

**MINISTRY PAPER NO.:** \_\_\_\_\_

## **PERFORMANCE OF THE SCIENTIFIC RESEARCH COUNCIL FOR THE 2003/2004 FINANCIAL YEAR AND FOCUS FOR 2004/2005**

### **1.0 Purpose of Ministry Paper**

The main purpose of this Ministry Paper is to inform the general public of the performance of the Scientific Research Council (SRC) during the 2003/2004 Financial Year and the main focus for the 2004/2005 Financial Year.

### **2.0 Mission**

The Mission of the SRC is to:

- providing quality scientific and technological solutions (product/process research and development, policy advice, technology transfer);
- popularising science and technology through strategic alliances; and
- being customer-focused, with innovative, competent and responsive teams.

### **3.0 Role and Functions of the SRC**

The SRC was established by an Act of Parliament in 1960, with subsequent modifications to operating procedures.

Overall, the SRC seeks to contribute to economic growth by broadening the industrial base in a manner that focuses on the utilization of local resources. The SRC also provides technical support to existing industries to enhance their performance in increasingly competitive domestic and international markets. To that end, the Council is involved in:

- (a) development of new and improved marketable Jamaican value-added products;
- (b) commercialisation and subsequent sale of products and technologies based on local raw materials. (The objective is to reduce risks to entrepreneurs.)
- (c) provision of Science & Technology (S&T) information;
- (d) provision of technical support, training, and transfer of technology to the agro-industrial sector;

- (e) provision of technical support, training and advice for the management and optimisation of waste in several sectors, including tourism;
- (f) increasing public awareness of the relevance of science and technology to national development;
- (g) introduction of advanced agricultural technologies to enhance productivity in selected sectors;
- (h) economic management of important local resources in a sustainable manner; through partnership with local communities
- (i) facilitating and encouraging the development of the national innovation system; and
- (j) policy planning, implementation and management through national projects and committees of Government agencies.

#### **4.0 Priority Policy Issues**

Based on the National Industrial Policy (Cluster 3) and the National Science and Technology Policy, the SRC is mandated to support the agro-industrial sector in ensuring food security, strengthening export potential and to improve the quality of life.

#### **5.0 Highlights of Performance for 2003/04**

The following outlines the achievements of the SRC in meeting the priorities of the Ministry for the financial year 2003/2004.

##### **5.1 Objective 1 - Customer productivity is increased and the quality of their goods and services improved through the provision of S&T solutions**

###### **5.1.1 Marketing of SRC Services**

- (a) The SRC corporate brochure was completed and distributed and the website updated; the corporate logo and mission and vision statements were completed and signage posted at appropriate locations.
- (b) Presentations were made to the Jamaica Manufacturers' Association to sensitise its members about available SRC services; the Jamaica Agricultural Society (JAS) Board, and to the Private Sector Organization of Jamaica (PSOJ) to discuss areas of collaboration and assistance.
- (c) A needs survey was initiated among a sample population of the JMA, JEA, PSOJ and JAPA members. Over three hundred (300) questionnaires were distributed. Following the survey and an internal needs assessment, the marketing plan for the SRC will be developed. A low response rate from the online survey was experienced. The preliminary results indicated the need for assistance in food

product development, formulations and HACCP systems. One-on-one interviews are being administered to raise the response level.

- (d) The marketing programme for capabilities of the SRC in Environmental Management Systems was initiated. As a first step, focus was placed on sensitising policy makers, training institutions and housing developers. Presentations were made to a technical team as well as the Boards of NEPA, the KSAC and representatives of the building industry. A presentation was made on anaerobic wastewater treatment technology to the National Planning Council. A presentation was also made to the Development Council with focus on income generating prospects of SRC's technologies.
- (e) A paper was presented in Cuba to representatives of the Small Island Developing States (SIDS) on "The experience of the SRC in wastewater management in Jamaica." Subsequently, SRC was asked to consider provision of assistance to the Pacific islands in this area. Anaerobic technology along with Biodigester septic tank, Upflow Anaerobic Sludge Blanket (UASB), biodigesters, Imhoff Tank as well as tertiary systems such as the Reed Bed and Evapo-transpiration bed have been included in the listing of approved waste management technologies for the Caribbean.

#### **5.1.2 Technical Assistance**

- (a) Over two thousand (2000) water/wastewater and food samples were analysed for clients.
- (b) Technical assistance in microbiological analysis was provided to the Jamaica Citrus Growers Association.
- (c) Technical assistance was provided to the College of Agriculture, Science, and Education (CASE) in food analyses.
- (d) The retorts of fourteen (14) food-processing factories were inspected.

#### **5.1.3 Training Services**

- (a) A training programme was completed for final year students of the CASE in thermal processing of low acid canned foods.
- (b) Some five (5) training sessions in jams/jellies and canning technologies were completed for students of the UWI and UTech.
- (c) Training in meat processing and chip production was conducted for fifteen (15) UWI students and eleven (11) UTech students.
- (d) A course outline for training in biogas technology was submitted to the NCTVET for review. The course was subsequently approved and was held in October 2003. Twelve (12) representatives of the local construction industry participated in the 3-day training.

- (e) In continuation of the food processors project being funded by the Organisation of American States (OAS), the SRC (as national coordinating agency) and other collaborators completed the training of twenty five (25) micro, small and medium-sized food processing enterprises from rural Jamaica in Business, Quality and Environmental Management, for a total of seventy two (72) contact hours per participant. Six (6) Home Economics Officers of the Rural Agricultural Development Authority (RADA) were also trained on the project and will function as rural leaders to assist the enterprises in implementing the work programmes for 2004.
- (f) A Nutraceutical symposium and training workshop was held in November 2003. Its three (3) international presenters and over fifty (50) participants indicated that the symposium met its objectives as a means for fostering the development of a Nutraceutical industry
- (g) Fifteen (15) extension officers of RADA were trained in areas relating to the Nutraceutical industry. These officers will provide valuable assistance in the cultivation of specific plants for extraction purposes.
- (h) The process for NCTVET accreditation of training courses being offered by the SRC in Food Processing was initiated. Three (3) course outlines (for Canning, Juice processing, and Meat Processing) were prepared and submitted to the NCTVET for approval.

## **5.2 Objective 2 - Customer needs and demands are satisfied through the development of new products (goods and services)**

### **5.2.1 Project Planning/Development**

- (a) A Board and management retreat was held to review nine (9) new project concepts of which six (6) were identified for implementation in the 2004-2005 Financial Year. These include low cost tissue culture operations and minimally processed foods.
- (b) A proposal entitled "Tissue Culture of an Endemic Jamaican Plant and Medicinal drug development from its Secondary Metabolites" was prepared and submitted to The Alexander von Humboldt Foundation in Germany.
- (c) A logical framework of a proposal to increase capacity of public and private sector entities in environmental management with emphasis on cleaner production technologies was prepared and submitted to the IDB for project formulation.
- (d) A proposal on "Competence building in Food Processing for increased productivity in the Agro-industrial sector in Jamaica" was prepared and submitted to the USAID Jamaica Office for funding.
- (e) A proposal was submitted to the OAS through the Planning Institute of Jamaica (PIOJ) for funding of a regional training programme in wastewater management.
- (f) An application was submitted to Land O'Lakes Corporation for technical assistance in extrusion technologies.

- (g) Two proposals were submitted to the National Commercial Bank regarding support to the Development Plan at Yallahs Lagoons and the Air Water Lift system for production of *Artemia* (brine shrimp).
- (h) A proposal for an environmental audit of a coffee factory was completed and submitted to NEPA for approval
- (i) A concept paper on the establishment at the SRC, of a regional testing facility for Genetically Modified (GM) Foods, was prepared and submitted for consideration at the Caribbean Regional Organization for Standards and Quality (CROSQ).
- (j) A concept paper on integration of the tissue culture operations to improve the market potential of Jamaican products was submitted to Canadian International Development Agency (CIDA) for funding.
- (k) A proposal was prepared for research activity on an endemic Jamaican medicinal plant

### **5.2.2 Technical Assistance**

- (a) Completed and delivered protocols for production of new food drink products to Serge Island Dairies; the documentation on the formulation of a fruit drink was completed for another client; scheduled processes were established for two (2) new soup formulations; and one (1) seasoning and one (1) drink formulation were completed for two (2) clients.
- (b) Sixty-three (63) clients received technical assistance in various aspects of food processing. Thirty (30) clients utilized the Pilot Plant facilities for processing of foods (meats, herbs and spices).
- (c) Thirty-five (35) nutritional facts panels (labels) were generated for clients
- (d) Approximately eighty-seven thousand (87,000) banana and six thousand five hundred (6,500) ginger plantlets were delivered to clients.
- (e) Satisfied the requests of over thirty (30) clients in the areas of food product development, nutritional labelling, formulations and batch testing, Nutraceuticals (Business) and the actives of spices and local herbs.
- (f) Processed over four (4) tonnes of meats for clients.
- (g) Participated in an exhibition at the CARICOM Heads of Government Conference held in July 2003, the theme of which was "*S&T for SMEs*".
- (h) Protocols for *In-vitro* propagation of Medicinal Gene Bank plants - Twenty species of plants were initiated into culture. Jackfruit and avocado were successfully established into a multiplication cycle. Following initiation in culture, naseberry, cinnamon, papaya, sweetsop, gooseberry, Seville orange, and ackee are in the early stages of development. Establishment of a mother stock nursery was achieved. Plants in the SRC nursery include, Cinnamon, Lemon Grass, French Thyme, Cola Nut, Cashew, Pimento, Jackfruit and Blue Mahoe.

- (i) Protocols for Low Cost Biotechnology programme -Two (2) technologies were identified for incorporation into the 'Low Cost Bio-Technology' program. These include the Temporal Immersion System and The Glove Box Technology. The former was used to establish protocols using 500ml vessels for successful growth of ginger.

### 5.2.3 Product Development

- (a) Several pieces of equipment were acquired for the Food Technology Pilot Plant including a Fryer, Tray Sealer and computers. In addition, laboratory equipment including a freeze dryer, a deep freezer and a Super Critical Fluid Extractor (SFE) were procured in order to enhance product development activities. Training in SFE was conducted over a five (5)-day period.
- (b) Research activities continued in the characterization of actives from five (5) economically important plant species using Gas Chromatography and High Performance Liquid Chromatography (HPLC), the latter process facilitated by purchase of a pre-owned HPLC unit. Technical reports such as protocols were completed on ginger, turmeric, rosemary, lemongrass and sorrel. These activities were implemented with support from the OAS.
- (c) A programme to evaluate at least one hundred (100) Jamaican plant extracts for *in vitro* anti-oxidant activity was initiated. Extracts from the first twenty (20) plants were effected with at least five (5) displaying excellent anti-oxidant activity.
- (d) Product development formulations were carried out on functional foods, turmeric ice cream, ginger snack; cosmeceuticals - rosemary cream, turmeric lotion; insect repellent - rosemary, ackee oils; and anti-wrinkle cream and expectorant – lemongrass
- (e) Documentation of four (4) Jamaican soups and sensory evaluation of a ginger product were completed while research on products for diabetics continued.
- (f) Work continued on the colour stabilization project. A preliminary project report on all experiments done to date was prepared.
- (g) Modifications were made on the air water lift (AWL) system for producing viable *Artemia* (brine shrimp) biomass for prolonged periods. (*Artemia* is a crustacean used as an ornamental fish feed.)
- (h) Research on the effect of culture vessel size and concentration of minerals on growth and multiplication of *in vitro Musa* (banana) plantlets, was completed. The adapted Temporal Immersion System for plant propagation was put in operation. Larger vessels are to be used for commercial trials.
- (i) Protocols of tissue culture of woody plants and other crops of economic importance were prepared. These included in-vitro growth and development of Bamboo, *Dracaena*, Coffee and Ornamental Plum. Ninety (90) different cultivars of bananas and plantains have been established in the In-vitro *Musa* Gene bank. These plants

are being maintained with a survival rate of ninety five percent (95%). Maintenance of ornamental plants such as Orchids, Anthuriums and African Violets, was also achieved in addition to food crops/fruit trees such as Sweet Potato, Cassava and Pineapple.

- (j) A project to develop Convenience Meal and Minimally Processed Refrigerated Foods was initiated. Preliminary experimental work was started and scheduled for completion in the 2004/2005 Financial Year. Two (2) batches of a sauce were completed and a progress report prepared.
- (k) Liaison continued with regional and international agencies (CARICOM, UNIDO, GEF, and GTZ) on implementation of energy efficiency and renewable energy projects. An internal solar drying group was established to identify mechanisms for increasing the use of this technology in Jamaica.
- (l) An Ackee focus group was set up to develop value added Ackee products and a task force on flavour extraction was established.

### **5.3. Objective 3 -The utilization of technologies is increased in the productive sector**

#### **5.3.1 Technology Transfer/Contract Services**

- (a) Technology for production of sorrel chutney and sorrel pepper jelly was divested to a private sector company under a non-exclusive agreement.
- (b) Nine (9) other food formulations were sold to food processors/prospective processors.
- (c) Technology to produce Mushroom spawn was transferred to three (3) mushroom farmers.
- (d) Monitoring and assessment were carried out on forty (40) wastewater treatment systems and an operation, maintenance and strategy manual prepared for these systems under a programme funded by the Coastal Water Quality Improvement Project (CWIP). The manual is now being used by the NWC. The SRC continued representation on the Negril, Montego Bay, Ocho Rios and Portland Wastewater Advisory & Monitoring committees to which technical advice and training were provided.
- (e) The biodigester system at Elim Agricultural School was renovated and is now fully functional for the treatment of pig waste. Gas is now being utilized for cooking and heating.
- (f) Two 50 m<sup>3</sup> and one 10 m<sup>3</sup> biodigester septic tanks were completed for residential communities and an individual respectively. Construction of the first 150 m<sup>3</sup> residential biodigester septic tank was also completed. This is a significant milestone for the SRC.
- (g) A 100 m<sup>3</sup> biodigester/anaerobic system for the treatment of pig waste was completed for a client in St. Elizabeth. Also, construction of a 10 m<sup>3</sup> bio-

- digester for Frome Technical High School agricultural farm was completed. There was continued monitoring and assessment of three (3) bio-digesters
- (h) Construction of an upflow anaerobic evapo-transpiration bed (UASB) system for the treatment of waste from two (2) food-processing facilities was continued. These have been commissioned along with the evapo-transpiration bed. The systems are now producing over 10 m<sup>3</sup> of gas a day and the effluent quality is well within the NEPA standard.
  - (i) Forty (40) feasibility studies were completed for the construction of biodigesters for farms and biodigester septic tanks, reed beds and evapo-transpiration beds for single households and housing developments.
  - (j) A contract for implementation of a wastewater treatment facility at Port Royal for the NHDC was prepared. Architectural drawings for this project were also completed.
  - (k) Completed construction of a wastewater treatment facility at the Caribbean Cement Company, which includes two reed beds and the installation of a UV system. The system is functioning extremely well with all parameters well within NEPA's sewage effluent discharge standards.
  - (l) Completed feasibility report for funding of a wastewater treatment facility for the Blue Mountain Coffee Co-op. EFJ has approved the project for funding.
  - (m) Commenced an environmental audit of a coffee factory as requested and approved by NEPA. Recommendations are being implemented. Completed preliminary designs for UASB treatment systems for two Coffee Factories.
  - (n) Design of a wastewater treatment facility for Walkerswood Caribbean Food Processing Facility was completed and a contract signed for its installation.

#### **5.4. Objective 4 - S&T is an integral component of national policies**

- (a) Contributed to national development through advice given to the following committees on science and technology:
  - I. National Coordinating Committee for Biosafety (NEPA)
  - II. National Planning Council (NPC)
  - III. Development Council
  - IV. National Commission on S&T
  - V. Project Pre-selection Committee of the Ministry of Finance & Planning
  - VI. Steering Committee of the National Quality Infrastructure Project
  - VII. Technical Committee to the IDB-funded Quality Jamaica Project

- (b) Contributed to the development of a revised draft of the national S&T policy.
- (c) Participated in a special NCST Meeting held with the private sector.
- (d) Conducted meetings with the World Intellectual Property Organization, and discussed patents, licensing, training and profit generation from licensing.

## **5.5. Objective 5 -Continual sensitisation on the national, regional and international importance and value of S&T**

### **5.5.1 Publication and Dissemination of S&T Information**

- (a) Thirty (30) copies of the Jamaica Journal of Science and Technology Volumes 12 & 13 December 2001 & December 2002 respectively, were printed. Also completed Volume 14 (2003) of the Jamaica Journal of Science and Technology. This issue focused on Biotechnology.
- (b) Work continued on the proceedings of the 13<sup>th</sup> and 15<sup>th</sup> annual national conference on S&T as well as on the Occasional Papers. Completed Conference Proceeding for the current (17<sup>th</sup>) Annual National Conference on S&T, which was available at the 17<sup>th</sup> conference.
- (c) Completed Petroleum Statistics (PETSTATS) tables for six countries; Prepared 1985-2002 data on energy consumption in fifteen (15) Caribbean countries by sector, product and retail prices, for the Caribbean Development Bank (CDB). Presented a paper on "Update on the Clean Development Mechanism" (CDM) Regional Project at a GEF workshop held in Kingston in November 2003.
- (d) Contributed over thirty (30) articles in the popular press on topics ranging from biotechnology and nutraceuticals to choosing careers in S&T.

### **5.5.2 Science Education & Popularisation of S&T**

- (a) Developed a public education programme on S&T. Several articles on science issues were prepared and published in the print media
- (b) Approximately three hundred and ninety (390) client requests for S&T information were handled
- (c) November 2003 was observed as Science & Technology Month. Activities of the SRC for the month included the following:

- (d) The 17<sup>th</sup> Annual National Conference on Science and Technology was successfully staged under the theme “*S&T for Economic Development: Technology-driven Agriculture & Agro-processing.*” Eight (8) overview presentations, forty five (45) short papers, six (6) poster presentations and two panel discussions were presented.
- (e) The SRC/JPSCO Young Scientist 2003 Award was presented to Dr. Maxine Gossel-Williams for her work on pumpkin seed oil.
- (f) The JPSCo in collaboration with the SRC, held two (2) science fairs. Nineteen (19) schools from Portland, Kingston and St Andrew participated in the first and Camperdown High School was the overall champion of the science exhibits. The second science fair was held in Montego Bay.
- (g) An Outpost of the SRC was established in the western region with offices in Montego Bay, through the offices of the Bureau of Standards. Personnel of the SRC attend to requests of the public on Thursdays and Fridays of each week.

**5.6. Objective 6 - The SRC has a dynamic, innovative, responsive, efficient and effective team**

**5.6.1 Corporate Development/Institutional Strengthening**

- (a) New functional and operational, organizational structures were implemented at the SRC. This restructuring exercise became operational on July 1, 2003. All divisional organizational charts have been finalized.
- (b) The Research and Development Division was split into two divisions namely: Product R&D and Process Development. The Process Development division is being established with assistance from external consultancies. The main focus of this Division is to provide technical consultancy services to industry as well as process operations relevant to products developed.
- (c) The Human Resources Management and the Administration divisions were merged. The units of Purchasing and Stores now fall under the Finance Division. Publications and Science and Technology Education units have also been merged into one unit called Popularisation of S&T. This unit falls under the Information Services division. Janitorial Services was outsourced.
- (d) Marketech Limited, a subsidiary of the SRC, increased its focus on the business development portfolio. This subsidiary was strengthened by the employment of two Marketing Research Officers and the repositioning of the Communications Manager (formerly Public Education Manger) to this department.
- (e) Twenty one (21) positions mainly in the Product R&D and Process Development divisions were filled.

- (f) SRC desired structure and Corporate Culture (dynamism, innovation, responsiveness, transparency, efficiency and effectiveness) were defined and systems developed to inculcate a new culture. The Shared Values developed by the SRC are Professionalism, Relevance, Accountability, Communication, Transparency, Integrity, Commitment, Efficiency and Staff development.
- (g) Cross training in Process Development and Product R&D was initiated to enhance staff competence.
- (h) Development of a local skills bank of external and SRC expertise continued with input of 6 entries. The information is available through the Documentation Centre.
- (i) Annual corporate objectives and targets for the organization, teams and individuals were established. Board/Senior Management and staff retreats were held to review performance of the SRC and to develop the Corporate Plan for 2004-2007.
- (j) Review of policies and documentation of procedures and work instructions relating to the QMS of the SRC continued. The Quality Management Review Committee met monthly. A sensitisation programme was developed; internal quality auditors were trained and have so far completed three (3) internal audits of the laboratories in the analytical services department.
- (k) The Quality Manual for the Analytical Services Department was completed. Technical assistance was received under the Jamaica /Sweden National Quality Infrastructure Project that *inter alia* seeks to complete accreditation of twenty five (25) laboratories in Jamaica in 2004.
- (l) The standard operating procedure for completing client requests was reviewed.
- (m) Eighteen (18) staff members including senior managers completed training in Project Planning and Preparation at the Management Institute for National Development, towards establishing a cadre of persons with the competence to prepare project proposals and business plans for internal and external clients.
- (n) Infrastructural improvement of the Pilot Plant was undertaken to include additional office space and new milling and drying facilities.

## **6.0 Strategic Linkages and Cooperation Agreements**

- (a) Memoranda of Understanding (MOU's) were signed with the following institutions:
  - Jamaica Agricultural Development Foundation (JADF) - Specific collaboration projects are being discussed;
  - Rural Agricultural Development Authority (RADA) with which a work programme focusing on the Nutraceutical industry has been developed; and

- Bureau of Standards, Jamaica is collaborating for improved performance in certain sub-sectors. A work programme has been developed and approved by both institutions. This incorporates training in: the use of laboratory equipment; standardization of plant actives; food safety; and environmental management and quality management systems.
- (b) Under an MOU with the University of the West Indies (UWI), cooperation was established with the Department of Chemistry for insecticidal assessment of actives from a Jamaican plant. Discussions are ongoing with the Natural Products Institute, UWI regarding a collaboration programme.
  - (c) Discussions were held on the forging of a tripartite alliance among the Jamaica Manufacturers Association (JMA), the Jamaica Agriculture Society (JAS) and the SRC.
  - (d) Techno-intelligence - Discussions were held with JAMPRO towards exploring viable options on market intelligence data which will be available through the Trade Map Jamaica initiative.
  - (e) Discussions were held with the Ministry of Foreign Affairs and Foreign Trade regarding strategies to benefit from scientists in the Jamaican Diaspora. A proposal was subsequently made for the inclusion of S&T in the database on the Jamaican Diaspora being coordinated by the Ministry of Foreign Affairs & Foreign Trade.
  - (f) Discussions were held with the Indonesian Embassy regarding enhancing cooperation between Jamaica and Indonesia in the areas of research and information technology.
  - (g) Discussions were held with the Japan International Cooperation Agency (JICA) to identify technical assistance/expertise in strengthening the MIS capacity of the SRC.
  - (h) Terms of reference were prepared for technical assistance to be received from Kraft Foods Inc. in several areas of food processing.
  - (i) Linkages with PIOJ, USAID, OAS, IDB and Land O' Lakes, the Indian High Commission and the Argentinean Embassy were strengthened/ forged.

## **7.0 Priority Projects/Programmes for Financial Year 2004/2005**

### **7.1 Increased Client Productivity and Product Quality**

- (a) The work programme for 2004/2005 will be implemented as under the MOU between SRC and BSJ. This includes the training of SRC staff in HACCP systems, ISO 9000 and ISO 14000 under the IDB-funded Quality Jamaica Project
- (b) Work programmes/action plans relating to other MOU's will be implemented as agreed. This includes the MOU's with JADF, RADA, UWI and UTech.

- (c) Marketing/Public Education - Creative and innovative marketing approaches will be utilized to reach businesses experiencing low productivity. A public education programme will be implemented as planned.
- (d) Feedback mechanisms will be implemented to measure and report on the impact of the services of SRC on clients.

## **7.2 New Products and Processes**

- a) OAS Nutraceutical Project - The SRC will finalize standardization studies and validate standardized protocols for plant extracts from Phase 1 of the OAS Project.
- b) Three (3) formulations/protocols for new natural products from at least one (1) indigenous material will be completed by March 2005
- c) At least six (6) project proposals (nutraceutical, tissue culture, etc.) will be submitted to funding agencies by March 2005.
- d) R&D Programmes for select species for a three (3) year period will be developed by December 2004. The research work on the Temporal Immersion System and the Glove Box will be completed by October 2004 and protocols developed for commercialization by December 2004.
- e) An Environmental Management System model will be established at the SRC by September 2004 and technical assistance will be provided to enterprises as requested in this area.

## **7.3 Utilization of Technologies**

- a) Training programmes - Training programmes for external customers will be developed according to marketing strategy and needs analysis within two (2) months of completion of surveys where relevant. Specific training programmes will be completed in wastewater management and in food processing.
- b) Tissue Culture training courses will be accredited by the NCTVET by December 2004. At least two (2) food processing training courses will be accredited by the NCTVET by June 2004.
- c) Policies and procedures for technology transfer will be finalized by June 2004.

## **7.4 S&T Awareness and Popularisation:**

- a) A guest speaker programme to popularise S&T targeting select Government ministries and private sector firms will be implemented by March 2005. Focus group discussions will be held and quarterly e-newsletters will be disseminated to embassies and development agencies as of June 2004.

- b) Information packages (including S&T Policy Bulletin and advisories) will be prepared for each quarter and disseminated to appropriate ministries
- c) Information on technologies and S&T related issues will be presented to at least six (6) communities by March 2005
- d) A programme designed to assist pilot schools in improved performance in science for students at the GSAT level will be completed by March 2005.

#### **7.5 Internal Capacity Building:**

- a) Subscription to select journals completed by June 2004
- b) Secure membership of staff in select professional associations, trade associations, and service groups as identified.
- c) At least one, conference/seminar each in the areas of Biotechnology, Food Processing and Wastewater Management will be attended by March 2005

#### **7.6 Institutional Strengthening**

- a) Improving performance standards and increasing the level of employee satisfaction
  - i) A performance management system will be developed and implemented in a timely manner;
  - ii) A proposal for performance-based remuneration and incentive system will be developed and approval sought. Any approved system will be implemented in a timely manner.
  - iii) A career development plan will be established for each employee.
- b) Property improvement and maintenance plans will be implemented. In addition, adequate MIS, FMIS and project accounting systems will be established.
- c) A certifiable QM system is to be in place by July 2004 and analytical laboratories are accredited by March 2005.

## 8.0 Budgetary Allocation

The actual expenditure for 2003/04 and Approved Expenditure for 2004/05 are presented in the Table 8.1 below.

**Table 8.1: Actual Expenditure (2003/04) and Approved Expenditure (2004/05)**

<b>Categories of Expenditure</b>	<b>Actual Expenditure (2003/04) (\$M)</b>	<b>Approved Expenditure (2004/05) (\$M)</b>
Compensation of employees	128.6	101.3
Travel expenses and subsistence	11.9	11.4
Rental of property, machinery, equipment	0.1	0.7
Public utility services	9.1	7.2
Purchases of other goods and services	30.5	12.9
Retirement benefits	0	
Awards and indemnities	0	
Grants and contributions	0	
Equipment (capital goods)	5.4	
<b>Total</b>	<b>185.6</b>	<b>133.5</b>

---

**Phillip Paulwell**  
**Minister**  
**Ministry of Commerce, Science and Technology**  
**May 12, 2004**