. With that in mind, it might be difficult for them to implement management decisions.
- (10) The Institute seems to have the necessary equipment to answer the immediate needs of its clients. Unfortunately, much of the equipment is old, takes time to operate and upgrading to take in an autosampler or computer commands is impossible. This equipment will have to be replaced if the unit is to operate efficiently and lower the cost of analyses.

There is also a lack of equipment maintenance which results in frequent breakdown. The technicians do not have the necessary training to repair or maintain them.

- (11) The staff is willing to go along with management's plans and vision provided that:
 - (a) the mission is clearly stated and explained to them;
 - (b) management takes actions that concur with that mission;
 - (c) management gives them the proper tools, equipment, infrastructure, etc. and the proper training to enable them to function efficiently;
 - (d) good management practices are implemented to motivate them to do their work more efficiently;

- (e) management sets more realistic objectives with their participation and appraises them fairly;
 - (f) management gives them some feedback and follow-up after they have been appraised;
 - (g) management rewards high achievers in appreciation for their work.
- (12) There is obviously a lack of funding for the Institute's activities but as this is linked with good management organization and practice, **CARIRI** must solve its management problem first before developing a funding strategy. **CARIRI** must set up a means of measuring the impact of its activities on the country's overall economy and the market needs of its services.
- (13) The internal climate is poor because of low staff morale and lack of motivation. Management has a major role in restoring staff confidence by providing direction and a sense of purpose.

6.0 RECOMMENDATIONS

Based on analysis of staff replies to our questionnaires, the comments made by those interviewed, customers and management, and our own observations and conclusions, we would like to make the following recommendations to **CARIRI**:

- (1) Recruit a CEO as quickly as possible, preferably from the Caribbean Region, who would have the following profile:
 - a good technical background to be able to understand the nature of the business **CARIRI** is in;
 - proven management experience at an operational level and coming preferably from a technically-based industry such as Food Technology, Pharmaceutical, Petro-chemical and/or Petroleum industries;
 - a good knowledge of the industries in the Caribbean Region, a clear vision of where an institute like **CARIRI** should go and an ability to make firm decisions to position **CARIRI** for the future.
 - good communication skills; must not be racially biased and must be honest and committed.
- (2) The new CEO must be able to build his or her team from among competent people within the Institute or through personal contacts outside to be able to implement faithfully the Board's decisions and his or her own vision. The team composition should preferably consist of a human resource manager, a financial manager, a marketing manager, a technical manager and a TIS manager (once TIS becomes more viable and important).
- (3) Unit leaders should be appointed from staff who are not only technically competent but also share the same vision as the executive committee and the Board and have the same personality profile as its members.
- (4) The initial mandate of the CEO will be to revise the Strategic Plan and develop, in conjunction with unit leaders, ways to implement the plan.

- (5) The new executive committee will have to reevaluate the Institute's mission and, with the help of the Board, renegotiate it with the appropriate government department. They will have also to rephrase its wording to ensure it is well understood by staff and clients alike.
- (6) To be more business-oriented, the composition of the Board will have to be reviewed in order to contain a larger majority of business people recruited from the island's main ethnic communities.
- (7) The executive committee and unit leaders, with the support of the Board, will have to review all services presently offered by the Institute, unit by unit, and eliminate those that are not profitable or not required by the market. Activities that represent the national interest should be retained or introduced and supported in a planned manner to acquire new knowledge or to develop new technology.

The selection or the introduction of new activities should be based on the following criteria:

- (a) capabilities of the staff to do the job;
 - (b) the number of projects realized in each category over the last two to three years;
 - (c) market needs;
 - (d) competition by other similar institutions in the private sector;
 - (e) interrelationship between the services offered and the support available in the Institute;
 - (f) physical capacity to do jobs (equipment, infrastructure, computers, etc.).
- (8) Environment and Biotechnology

Environment

CARIRI was asked by government to offer services in the sectors of environment and biotechnology.

Based on the available facilities at *CARIRI*, we would recommend work in the following areas of the environment:

- (1) biodegradation studies on the final product such as detergent, soap, washing liquids, packaging, etc.;
- (2) monitoring and diagnostic work relating to the quality of drinking water, air, wastewater and sludge. These may be done at two levels:

Level I

determine the following parameters: pH, ThOD, TOD, TOC, BOD, COD, turbidity, total counts, fecal coliform, colour and such ions as Pb^{++} , Hg^{++} , Al^{+++} , Na^+ , K^+ , Ca^{++} , Mg^{++} , Cl^- , SO_4^{--} , NO_3^- , NH_3 , etc.;

Level II

organic pollutants by HPLC, GC and GC-MS.

(3) Treatment

- search for appropriate technologies for the treatment of water, wastewater and air from international databanks;
 - select one or two technologies pertinent to the climatic conditions as well as the nature of the waste water to be treated;
 - carry out comparative testing of the various technologies on a laboratory scale to determine the best technology;
 - recommend the best technology to clients;
 - implement the technology with or without modifications to suit conditions in Trinidad.
- (4) Development and supply of microbial inoculants to existing treatment facilities. *CARIRI* has already got experience in that area in enhanced recovery of oil, mushroom inoculum, and starter culture in wine-making.

CARIRI should avoid the following areas:

- synthesis of CFC substitutes except for testing purposes;
- development of new treatment processes unless the idea is original and has not been studied elsewhere;
- environmental impact studies such as toxicology, measurement of CL₅₀, allergies, respiratory distress;
- any interference in existing processes because of industry conservatism, unless **CARIRI** wants to improve the efficiency of the treatment process by optimizing the utilisation of the plant.

(5) Valorization Area

Liquid recycling, wastewater treatment, raw materials for making microbial inoculants.

Solid composting, raw materials for making inoculants, sugars etc.

Biotechnology

As far as biotechnology is concerned, **CARIRI** should concentrate its efforts in fermented foods or the production of certain food additives such as food colours, certain flavour ingredients, etc. It should also look at the application of enzymes to increase yield in existing food transformation processes such as juices, beer, wine, extraction of natural products, etc..

- (9) **CARIRI** will have to revise its position towards TIS and view it as a matter of national importance because we are living in an information era. The western nations are already thinking in terms of an INFORMATION HIGHWAY. TIS should link up with industry and government to set up a more efficient and updated TIS either within **CARIRI** itself or as part of a National Information Centre. This should include the Caribbean countries, Latin America and part of North America. By doing this, it will enable TIS staff to acquire a certain degree of specialization as the customers request.

- (10) BDU faces many challenges:
 - (1) make inventories of the capabilities of the Institute both in terms of staff and equipment with the participation of unit leaders;
 - (2) carry out with the help of TIS a thorough market study of the entire Caribbean Region in the field of environment and other potential areas;
 - (3) interact with unit leaders to develop and implement a marketing plan to sell *CARIRI*'s capabilities to institutions and industries in the entire Caribbean Region;
 - (4) reassess both the composition and the abilities of its staff to sell the Institute's services;
 - (5) develop, with the participation of the finance manager and the unit leaders, a pricing policy.
- (11) *CARIRI* will have to set up a Human Resources Division as soon as possible to boost staff morale, develop a policy of work ethics and exclusivity of services, develop and implement a training program for both the managers and staff of the various units and improve staff working conditions (motivation, internal communication and the performance appraisal system).
- (12) Our opinion is that a project management group to oversee the progress of projects is unnecessary. *CARIRI* will have to delegate authority to project leaders responsible to oversee the status of their own projects in terms of budget, delivery of results, informing the customers, signatures of reports and purchases. This would improve on the timely delivery of results, customer confidence and budget overrun provided the necessary tools are available. Project leaders would have a better organization of their work and be able to set priorities. Project leaders will also provide some interpretation of the results and tell the customers what to do with them.
- (13) *CARIRI* will have to make an inventory of all equipment, keep equipment that is relevant to its new direction and discard that no longer useful; acquire new and more up-to-date equipment and have a maintenance policy (service contract with new equipment).

- (14) There should be only one **CARIRI** located preferably on campus. This would enable the Institute to rationalize both space and activities. TIS would then be able to make better use of the UWI library and databanks and better service both internal and external clients.
- (15) The Institute will have to take its communication problems seriously and consider installing a 1-800 line. In fact, the Institute is lacking in all communication equipment, international fax machines, televisions, videos, cameras and so on.
- (16) For internal purposes, project and unit leaders should charge the real costs for doing a particular project. However, to sell to customers, **CARIRI** should have a pricing policy taking into account, for example, discounts for regular customers in good standing, the element of risk in the project, the amount of stock to hold on site and a good equipment maintenance program. If it is too expensive or too risky to do the project, management will be able to make a decision as to whether to continue in this line of activity or stop it altogether. Because the Institute charges its customers at an hourly rate, management will have to decide where and how to spread the overhead costs.
- (17) **CARIRI** will have to make a study of all funding possibilities and develop a strategy of how to acquire funding. This may take the form of:
 - (a) negotiation with the government for more funds to finance some of the Institute's activities and give more incentives to industry to invest in R&D;
 - (b) foreign aid from developed countries like Europe, Japan, U.S.A. and Canada;
 - (c) form an association of industries working in similar or connected fields, whereby **CARIRI** will be an associated laboratory doing R&D for each of its members;
 - (d) public funding such as selling shares in the stock market. For this to succeed, **CARIRI** must be innovative in identifying projects that will pay off;
 - (e) joint ventures, like the mango project, with partners abroad;

- (f) a loan from the International Monetary Fund or from Regional Banks although this would require a good management team, the backing of the government and a good project;
 - (g) recuperation of bad debt from customers;
 - (h) rescheduling of *CARIRI*'s debt and interest payment.
- (18) *CARIRI* will have to play an active role in the regional and international networks (e.g. Waitro).

CONDITIONS

In order to meet those challenges, *CARIRI* will have to fulfil the following conditions:

- (1) a good management team and practices;
- (2) a clear vision of where *CARIRI* is going;
- (3) good leadership;
- (4) a professionally run organization;
- (5) a highly motivated and loyal staff;
- (6) stability while making the changes;
- (7) a planned implementation of managerial decisions;
- (8) improvement of the Institute's image in the marketplace;
- (9) a good marketing strategy;
- (10) willingness to form partnerships with other organizations;
- (11) willingness of staff to work as a team;
- (12) willingness of unit leaders to cross-sell the activities of other units.