

# NORTHEASTERN BRAZIL GROUNDWATER PROJECT

**Canada-Brazil Technology Transfer Fund  
CIDA Project No. BR-19777-21-K**

## PROJECT IMPLEMENTATION PLAN

- **Geological Survey of Canada (GSC), Ottawa**
- Companhia de Pesquisa de Recursos Minerais (CPRM), Rio de Janeiro, RJ
- Comunidade Solidária, Brasília, DF
- Superintendência do Desenvolvimento do Nordeste (SUDENE), Recife, PE
- Associação Brasileira de Águas Subterrâneas (ABAS), Fortaleza, CE



prepared by:

**Yvon Maurice (GSC)  
Samir Nahass (CPRM)**

*November 2000*

## **EXECUTIVE SUMMARY**

This report called “Project Implementation Plan” or PIP sums up the results achieved during the Inception Phase of the Northeastern Brazil Groundwater Project, a program seeking to improve long-term access to a more regular and abundant supply of good quality water for the mainly rural population of northeastern Brazil, a region periodically affected by devastating droughts.

The project was approved in April 2000 with the provision that it would undergo a six-month Inception Phase during which the partners would seek to strengthen certain aspects of the project that were deemed to be insufficiently developed in the original project proposal. These aspects revolved around building stronger social and gender strategies for the project as well as to clarify a number of management-related issues.

Regarding management, the issues that needed to be addressed can be divided into two categories: (1) a better definition of the roles of partners and committees, and (2) improvement to the Logical Framework Analysis (LFA), the basis of Result Base Management (RBM), the management style adopted by CIDA in all its projects. In the context of our project and the Inception Phase, improving the LFA meant better definition of the project goal and purposes, anticipated results, improved performance measurement mechanisms, risk and risk management approaches, and a sustainability plan.

A great deal of effort, demonstrated by the numerous meetings and exchanges involving all the partners, went towards fulfilling the Inception Phase requirements. This occurred at the same time as the technical program was being initiated and executed following the original plan.

The principal measures taken during the Inception Phase can be summarized as follows :

- (1) Hiring a Canadian social area specialist to provide liaison between the technical and social component of the project. The decision to hire a Canadian to play this role was made after examining a number of options. This specialist will also perform preliminary work in the gender area.
- (2) Complete restructuring of the LFA with clearer definitions for the project goal and purposes, more realistic list of anticipated impact and outcomes, better performance indicators and a more useful risk management strategy.
- (3) Clarifying the responsibilities of the various partner institutions and committees with an update of their composition and representatives, and designing a simplified project management chart.

(4) Other measures taken : (a) update of the budget and disbursement schedule; (b) update of the general and annual workplans; and (c) clarifying certain aspects of the environmental strategy.

Although substantial progress was achieved in strengthening those aspects of the project that needed to be strengthened, there is no doubt that we will witness more changes and improvements to the project's substance and operational structure throughout its life. This is an ongoing process based on trial and error, that will need to be adjusted continuously.

Yvon Maurice  
Geological Survey of Canada – Ottawa  
Project Coordinator for Canada

Samir Nahass  
Companhia de Pesquisa de  
Recursos Minerais – Rio de Janeiro  
Project Coordinator for Brazil

November 6<sup>th</sup>, 2000

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	1
INTRODUCTION .....	7
ISSUES REQUIRING FURTHER DEVELOPMENT DURING THE INCEPTION PHASE.....	8
SUMMARY OF ACTIVITIES CARRIED OUT DURING THE INCEPTION PHASE .....	9
MAIN ISSUES.....	12
1. <i>Project Workplan</i> .....	12
2. <i>Revised Logical Framework Analysis (LFA)</i> .....	16
3. <i>Management Strategy</i> .....	17
4. <i>Performance Measurement Framework</i> .....	22
5. <i>Gender Strategy</i> .....	24
6. <i>Sustainability Plan</i> .....	25
7. <i>Budget and Disbursement Schedule</i> .....	27
8. <i>Environmental Strategy</i> .....	27
ANNUAL WORKPLAN 2000 – 2001 .....	31
<i>Introduction</i> .....	31
<i>Activities planned for the remainder of 2000 – 2001</i> .....	32

### List of Tables

Table 1	List of activities carried out during Inception Phase as they relate to issues that required further development
Table 2	Revised Result-Oriented Logical Framework Analysis (LFA)
Table 3	Project Budget and Forecast Disbursements of CIDA Funds
Table 4	Quarterly Financial Report and Budgetary Forecast (updated Oct. 2000)
Table 5	Partial list of environmental legislative and regulatory documents consulted during Inception Phase
Table 6	Project expenditures by Brazilian partners and project participants related to their participation at the 1 <sup>st</sup> Steering Committee Meeting, May 2000

- Table 7      Project expenditures by Brazilian partners and project participants related to their participation at the Geophysical Workshop and Field Trips, June 2000
- Table 8      Project expenditures by Brazilian partners related to their participation at the Project Preparatory Meetings, June 2000

### **List of Figures**

- Figure 1      Project Management Chart
- Figure 2      2000-2001 Project Timeline (Updated November 2000)

### **Appendices**

- A      Lessons Learned Symposium organized by CIDA, Guarujá, São Paulo, May 7-9, 2000; 2 p., by Ana-Cristina Palacky
- B      Ata da primeira reunião do Comitê de Direção, Rio de Janeiro, 11 de maio, 2000; (Anexo I: Agenda; Anexo II: Discurso do Diretor-Presidente da CPRM, Umberto Raimundo Costa; Anexo III: List of participants); 9 p., Compiled by Samir Nahass
- C      Programa de Água Subterrânea para o Semi-Árido Brasileiro: Diretrizes Programáticas 2000 – 2003; 32 p., Companhia de Pesquisa de Recursos Minerais
- D      Informe, Reuniões Estaduais Preparatórias, 7 a 9 de junho de 2000; 5 p., Samir Nahass
- E      Terms of reference for a contract between the Geological Survey of Canada (GSC) and Sherry Nelligan & Associates, September 2000; 6 p., Yvon Maurice
- F      1<sup>st</sup> Joint World Congress on Groundwater, Fortaleza, Brazil, July 31<sup>st</sup> – August 4<sup>th</sup>, 2000: A Canadian Perspective; 2 p., by Yvon Maurice
- G      Recent media articles referring to Project (Abastece, Vol. 2, No. 6; Diário de Natal, June 2000; Estado de São Paulo, August 2000; Diário do Nordeste, August 2000;); 4 items, 5 pages
- H      Gender Equality in Water Management Programs in Northeastern Brazil; 2 p., by Ana-Cristina Silva Palacky;  
Promoting Gender Equality in Technology Transfer Projects; 10 p., by Ana-Cristina Silva Palacky
- I      Program Environmental Analysis, Northeastern Brazil Groundwater Project; February 2000, 6 p., by Yvon Maurice

- J Documents related to Pilot Project on Solar Power Applied to Groundwater Management in Ceará; 4 p.; letter from Fábio Peixoto Cavalcante, Superintendente of SOHIDRA to L.H Seabra, Director of DANCOR, Sept. 8, 2000; with technical specifications.
- K Developing Indicators and Measuring Results in Technology Transfer Projects; paper presented at Lessons Learned Symposium, Guarujá, São Paulo, Brazil, May 7 – 2000; by Gina LeCheminant et al.

## INTRODUCTION

This Project Implementation Plan (PIP) is being prepared at the end of the six-month Inception Phase of the Northeastern Brazil Groundwater Project and is intended to (1) strengthen certain aspect of the project that were deemed to be insufficiently developed in the original Project Proposal, and (2) provide a detailed workplan for the first year of the project. The original Project Proposal was submitted to CIDA and ABC in November 1999. The project itself was approved and ratified last April.

The aspects of the project that needed to be strengthened were identified by CIDA and ABC and are outlined in the *Inter-Departmental Administrative Arrangement* between CIDA and GSC. That document, and another entitled *Inception Phase Workplan*, prepared by the project partners and submitted to CIDA and ABC in early June 2000, contain essentially all the main topics to be addressed in that respect and were used extensively to guide in the preparation of the present PIP.

The Inception Phase included activities specifically designed to address those issues that needed to be strengthened, as well as activities that formed part of the original project workplan. These activities were often carried out concurrently (i.e. during the same mission, field trip, etc.) and for that reason, they cannot be fully dissociated in this document. However, this PIP is not intended to be a full progress report of the first six months of operation. This will be provided in a Semi-Annual Narrative Report to be submitted separately.

## ISSUES REQUIRING FURTHER DEVELOPMENT DURING THE INCEPTION PHASE

As presented in Appendix D of the Inter-Departmental Administrative Arrangement between CIDA and GSC, the issues requiring further development during the Inception Phase are the following:

1. **Project Workplan:** describes all Project activities (including outreach and communication activities) to be undertaken, their rationale, and anticipated outputs. The Workplan should also include further elaboration of activities involving the social sector.
2. **Revised Logical Framework Analysis (LFA):** should be based on LFA elaborated during the development of the Project proposal. Pilot Project LFAs should also be elaborated.
3. **Management Strategy:** describes the roles and responsibilities of all partner institutions; the structure, mandate and modus operandi of all Project committees and local coordination units; and the partners' approach to manage and report on results throughout the life of the Project (i.e., the internal monitoring and reporting structures).
4. **Performance Measurement Framework:** explains how the Project's progress towards results achievement will be measured (i.e., from which **baseline data** and with which major **performance indicators**) and how this information will be gathered, analyzed and used. The partners will also clearly identify underlying assumptions critical to the attainment of Project outcomes and results, and how risks will be managed during the life of the Project.
5. **Gender Strategy:** includes a gender analysis; sex-disaggregated data to guide Project development and monitoring; and expected results related to improving gender equality and related gender-sensitive indicators for monitoring Project performance. This Strategy should be specific to the context of the Project.
6. **Sustainability plan:** details which mechanisms will be put in place to ensure the sustainability of Project outcomes, using all known information available at the time of preparing the PIP (as further information becomes available, it can be updated in subsequent reports).
7. **Budget and Disbursement Schedule:** the schedule will be based on revised Project estimates and management and administrative requirements.



In addition, an environmental strategy for the project, that would satisfy Canadian laws, was to be developed during the Inception Phase. There were concerns that some of the project activities, especially those involving physical work, may not be properly regulated in Brazil and thus infringe upon both CIDA's environmental policies and Canada's Environmental Assessment Act.

Finally, this PIP includes the first Annual Work Plan of the project, covering the first year of activities.

## **SUMMARY OF ACTIVITIES CARRIED OUT DURING THE INCEPTION PHASE**

Three major activities, involving Canadians traveling to Brazil, were carried out during the first six month of the project. These were:

1. **1<sup>st</sup> Steering Committee Meeting – Rio de Janeiro, May 11, 2000**

Twenty five people attended this meeting including representatives from all the partner organizations and other participants, many of whom traveled from the northeast to attend. The entire project workplan was reviewed including a detailed presentation of the issues requiring further development during the Inception Phase. Canada was represented by the Project Coordinator Dr. Yvon Maurice (GSC), Ms. Gina LeCheminant (GSC), advisor on project management and social/environmental issues, and Ms. Ana-Cristina Palacky, a consultant specialized in gender issues. All three had participated in the Lessons Learned Symposium, an event organized by CIDA in Guarujá, SP, just before the Steering Committee Meeting (May 7 – 10, 2000).

2. **1<sup>st</sup> Technical Mission – Transfer of Technology in Geophysics for  
Groundwater Studies in Northeastern Brazil, June 10 to July 2, 2000**

This project was carried out under contract to the Calgary firm Komex

International Ltd., by two specialists in geophysics, Dr. Richard Kellett and Dr. Gilein Steensma. Dr. Yvon Maurice, project coordinator, accompanied the mission. A three-day technical short course was carried out in Natal, and field work was conducted in the pilot areas of the three states. About 41 people took part in the various activities. In addition to the technical accomplishments, this mission permitted further elaboration of the social component of the project. Meetings were held with Rio Grande do Norte Social Assistant Maria de Fátima de Freitas Rego, and Rita Eugênia Martins Santiago, project social coordinator in Ceará. Formal and informal meetings were held with residents and community leaders in the three pilot areas, including with “variador” Francisco das Chagas Alves (better known as 25) an elected politician representing the Irauçuba-Juá region at the heart of the Ceará pilot area. These discussions focused on water and social problems in the region, and how to organize the project to maximize benefits/impact.

3. **1<sup>st</sup> Joint World Congress on Groundwater – Fortaleza, CE, July 27 to August 5, 2000**

Twelve Canadians, representing some of the leading private sector firms and public institutions in the area of groundwater resource development, participated in this highly successful congress and field trip to the interior of Pernambuco, Paraíba and Ceará. The event was an occasion to showcase Canadian technology and know-how, and to see first hand the water-related problems in the region, as well as the solutions that are currently being applied. Meetings were held with community residents and social worker in some of the hardest hit areas. Discussions and meetings between the Canadian participants and with the Brazilian partners led to numerous new ideas on how to apply Canadian technologies to bring about relief to the region.

Other activities that took place during the Inception Phase which are particularly relevant to project development issues include:

4. **A series of discussions within CPRM and between CPRM and other institutions** in the Northeast that culminated with a detailed plan for a major initiative on groundwater development for the region with a total estimated budget of over R\$90 million. This initiative goes far beyond the programs that CPRM had intended to launch in each of the three northeastern states when the Northeastern Brazil Groundwater Project was being developed in 1999. The fact that CPRM and its Brazilian partners are prepared to undertake such an effort and commit the necessary resources at this time, reflects the level of priority given to water issues in the Northeast by the Brazilian government and the importance attached to the Canada-Brazil Cooperation in this area. Details of the plan are contained in a document entitled “Programa de Água Subterrânea para o Semi-Árido Brasileiro, Diretrizes Programáticas 2000-2003” (see Appendix C).
  
5. **A series of meetings organized and led by CPRM in each of the participating states** to initiate Brazilian project activities and discuss and clarify project management issues such as the roles and responsibilities of partner institutions, the roles and responsibilities of the various committees, and to identify and/or confirm personnel assigned to these committees. The project management chart was revised and simplified, and all of the issues requiring further development during the Inception Phase were discussed. The meetings were attended by nearly all of the Brazilian project partners and collaborators. A summary can be found in Appendix D.
  
6. **The process of establishing the workplan for a Canadian social worker** to provide a liaison between the technical and social components of the project, and between the Canadian social community and the Brazilian social service providers that are active in the Northeast. The decision to hire a small firm with relevant experience was taken after examining various other options : (1) liaison provided by a Brazilian national institutions (e.g. Comunidade Solidária); (2) involvement of a large Canadian foreign aid institution that is active in Brazil and on the world stage (serious discussions were held with OXFAM and World Vision Canada);

(3) involvement of another CIDA partner currently running a social program elsewhere in Brazil (i.e. UBC's Centre for Human Settlements). The small Canadian firm of Sherry Nelligan and Associates was chosen in preference to the other options because of the highly relevant experience of its personnel, namely Sherry Nelligan, and the belief that a small firm under contract would work more closely with project partners towards meeting project objectives. There is great hope that the project's social agenda will be well looked after by this contract. (See work statement in Appendix E.)

These activities and others that were conducted during the Inception Phase (14 in all) are summarized in Table 1. The Table provides details of what each activity consisted of with dates, and the principal results/outcomes with emphasis on those aspects that needed to be developed further during the Inception Phase. The Table also refers to documents in the appendices where additional information about specific events/activities can be found.

## THE MAIN ISSUES

### 1. Project Workplan

The original project proposal stated that "*Brazil, led by the Geological Survey of Brazil (CPRM), will launch major programs in three states, Ceará, Pernambuco and Rio Grande do Norte...*". These technical programs were to form the base on which the Northeastern Brazil Groundwater Project would operate, by supplying state-of-the-art Canadian technologies required to run the programs at maximum efficiency.

In November 1999, when the original project proposal was submitted to CIDA, the Brazilian program had not yet been fully detailed. Since then, the Brazilian partners have assembled an ambitious agenda that encompasses the entire northeast region or *drought polygon*, made up of nine states or part thereof, and different geological environments, not

only the crystalline rocks that are the main focus of the Canada-Brazil technology transfer project. The Brazilian program (see Appendix C) is divided into 4 parts:

- (1) A complete inventory of known groundwater resources of the entire northeast region;
- (2) Groundwater in crystalline rocks;
- (3) Groundwater in alluvial deposits;
- (4) Groundwater in sedimentary basins.

Of these, the most problematic is #2, groundwater in crystalline rocks, and this will continue to be the main focus of the Canada-Brazil technology transfer project. However, the project will provide technology to the other components if this can bring about an improvement in the supply and/or quality of water to the communities. In general, however, alluvial deposits and sedimentary basins have more abundant water and of better quality (i.e. less saline) than the crystalline rock environment. But they are often plagued by other problems, some of them complex and requiring modern technologies to resolve as, for example, problems of overexploitation, contamination, irregular yields, etc. This is the case in Rio Grande do Norte where important sedimentary aquifers, on which a large segment of the rural and urban population of that state depends, are at risk of severe depletion due to overexploitation.

The Brazilian program for the crystalline rock environment calls for regional and detailed studies using a variety of tools such as remote sensing, geophysics, groundwater modeling, etc. (see Appendix C, Subprogram II, pp. 12 – 17) which, for maximum efficiency, will require input of Canadian know-how and technologies. The technology transfer project will respond to those needs as they occur and as the Brazilian program develops. It would be a futile exercise to try to predict what these needs will be for the entire duration of the project and, therefore, a detailed workplan cannot realistically be laid out for more than one year at a time. The workplan for the first year of activities is presented later in this report.

With regards to outreach and communications, this will be done as occasions arise. Project partner ABAS (the Brazilian Groundwater Association) will play a dominant role in these

activities. To date, ABAS has given Canadian technology a great deal of visibility by providing the project with a prominent display area at a world class congress on Groundwater in August in Fortaleza (Fortaleza 2000), and by publishing at least two articles on project activities in the Association's glossy magazine *Abastecer*. Also, during the first six months of operations, there has been two television interviews, at least three newspaper articles and several public presentations and reports on project activities. Some of these items are presented in Appendix G. The Canada-Brazil Cooperation Project is drawing so much interest throughout the northeast that its results will be dispersed by the local media with minimal effort. The project also publishes a website which will be kept current throughout the duration of the project.

With respect to activities involving the social sector, a great deal of progress has been made since the original proposal was submitted to CIDA in November 1999. Meetings have been held with social service organizations and community leaders and residents in the three states on various occasions during the Inception Phase (see Table 1) and local social coordinators have been selected :

1. Maria Lia Corrêa de Araújo (FUNDAJ), Social Coordinator for Pernambuco;
2. Maria de Fátima de Freitas Rego (SERHID), Social Coordinator for Rio Grande do Norte;
3. Rita Eugênia Martins Santiago (prefeitura de Irauçuba), Social Coordinator for Ceará.

In terms of overall coordination of the social activities within the project, it was decided, after examining a number of options, that the project would be best served by contracting a Canadian social service provider for that purpose (see item #6, p. 10 above). The main purposes of this contract are:

1. To establish a link between the technical and the social components of the Project;
2. To establish a link between the Brazilian social action groups involved in the Project and Canada's social service community.

A six-month renewable contract to provide this service will be executed by Sherry Nelligan of Sherry Nelligan and Associates (Toronto). Specifically her tasks will include :

1. Promoting expansion of existing Brazilian social programs into the Project's technical pilot areas in each states;
2. Helping to organize special awareness sessions to inform the community about the Project's technical program, and education sessions focusing on the main theme of the technical project, i.e. water-related issues: conservation, groundwater protection, hygiene, waste disposal, etc.; ensuring that the technical and social components of the Project respond to the needs of the community;
3. Identifying problems related to the implementation of the Brazilian social programs and helping develop appropriate solutions. Examples of such problems may include: (a) obstacles related to initiation of social projects; (b) problems expanding social programs into the pilot areas;
4. Identifying technical water supply/quality problems in the community and helping develop community based solutions. Such problems may be related to poor maintenance of simple equipment such as pumps, windmills, etc.; improper training of equipment operators (e.g. desalinization plants); contamination of water supply due to improper disposal of waste, etc.;
5. Developing a Results Based Management strategy in terms of social goals and objectives, realistic results, performance indicators, risks and risk management. Developing a Logical Framework Analysis (LFA) for the social component of the Project;
6. Collecting baseline social data in pilot areas to permit proper evaluation of short and long term project results;
7. Assisting the Gender Equity Specialist attached to the Project, with the incorporation of gender equity strategies into the Project;
8. Seeking the participation of the community in certain aspects of the technical program (e.g. some survey activities and construction work may be appropriate for the utilization of local help); obtaining direct input from the communities on some technical issues such as where to conduct surveys or drill wells, and ensuring that social, cultural and political constraints are taken into account during implementation of the Project;

9. Assisting in the planning and organization of a social mission to Canada or elsewhere;
10. Improving the efficiency of the Brazilian social projects by introducing Canadian experiences, methods and models and to provide special assistance to the Brazilian social projects through input from Canadian social assistance programs;
11. Enhancing the level of awareness of Canadian social values and methods through direct contact, and to organize social training missions in Canada and/or Brazil involving organization and community representatives in the three pilot area and Canadian social services providers.

Additional details on approaches, methodologies, etc. can be found in the terms of reference of the contract in Appendix E.

## **2. Revised Logical Framework Analysis (LFA)**

The project's Logical Framework Analysis (LFA) was reviewed during the Inception Phase in consultation with project partners and CIDA, and utilizing excellent tools obtained at the Lessons Learned Symposium in May. The resulting new LFA is simpler than the original, and the project goal and purposes have been made more specific so that results can be measured more easily. Also, the performance indicators are expressed in terms of measurable parameters. Gender and social objectives are now fully incorporated into the LFA. The revised LFA is presented in Table 2.

The question of developing separate LFAs for each of the pilot areas was examined as part of LFA review exercise. The consensus was that it would not be useful to have separate LFAs at this time because there are not enough distinctions between LFA elements (goal, purposes, outcomes, activities, indicators, risks, etc.) in the different states. However, should significant distinctions develop as the project progresses, it may become useful to have different LFAs for each state. If that becomes the case, then LFAs will be developed for each state.



### 3. Management Strategy

The management structure of the project was discussed at length amongst the partners, particularly during a series of CPRM-led meetings held in the three northeastern states between June 7 and 9. During those meetings, a new, simplified project organization/management chart was designed and adopted (see Fig. 1), and the roles of the partner and of the various committees were redefined. A summary account of those meetings is presented in Appendix D.

#### *Partners and collaborators, and their roles*

A distinction is made in this project between partners and collaborators. In Brazil, **partner institutions** are national institutions with influence that transcend state boundaries. The Brazilian partners are : CPRM, Comunidade Solidária, ABAS, and SUDENE. In Canada, GSC is the only partner institution. Each partner plays an important advisory role in their respective areas of competence, in addition to having specific coordinating roles or mandates. Each partner has a permanent representation on the project's Steering Committee (Comitê de direção, Fig. 1). The Ministry of Mines and Energy (MME) also has a permanent representation on the Steering Committee.

**Collaborators**, in Brazil, are the state institutions that play a role either in the delivery of the project or in its management. On the organization chart (see Fig. 1), they can be represented on local coordination committees (Coordenação Pernambuco, Ceará, Rio Grande do Norte) and/or on the regional integration committee (Comitê de Integração Regional). In Canada, collaborators are private sector firms, consultants or universities that are involved in any aspect of the delivery of the program. They provide advice and can occasionally sit on committees, but to date, no Canadian collaborator has been appointed to a committee other than on an ad hoc basis. This may change as the project progresses, and Canadian social and gender specialists may be called upon to play a more active role in managing the project.

As was anticipated, after six months of operation, some Brazilian collaborators are distinguishing themselves more than others in the delivery and management of the project. They include UFRN, SERHID and CAERN in Rio Grande do Norte, FUNDJ, FNS and UFPE in Pernambuco, and SOHIDRA, FUNCEME and UFC in Ceará. These institutions, and others that may stand out in the future, will have as much, if not more, influence on project delivery and management as the national partner institutions. In Canada, about a dozen private sector firms and universities have already taken part in project activities, and some are positioning themselves to play an even greater role in the future.

The following, taken from one of the documents produced following the June 7 to 9 meetings, gives the composition, roles and responsibilities, mandate and modus operandi of the different Project committees, and local coordination units, as shown on Figure 1.

### ***COMPOSIÇÃO E ATRIBUIÇÕES DO COMITÊ DE DIREÇÃO***

*O Comitê de Direção é composto por representantes do Geological Survey of Canada, CPRM - Serviço Geológico do Brasil, Associação Brasileira de Águas Subterrâneas (ABAS), Superintendência do Desenvolvimento do Nordeste (SUDENE), Programa Comunidade Solidária e Ministério de Minas e Energia (MME) e tem a atribuição de formular políticas e diretrizes gerais para o Projeto, inclusive com base em propostas da Coordenação Geral, devendo para isso reunir-se semestralmente, no Brasil ou no Canadá.*

*O Comitê de Direção poderá, quando julgar necessário, criar Comitês de Consultores para assuntos específicos.*

### ***COMPOSIÇÃO E ATRIBUIÇÕES DA COORDENAÇÃO GERAL***

*A Coordenação Geral é composta por um representante do Brasil e um representante do Canadá, com os respectivos substitutos, e tem as seguintes atribuições:*

- 1) Responder pelo Projeto perante a CIDA, a ABC e o Comitê de Direção.*
- 2) Responsabilizar-se pela administração do Projeto, inclusive em relação aos seus aspectos financeiros, e pelo cumprimento das metas físicas.*
- 3) Transmitir orientação e diretrizes à Coordenação Nacional.*

- 4) *Decidir sobre as indicações de colaboradores para treinamento e capacitação, recebidas da Coordenação Nacional.*
- 5) *Decidir sobre propostas apresentadas por consultores e empresas de consultoria, aprovando ou não a contratação das mesmas para o Projeto.*
- 6) *Integrar, a partir dos dados recebidos da Coordenação Geral, os relatórios do Projeto.*
- 7) *Assistir, e apoiar as missões canadenses e brasileiras no Brasil e no Canadá, respectivamente.*
- 8) *Responsabilizar-se pela guarda dos dados, informações e relatórios do Projeto.*

### **COMPOSIÇÃO E ATRIBUIÇÕES DO COMITÊ DE INTEGRAÇÃO REGIONAL**

*O Comitê de Integração Regional é composto por representantes dos Comitês Estaduais e pelos Coordenadores Nacionais e tem atribuições de assessorar a Coordenação Nacional do Projeto, quando para tal solicitado, especialmente em relação aos seguintes assuntos:*

- 1) *Cumprimento de objetivos e de metas físicas e financeiras do Projeto.*
- 2) *Promoção da troca de experiências entre os participantes do Projeto nas áreas-piloto.*
- 3) *Homogeneização de normas e padrões para o Projeto.*
- 4) *Indicação de colaboradores para treinamento e capacitação.*
- 5) *Revisão, compatibilização e integração de relatórios trimestrais, anuais e outros elaborados pelas Coordenações Estaduais.*

### **COMPOSIÇÃO E ATRIBUIÇÕES DA COORDENAÇÃO NACIONAL**

*A Coordenação Nacional é composta por um representante da área técnica e por um representante da área social, com os respectivos substitutos, e tem as seguintes atribuições:*

- 1) *Coordenar as atividades do Projeto nas áreas técnica e social.*
- 2) *Emitir diretrizes para as Coordenações Estaduais.*

- 3) *Assessorar a Coordenação Geral.*
- 4) *Transmitir às Coordenações Estaduais as diretrizes oriundas da Coordenação Geral.*
- 5) *Examinar os relatórios elaborados pelas Coordenações Estaduais e revisadas pelo Comitê de Integração Regional, podendo efetuar nesses documentos as modificações que julgar convenientes ou necessárias, e encaminhá-los à Coordenação Geral.*
- 6) *Manter entendimentos com autoridades e com representantes dos órgãos e instituições envolvidos no Projeto, visando às providências necessárias ao andamento dos trabalhos.*
- 7) *Examinar as indicações de colaboradores para treinamento e capacitação, efetuadas pelas Coordenações Estaduais, transmitindo sua opinião à Coordenação Geral.*
- 8) *Discutir diretrizes do Projeto com consultores e empresas de consultoria contratadas.*
- 9) *Homogeneizar normas e padrões adotados no Projeto.*
- 10) *Integrar, no que for possível, as atividades técnicas e sociais do Projeto nas áreas-piloto escolhidas.*

### **COMPOSIÇÃO E ATRIBUIÇÕES DAS COORDENAÇÕES ESTADUAIS**

*As Coordenações Estaduais são compostas por um representante da área técnica e por um representante da área social, com os respectivos substitutos, e terão as seguintes atribuições:*

- 1) *Acompanhar cronogramas físico e financeiro do Projeto.*
- 2) *Manter entendimentos com os parceiros visando a obter a sua efetiva participação no Projeto.*
- 3) *Providenciar a logística para cursos, seminários e “workshops”.*
- 4) *Indicar colaboradores para treinamento e capacitação.*
- 5) *Elaborar relatórios técnicos e sociais.*
- 6) *Identificar demandas de transferências de tecnologia para o Projeto.*

- 7) *Atender solicitações das Coordenações Geral e Nacional e do Comitê de Integração Regional.*
- 8) *Manter entendimentos com consultores e empresas de consultoria contratadas para trabalhar no Projeto, articulando o trabalho desses consultores com os parceiros e órgãos atuantes no Projeto.*
- 9) *Constituir Grupos de Trabalho ou de Assessoramento com os parceiros, conforme as necessidades do Projeto.*

At the time of writing, the following people had volunteered to serve on the various Committees :

### **Comitê de Direção**

*Claudio Miccieli (CS), Assessor para Assuntos Internacionais  
Carlos Fernando PintoTeixeira (SUDENE), Assessor Técnico  
Itabaraci Nazareno Cavalcante (ABAS), Presidente  
Tasso Mendonça Jr. (MME), Assessor da Secretaria de Minas e Metalurgia  
Thales de Queiroz Sampaio (CPRM), Diretor de Hidrologia e Gestão Territorial  
Yvon Maurice (GSC), Coordenador da Cooperação Canadá-Brasil.*

### **Coordenação-Geral**

*Yvon Maurice (GSC), pela parte canadense  
Gina M. LeCheminant (GSC), substituta pela parte canadense  
Samir Nahass (CPRM), pela parte brasileira  
Fernando de Britto Dantas (CPRM), substituto pela parte brasileira*

### **Coordenação Nacional**

*Humberto José Tavares Rabelo de Albuquerque(CPRM), Coordenador Técnico  
Ana Beatriz da Cunha Barreto (CPRM), substituta do Coordenador Técnico  
Claudio Miccieli (CS), Coordenador Social  
Substituto do Coordenador Social, a definir*

### **Coordenação Pernambuco**

*Enjolras de A. Medeiros Lima (CPRM), Coordenador Técnico  
Helena Magalhães Porto Lira (FUNASA), substituta do Coordenador Técnico  
Maria Lia Corrêa de Araújo (FUNDAJ), Coordenadora Social  
João Suassuna (FUNDAJ), substituto da Coordenadora Social*

### **Coordenação Ceará**

*Fernando Antonio Carneiro Feitosa (CPRM), Coordenador Técnico*  
*Sonia Maria Silvia Vasconcelos (UFC), substituto do Coordenador Técnico*  
*Rita Eugênia Martins Santiago, (Prefeitura de Irauçuba), Coordenadora Social*  
*Substituto da Coordenadora Social, a definir*

### **Coordenação Rio Grande do Norte**

*Walter Medeiros (UFRN), Coordenador Técnico*  
*Marcelo Augusto de Queiroz (CAERN), substituto do Coordenador Técnico*  
*Maria de Fátima de Freitas Rego (SERHID), Coordenadora Social*  
*Substituto da Coordenadora Social, a definir*

## **4. Performance Measurement Framework**

The revised Logical Framework Analysis (LFA) – Table 2 – provides a range of performance indicators that will allow to assess progress towards achievement of the anticipated project results with a reasonably high degree of reliability. It also lists basic assumptions that, if they hold true, will make attaining project objectives all the more likely. With regards to baseline data, against which progress will be compared, the Brazilian initiative on groundwater development for the Northeast (see Appendix C) is currently in the process of collecting water-related data throughout the region as part a major inventory program. These data will allow to monitor changes regarding water quality and availability in the communities, including communities within the pilot areas.

Baseline data related to the state of technical capability of local institutions is also being gathered during each technical mission. This information is then included in mission reports. This will permit assessing progress in terms of institutional strengthening, one of the primary purposes of the project. With regards to baseline data of a social nature, including gender data, these will be collected during the social and gender missions to be carried out by Canadian contractors who will lead these missions, starting with a social mission planned for November 2000 (see Appendix E). Their main task will be to update for the pilot areas, the enormous amount of data already available from government

statistical compilations which are published through numerous outlets, including on the Internet.

Major efforts will also be made to capture unexpected and collateral results by adopting a comprehensive reporting strategy for the project<sup>1</sup>. Collateral results are those that extend beyond the project's stated goal and objectives such as successes in fulfilling the international mandate of the Canadian Government, scientific breakthroughs, or spin-offs for the Canadian or Brazilian private sectors. Mission and training reports will be requested from all project participants, Canadians and Brazilians, following each activity as the best means of capturing unexpected results. There will also be close monitoring of other sources (e.g. the media, company reports, etc.) for any collateral outcomes that may directly or indirectly derive from project activities.

With regards to risks, a project as complex and as diverse as the Northeastern Brazil Groundwater Project would be expected to present many risks. Upon reflection, however, it is quite clear that the diversity in the partnership and the wide choice of approaches and range of activities that can be performed to achieve project objectives, are in fact contributing to lowering the risk. For example, if one partner institution in Brazil finds itself unable to fulfill its commitments due to lack of funding or the loss of key personnel, other partners may be able to carry on in its place. Similarly, if one technology from Canada proves to be unsuitable or too costly, then a different one may be obtained from another supplier.

Since many changes that will occur during the life of the project are unpredictable at the onset, there are many risks also that cannot be anticipated. The more obvious ones have been identified on the LFA. As for most other CIDA projects in Brazil, they include such standards as the political will, lack of funding, maintaining interest in the project in both the institutions and the communities, availability/loss of key personnel, differences in

---

<sup>1</sup> See Developing Indicators and Measuring Results in Technology Transfer Projects by LeCheminant et al. 2000; discussion paper presented at Lessons Learned Symposium, Guarujá, São Paulo, Brazil, May 2000 (Appendix K).

cultural backgrounds of trainees and trainers, applicability and adaptability of Canadian methods and models to the Brazilian context, etc.

The best approach to managing these and other risks is to build into the project enough flexibility to be able to change course as required by the circumstances and take advantage of opportunities as they present themselves. It is also believed that risk can be reduced by good communication and networking (i.e. keeping people informed and making the project known), participatory decision making, augmenting the reach by encouraging the widest possible participation in project activities, and by promoting collaboration and the sharing of resources amongst partners and collaborators. Some of these measures will also have an impact on the sustainability of project outcomes (see below).

## **5. Gender Strategy**

During the Inception Phase, the issue of gender equity was discussed at several meetings with project partners, and a capable consultant in this area, Ms. Ana-Cristina Palacky, was identified and contracted for preliminary work. Ms. Palacky participated in the Lessons Learned Symposium in Guarujá in May, and attended the Project's 1<sup>st</sup> Steering Committee Meeting in Rio, where she addressed the Committee and presented her views on gender equity. She also met the designated "gender person" at CPRM, who will act as the Brazilian counterpart to the Canadian gender specialist assigned to the project. Additional discussions and research by Ms. Palacky enabled her to produce two working documents in which she proposes a workplan to deal with gender issues within the project (see Appendix H). The proposed approach calls for (1) an analysis of the existing situation, (2) promoting women involvement in the project, and (3) education of women on water-related issues, targeting both the Brazilian institutions and the communities.

Although the preparations towards incorporating a gender strategy into the project are well underway, it remains that, amongst all of the Brazilian partners, the issue of gender is the



one that is least understood. It was therefore decided that, instead of rushing into an early program of activities on gender, that could be misconstrued by the partners and some segments of the population, it would be more appropriate to bring gender into the project as part of the social package, at least initially. Thus, the first social mission to be carried out in November 2000 by Ms. Sherry Nelligan, who is also a specialist on gender issues, will introduce the topic. Ms. Nelligan will observe reactions and gather preliminary data that will be used to prepare an appropriate workplan on gender that will respect local traditions and culture. This exercise should also allow to define realistic objectives and determine appropriate performance indicators.

## **6. Sustainability Plan**

Sustainability of technology transfer and development projects is a major challenge for all organizations that are engaged in such activities. The issue has been brought up at various meetings but, in most cases, it has not generated a great deal of discussion due to the fact that few people have clear ideas on how to approach the problem. But a cursory search on the Internet revealed that an enormous amount of effort is being devoted to this questions by such prominent organizations as the International Institute for Sustainable Development, the International Development Research Centre, the United Nations and many others. As the project progresses, we will endeavour to learn more about what is being done elsewhere and attempt to apply some of the more creative ideas to ensure that what is accomplished during the project is also sustainable.

Notwithstanding the above, we consider that sustainability in the context of the Northeastern Brazil Groundwater Project can be viewed from two different angles: (1) sustainability of the “high” technologies transferred to the Federal and State institutions that have the mandate of managing the region’s water supply; and (2) sustainability of the “low” technologies implanted within the communities. Ensuring sustainability in each case poses different challenges and requires different approaches.

With regards to the high-tech (e.g. geophysics, remote sensing, modeling, aquifer recharge, etc.) we believe that any technology that is proven useful and cost effective during the technology transfer project will be readily adopted by those Federal and State institutions that seek to be as efficient as possible in carrying out their mandate. These organizations are expected to have the necessary budgets to implement the project's recommendations; and if the operational and/or economic benefits derived from these recommendations are substantial, then long term application of the new technologies, and thus sustainability of the project's results, will be achieved.

On the other hand, at the community level, the changes that will be brought about by project activities (i.e. education and training in such areas as water conservation, hygiene, waste disposal, etc.) will be long lasting, i.e. be sustainable, only if they involve the ordinary people in the community; the greater their involvement, the more sustainable the project results will be. But long term sustainability in the community is at risk due to the need of at least some financial resources to implement even minor changes. And the resources that may be available during the life of the project may also cease to exist after the project has ended, making it necessary for the communities to raise funds on their own, not a straightforward task in northeastern Brazil.

Future social missions will examine the question of funding to promote sustainability at the community level, looking for possible solutions in activities such as fund raising, income generating activities, corporate sponsorships, etc. This is clearly an area which will become of growing concern to all the partners as the project progresses and solutions will be sought aggressively.

## **7. Budget and Disbursement Schedule**

Updated (to end of 2<sup>nd</sup> Q of 2000-01) financial data for the project are presented in Tables 3 and 4. Table 3 provides a breakdown of estimated CIDA funding requirements per line item as specified in the *Inter-Departmental Administrative Arrangement*, and includes the estimated amounts of contributions from GSC as well as from the Brazilian partners.

Table 4 gives additional breakdown of the disbursement schedule of CIDA funds for the current fiscal year. Similar breakdown related to GSC and Brazilian partner expenditures will be provided with the Quarterly Financial Reports.

## **8. Environmental Strategy**

In February 2000, some three months after submission of the original project proposal to CIDA and ABC, a Program Environmental Analysis was carried out at the request of CIDA, to determine the extent to which the Northeastern Brazil Groundwater Project would need to be subjected to the Canadian Environmental Assessment Act (CEAA). CIDA's environmental specialists concluded, after reviewing the analysis, that the Project fell under section 54.2 of the CEAA. This means that environmental screening will have to be done before any physical work is performed (e.g. drilling wells) unless it can be established that an equivalent Brazilian national environmental assessment process is congruent with the CEAA.

A search for Brazilian environmental policies, laws and regulations was undertaken during the Inception Phase expecting to turn up a Brazilian equivalent to the CEAA. A large number of documents were obtained from state and federal authorities (see partial list in Table 5) revealing that Brazil has indeed a wide range of regulations protecting all aspects of its environment. But these are essentially laws that establish what is ecologically permissible and what is not, and measures to be taken against violators. Nothing was found in the existing legislation that quite matches the preventative measures (i.e.

identifying the adverse environmental effects of proposed projects before they occur) that are fundamental to the CEAA.

But the search also revealed that Brazil will soon have its own CEAA-style environmental impact assessment mechanism as part of the environmental regulatory framework that is being devised for Mercosur. The negotiations that are currently taking place between Brazil and several of its neighbours, will lead to the adoption of protocols that will give these countries stringent environmental regulations that are comparable to those that exist in North America and parts of Europe.

But for now, although the search will continue, it is doubtful that anything even remotely comparable to the CEAA will be found in Brazil. The CEAA is one of the world's most advanced, if not the most advanced, environmental assessment tool, and few nations, even amongst the most developed, can claim to have anything quite like it. Therefore, we expect to have to perform environmental assessment in compliance with the CEAA whenever projects involving physical work are contemplated for the Northeastern Brazil Groundwater Project. But, at the time of writing, none of the projects planned for the near future involve such physical work and, therefore, the environmental strategy elaborated in the program Environmental Analysis of February 2000 (see Appendix I) still applies. That strategy consisted of the following provisions:

1. The project's management team will work closely with NRCan's Office of Environmental Affairs to ensure that the Government of Canada's policies and regulations are properly adhered to;
2. Environmental impact will be given priority status whenever meetings are held with partners and project participants to decide on specific project activities;
3. Project environmental analysis will be done as part of individual project planning process and, if required, environmental assessment will be performed in accordance with the CEAA;

4. Whenever deemed necessary, in-house specialists or consultants will be taken to the project site in order to be better able to evaluate the environmental impact of certain activities or projects, particularly those involving substantial physical work;
5. Projects that are considered of high environmental risk, and for which no satisfactory alternate approaches are found, will be cancelled.

It may be appropriate to point out that the application of the CEAA to projects outside Canada has met with considerable challenges, as revealed in a recent (Dec. 99) published review of the Act (see [http://199.212.18.103/discussion/discussion\\_e.htm#7-5](http://199.212.18.103/discussion/discussion_e.htm#7-5) ).

Amongst several issues that have presented problems in the application of the CEAA in foreign projects, the following are seen as being particularly significant for the current project in northeast Brazil:

- The Act's triggering provisions were developed for use in Canada and are not always appropriate for situations outside Canada.
- Some foreign countries view the request to conduct an environmental assessment under Canadian legislation as an infringement of their sovereignty, even though the assessment is the result of a request for financial assistance from Canada to allow the project to be carried out. In these instances, Canada's approach has been viewed as paternalistic and a challenge to the partner country's right to manage its resources and identify its needs.
- Sometimes, there is a lack of adequate, accessible information and authority to scope the project, assess cumulative effects or ensure that mitigation and follow-up occur as required without infringing on the sovereignty of the local country.
- In some foreign countries in which Canadian aid organizations operate, public participation is not as valued as in Canada. Public participation is prevented or

severely restricted by the lack of a tradition of public consultation, lack of adequate literacy or social limits on participation, such as gender roles in the society.

The report calls for greater flexibility and recommends exclusion of certain projects as, for example, those that have minimal environmental effect and/or those in which the Canadian government does not have decision-making authority. Such amendments would eliminate the need for environmental assessment for most, if not all, Northeastern Brazil Groundwater Project activities.

# ANNUAL WORKPLAN 2000 – 2001

## Introduction

Annual Workplans are required to be submitted to CIDA once a year, in March, before the beginning of each fiscal year. This one, however, the first of the Northeastern Brazil Groundwater Project, is exceptionally being submitted more than six months into the fiscal year, as part of the Project Implementation Plan (PIP) that follows a six-month Inception Phase. It spans the entire fiscal year even though half of the program has already been carried out. It does not extend beyond the current fiscal year because another, the 2001 – 2002 edition, will be submitted in March 2001.

A number of issues that should be included in the Annual Workplan have already been dealt with in the PIP. For those, we will either expand the coverage here, or we will simply refer the reader to the appropriate section of the PIP.

As stated in the PIP, the Project's Inception Phase included activities that were designed to address issues that needed to be strengthened in the original proposal, and others to initiate the technical program itself. Overall, the Inception Phase was very productive on both counts. First, strengthening the original proposal, is fully described in the PIP and the corresponding activities are summarized in Table 1. Second, initiating the technical program, two major activities that took place during the Inception Phase, the ground geophysical workshop and field work (H in Table 1) and the Canadian participation at the Fortaleza 2000 congress (K in Table 1), were particularly successful in achieving progress towards attainment of the project's results (see also pp. 8-9). At least 40 Brazilians, representing over a dozen organizations, were trained during the geophysical mission in June, thus enhancing the capacity of these organizations to perform groundwater research using geophysical methods. At Fortaleza 2000, at least five of the nine Canadian private sector firms and public institutions that were represented reported having made linkages that will likely develop into joint scientific or commercial activities in the near future. One of these firms is returning to Brazil in November to discuss with two Brazilian partners on the possibility of initiating a joint pilot project on the use of

solar power in a remote community in the state of Ceará (see below; a full report on all the linkages derived from Fortaleza 2000 will be included in the next Progress Report).

The Brazilian partners have elaborated a full program of activities to the end of 2002 (see Appendix C). There will be a full report on progress of that program with the next Progress Report. Brazilian trainees who took part in the June 2000 workshop and field work in geophysics have also carried out follow-up work in the pilot areas in order to prepare the next stage, the airborne geophysical survey.

### **Activities planned for the remainder of 2000 – 2001**

Two missions involving Canadians traveling to Brazil in November and in March, and possibly another in January to carry out an airborne geophysical survey, have been planned for the remainder of 2000 – 2001. In addition, there will be at least one mission involving Brazilians traveling to Canada in the spring, to receive training in remote sensing techniques. Most of these activities are designed to transfer the technology that the Brazilian partners will need to fully implement their own component of the program (see Project Timeline, Fig. 2).

#### ***November 2000 Mission***

This mission will take place between November 18 and December 10, 2000 and will include visits to Rio de Janeiro and to the three participating states. The following activities are planned :

- 2<sup>nd</sup> Steering Committee Meeting and three Regional Committee Meetings
- 1<sup>st</sup> Social Area Mission
- Solar Power Pilot Project

The **2<sup>nd</sup> Steering Committee Meeting (SCM)** will take place in Rio de Janeiro on December 8<sup>th</sup> and will be preceded by Regional Committee Meetings (RCM) in the capitals of each of the participating states. This format is being tried as a means of



avoiding excessive traveling of the Brazilian partners and collaborators, who would normally want to attend a SCM, but may be unable to travel for budgetary or other reasons. We also believe that a four-session SCM, spread over a two-week period will be more effective at covering all the issues than a large one-day SCM, by allowing time for the information to be absorbed between the sessions. The Rio session will bring together key personnel who are stationed in Rio de Janeiro and some representatives of the main partners who may have to travel from outside. The RCM, on the other hand, will bring together all the collaborators and most of the partners who are stationed locally. The two general coordinators as well as the social coordinator from Comunidade Solidária, plan to attend the RCM as well as the Rio session on December 8. Highlights of the outcome of the RCM will be presented and discussed at the Rio session.

Canadian social area contractor Sherry Nelligan of Sherry Nelligan and Associates will accompany the Canadian delegation in November to carry out the first of two **social area missions** to the region. Ms. Nelligan is also expected to attend all sessions of the SCM. The second mission will take place in March 2001. Ms. Nelligan's workplan was presented and discussed in detail in the PIP (see Project Workplan, p. 13 and Appendix E).

An interesting project is developing between the private sector firm Sunmotor International of Calgary and Dancor, a water pump manufacturer from Rio de Janeiro, and SOHIDRA, a state-owned water resource developer in Ceará. These Brazilian partners have asked Sunmotor and the GSC to join them in setting up a **pilot project on the use of solar energy** in managing groundwater resources (pumping and desalinizing) in a remote community in Ceará, after establishing contact with Sunmotor President Eric Jensen at Fortaleza 2000. The cost of this pilot project will be shared between the Brazilians, who will supply the pumps and the desalinization equipment, and the Canadians who will supply the specialized DC motors and solar panels. The Canadian technology to be transferred lies in the specialized DC motors and in adapting them to the pumps distributed by Dancor. The outcome of this experiment would directly benefit the residents of a small community in the interior of Ceará (see Appendix J). Mr. Jensen will

join the November 2000 mission to Brazil where he will attend meetings in Rio de Janeiro and Fortaleza, and visit the community where the pilot project will be set up.

### *Airborne Geophysics*

One of the objectives of the ground geophysical investigations carried out in June 2000 was to establish whether airborne geophysics might be useful in mapping groundwater in the crystalline basement rocks of the Northeast, and to select the location and determine the technical specifications for three pilot-scale surveys in the region, one in each state.

This was accomplished very successfully. There is no doubt that such airborne surveys will provide the information needed to carry out groundwater exploration in the crystalline rocks much more effectively than was possible previously. Also, three pilot areas totaling some 340 km<sup>2</sup> were outlined based on technical grounds and community needs, and all the necessary survey parameters (flight line orientation, spacing, flight elevations, etc.) were determined. These parameters were used afterwards to write the terms of reference for a Request for Proposal (RFP).

The technical specifications and other contract documents were prepared by GSC specialists and sent to CPRM in September. Because of the high costs involved (about R\$600,000) and the 50-50 cost-sharing formula between GSC and CPRM, it became legally mandatory for CPRM to award the contract themselves to a Brazilian firm<sup>2</sup>. Ideally, the airborne survey should be carried out in November or early December, which corresponds to the driest season in northeast Brazil. However, it appears now that the work may have to be postponed until next year due to delays in awarding the contract. The issue will be one of the main topics to be discussed during the 2<sup>nd</sup> Steering Committee Meeting in November. It should be pointed out that the results of the airborne surveys will provide much of the groundwater information for the region which will help to better plan future project activities. It is, therefore, important that these pilot surveys be carried out as soon as possible.

---

<sup>2</sup> There are only two firms in Brazil that have the capability of running such surveys, and both are headquartered in Ontario.

### ***Geophysical and Remote Sensing Training in Canada***

During the Fortaleza 2000 Congress in August, a meeting of the Brazilian national and regional coordinators and several Canadian participants outlined a program to train up to six Brazilian geophysicists and students in airborne geophysical compilation and interpretation, and in remote sensing, including geophysical and remote sensing data integration. Because of the possible postponement of the airborne geophysical pilot surveys in the northeast, portions of this program may have to be delayed, but we expect that parts will still be carried out, mostly those involving remote sensing. The program will be reviewed during the RCM and SCM in November. Training will probably take place during the 4<sup>th</sup> Quarter of 2000 – 2001.

### ***Expected outputs and progress towards achievement of outcomes and impact***

All of the project activities to be carried out in the remainder of this fiscal year will contribute towards achievement of outcomes and impacts as defined in the project LFA (see Table 2). The social missions will ensure that a social component to the project becomes reality, including education and training of the population in various aspects of water management and health related issues. With this will come an improved understanding of principles and benefits of sound water management (e.g. conservation; waste disposal; equipment maintenance; responsibility sharing) by community leaders and residents. Later, we can expect that these principle will be accepted by the communities in the pilot areas.

The solar power pilot project will increase linkages between Canadian and Brazilian institutions involved in groundwater research and management and, with the new technology, increase the capacity of key Brazilian organizations (SOHIDRA and Dancor) to manage the water supply. This will also contribute to increase long term access to a more regular and abundant supply of good quality water for some of the communities.

Training in remote sensing and the results of the airborne surveys will provide the trainees with increased understanding of those Canadian technologies and improve the

capacity of Brazilian organizations to undertake research and development by providing them with very powerful tools.

### ***Financial Matters***

Tables 3 and 4 present up-to-date actual expenditures (1<sup>st</sup> and 2<sup>nd</sup> Quarters) and expenditure forecasts of CIDA funds for the remainder of the fiscal year. GSC's in-kind contribution for the first two quarters is estimated at C\$90,000, the same as the estimated amount for the 3<sup>rd</sup> and 4<sup>th</sup> quarters.

Tables 6, 7 and 8 present a compilation of Brazilian partner expenditures (actual and in-kind) related to three events: 1<sup>st</sup> Steering Committee Meeting (May); the Geophysical Workshop and subsequent field operations (June); and the CPRM-led Preparatory Partner Meetings (June). The total reported is approximately C\$77,000, but this figure does not include overheads and the cost of running Brazilian technical program activities. These figures will be compiled and included in the next Annual Progress Report. The Brazilian technical program remains committed to spending \$6.8 million during the life of the project. During the remainder of the fiscal year, we anticipate the level of Brazilian spending to be similar to the first half, plus CPRM's share of contracting the airborne geophysical survey (R\$300,000).

Table 1: List of activities carried out during Inception Phase as they relate to issues that required further development.

	<b>Event/activity</b>	<b>Period/dates</b>	<b>Details</b>	<b>Results</b>
A	CIDA's Lessons Learned Symposium, Guarujá, S.P.	May 7 to 10, 2000	GSC and CPRM project officials attend 3-day symposium covering issues ranging from Social and Gender Equity to Result Based Management (RBM). Intense discussions with CIDA officials and participants in other CIDA projects in Brazil on ways to meet project requirements more efficiently.	Much clearer understanding of CIDA's short and long term objectives in Brazil and of RBM. New ideas and possibly new collaborators found for NE-Brazil Groundwater Project to deal with gender and social issues. (See report by A.-C. Palacky, App. A)
B	1 <sup>st</sup> Steering Committee Meeting, Rio de Janeiro	May 11, 2000	25 participants representing project partners and collaborators, including 3 from Canada, review the project workplan. Detailed presentation of the issues requiring further development during the Inception Phase. Intense discussions on gender equality issues and on the role of different partners in project structure.	Roles and intentions of project partners, notably Comunidade Solidária and SUDENE, become clearer. Methods of integrating social and technical programs emerge. Plan to address issues requiring further development is adopted. (See Minutes of Meeting, App. B)
C	Meetings and discussions on gender issues	April, May, 2000	Canadian gender consultant Ana-Cristina Palacky met and discussed gender issues with project partners in Canada and in Brazil.	Discussions and research by Ms. Palacky led to two working documents/ proposals on ways of implementing a gender equity in the project. (See documents in App. H)
D	Meetings and other exchanges with World Vision Canada	April, May, 2000	World Vision Canada offered to provide social coordination of the Groundwater Project with input from both their Brazilian and Canadian operations.	A detailed proposal was submitted to GSC in May, but was considered to be too ambitious and too dissociated from the technical program to be implementable.
E	Meetings and discussions at CPRM and between CPRM and other institutions throughout the Northeast	May, June, 2000	CPRM and other institutions take advantage of the availability of technical support from the Canada-Brazil Cooperation Project to launch a major groundwater resource development program in the Northeast.	The proposed program is contained in a document entitled "Programa de Água Subterrânea para o Semi-Árido Brasileiro, Diretrizes Programáticas 2000-2003". (See details, App. C)
F	Meeting with Teresa Pires at CIDA Headquarters, Hull	June 7, 2000	Review LFA and other issues of interest for Inception Phase (incl. dealing with gender issues, social coordination, social visit to Canada, complying with Canada's Environmental Assessment Act).	Useful information for all issues discussed, including CIDA's viewpoint on social coordination, social area mission to Canada, and valuable suggestions for LFA
G	CPRM-Led Preparatory Partner Meetings in 3 Northeastern States	June 7 to 9, 2000	CPRM holds series of meetings with project partners in 3 northeastern states to discuss issues that need to be developed further during Inception Phase	Participating organizations confirm their commitment/support to project. Project management structure and internal monitoring and reporting mechanisms are defined. A new simplified project organization chart is adopted. A series of recommendations to integrate social and technical components are made. (See Summary, App. D).

	<b>Event/activity</b>	<b>Period/dates</b>	<b>Details</b>	<b>Results</b>
H	Geophysical Workshop in Natal and Field Work in 3 Northeastern States	June 10 to July 2, 2000	1 <sup>st</sup> Technical Mission to Brazil brings technology to the communities. Selection of pilot areas based on social/technical criteria. Formal and informal meetings with community leaders, social workers and community residents in pilot areas.	Better appreciation of social problems in pilot areas, what Brazilian social workers are doing and what type of assistance the project can provide. Concept of a contracted social worker from Canada is presented and receives enthusiastic support. Candidates for social mission to Canada are tentatively identified. Comprehensive consultant report is prepared (to be submitted to CIDA separately)
I	Meetings and other exchanges with Social/Gender Specialist Sherry Nelligan	May, June, July, August, September, October, 2000	To design a realistic plan to bring about social sector involvement and gender equity into the project. Plan social sector mission to Canada.	Discussions culminate with the elaboration of a work statement to be used as the basis for a 6-month contract to Ms. Nelligan, to be implemented from October 2000 to March 2001. (See Terms of Reference, App. E)
J	Field Trip to Interior of Ceará and Pernambuco	July 28 to 31, 2000	7 Canadian groundwater specialists from the private sector and public institutions take part in a 3-day field trip with about 25 Brazilian hydrologists and groundwater technicians to discuss water problems and solutions for the Northeast. Meetings with community residents and social workers in some of the hardest hit regions.	Better appreciation of social and technical problems caused drought and of Brazilian solutions. Potential partnerships are established which may lead to collaboration and bring new solutions appropriate for the region and social context. Series of reports are produced by Canadians (to be submitted separately)
K	Fortaleza 2000, Fortaleza, CE	August 1 to 5, 2000	12 Canadian groundwater specialists and project officials participate in a world class symposium on groundwater, attended by nearly 1000 Brazilians including all project partners. A 6-booth Canadian pavilion allows to showcase Canadian groundwater technologies and know-how, and facilitates interaction with Brazilian counterparts. Formal and informal meetings with project partners are held.	Linkages are established and a vast number of new ideas for collaboration are proposed. Meetings of Canadians amongst themselves and with the Brazilian partners, including Ceará social workers, help refine the project workplan. Series of reports are submitted by the Canadian participants (to be submitted to CIDA separately). (See overview account of congress, App. F)
L	International Geological Congress, Rio de Janeiro	August 6 to 17, 2000	Brazilian and Canadian project coordinators participate in this international event attended by nearly 4000 people. Project is given publicity through a display. Informal meetings are held with other potential collaborators (e.g. Petrobras, USGS).	Project is given national and international visibility. Discussions held may result in future linkages and collaboration with other Brazilian and international institutions involved in groundwater exploration and management.
M	Correspondence with UBC Centre for Human Settlements	May, June, September, 2000	Attempts are made to involve the Centre in social component of groundwater project and/or to help organize social sector mission to Canada. Preliminary meeting held in São Paulo during LL Symposium and e-mail exchanges.	Involvement of Centre in social component of groundwater project was deemed impractical, at least in early stages (social contractor will be hired instead). Involvement of Centre in social area mission is more likely. Tentative plans have been made for a possible spring 2001 mission
N	Gathering of Information on Brazil Environmental Legislation/Regulations	August and September, 2000	Formal requests sent to state waterworks companies and legislatures for copies of state legislations to determine if Brazilian environmental laws satisfy provisions of the Canadian Environmental Assessment Act.	11 documents received, covering the entire spectrum of federal and state laws, regulations, policies, strategies, programs, etc. To be submitted to CIDA for assessment.

Table 2 RESULT-ORIENTED LOGICAL FRAMEWORK ANALYSIS

<b>Country/Region:</b> Northeast Brazil		<b>Project Budget</b> (in millions \$Can): \$1.36 CIDA; \$6.82 Brazil; \$0.40 GSC (in kind)	
<b>Project Number:</b> BR/19777/21K			
<b>Project Title:</b> NORTHEASTERN BRAZIL GROUNDWATER PROJECT			
<b>Partner Organizations:</b> Geological Survey of Canada, CPRM, SUDENE, Comunidade Solidária, ABAS		<b>Project Managers:</b> Dr. Yvon Maurice (GSC); Mr. Samir Nahass (CPRM)	
NARRATIVE SUMMARY	EXPECTED RESULTS	PERFORMANCE MEASUREMENT	ASSUMPTIONS/RISK INDICATORS
<b>Project Goal:</b> To contribute to greater equity in Northeastern Brazil by developing the region's groundwater resources	<b>Impact:</b> Increase long-term access to a more regular and abundant supply of good quality water	<b>Performance Indicators:</b> Increase in the number of people/ households/ communities with access to clean and stable water supply; decrease in emergency measures required during drought periods	<b>Assumptions:</b> Political will and government action to implement recommended measures prevails over self-interest of individuals or groups who benefit from the status quo. <b>Risk Indicators:</b> Short- and long-term programs are implemented with little or no "outside" interference.
<b>Purpose:</b> To provide Brazilian institutions with the tools to improve the water situation (access, abundance, quality) to communities in pilot areas of three northeastern states (Pernambuco, Ceará, Rio Grande do Norte)	<b>Outcomes:</b> #1 Capacity of key Brazilian organizations to undertake groundwater research and development increased #2 Capacity of key Brazilian organizations to manage water supply increased #3 Increased acceptance of sound water management practices by pilot project communities #4 Increased linkages between Canadian and Brazilian institutions involved in groundwater research and management #5 Women become more involved in the planning, operation, and management of the water supply in pilot areas	<b>Performance Indicators:</b> #1 Number of studies/ surveys/ projects carried out by organizations using Canadian models and technologies. #2 Measurable changes within institutions (new courses offered by universities, new equipment/ software purchased, etc.). #3 Number and nature of measurable changes made by the communities to their water management systems/ approaches. #4 Number of projects/ activities and follow-up involving Canadian and Brazilian public and private sector organizations; degree of collaboration; level of satisfaction. #5 Percentage of women in planning, management, operation, and decision-making roles in key Brazilian organizations and in the communities; level of satisfaction of women with local water supply systems.	<b>Assumptions:</b> #1 Adequate funding will be available to support short- and long-term project activities. #2 Federal and state government institutions and their personnel will remain interested in acquiring new technologies to combat the drought even in non-drought years. #3 Brazilian social services will be available in pilot areas to carry out activities; community interest in project remains high. #4 Gender equity is not perceived as contravening social and cultural traditions <b>Risk Indicators:</b> #1,2 Number of water projects employing new technologies implemented with adequate budgets. #3 Number of social workers operating in pilot areas, frequency of visits, number of activities organized; level of community participation. #4 Level of acceptance/ cooperation with gender equity specialist assigned to project
<b>Resources:</b> Activities: #1 Training sessions – workshops, seminars, short courses, in-field demonstrations, technical visits; information sessions and community meetings – Budget: \$750K Canada; \$750K Brazil  #2 Studies, surveys, and testing in pilot areas – inventories, well drilling and rehabilitation, airborne and ground geophysics, water storage projects, desalinization – Budget: 1M Canada; \$6M Brazil	<b>Outputs:</b> #1 <b>Increased understanding of Canadian technologies and methods of conducting groundwater studies, surveys, and infrastructure projects by trainees</b> #2 <b>Distinction made between the technologies that are useful, and those that are not.</b> #3 <b>Improved understanding of principles and benefits of sound water management (e.g. conservation; waste disposal; equipment maintenance; responsibility sharing) by community leaders and residents.</b>	<b>Performance Indicators:</b> #1 Number of courses and field demo sessions given; number of people trained; number and range of Brazilian institutions receiving technologies. #2 Number of successful vs. unsuccessful studies, surveys and tests performed in pilot areas. #3 Number of community meetings, information sessions, activities; level of participation at these sessions. Level of satisfaction derived from project activities by community leaders and residents.	<b>Assumptions:</b> #1 Sufficient funding will be available to project participants of both the technical and social areas, to cover travel, field work and other logistical costs associated with project activities #2 At least some of the new technologies offered by Canada will be useful to fight drought in the Northeast. <b>Risk Indicators:</b> #1 Level of participation by institutional staff in technology transfer activities and social programs. #2 Number of technologies tested in pilot projects that prove to be useful and cost-effective.

Table 5 – Partial list of environmental legislative and regulatory documents obtained from Federal and State authorities, which were examined in the search for CEAA-equivalent legislation in Brazil (all documents are available from project coordinators)

DOCUMENT	Source	# PAGES
POLÍTICA NACIONAL DE RECURSOS HÍDRICOS (LEI NO. 9.433 DE 8 DE JANEIRO DE 1997)	Ministério do Meio Ambiente, Secretaria dos Recursos Hídricos Associação Brasileira de Educação Agrícola Superior	33
LEI DA VIDA: A LEI DOS CRIMES AMBIENTAIS	Ministério do Meio Ambiente, Brasília, 1999	38
A AGUA É UM BEM DE TODOS: LEGISLAÇÃO SOBRE OS RECURSOS HÍDRICOS DO ESTADO DO RIO GRANDE DO NORTE	Secretaria de Recursos Hídricos do Estado do Rio Grande do Norte	64
LEI NO. 11.996, DE 24 DE JULHO DE 1992: POLÍTICA ESTADUAL DE RECURSOS HÍDRICOS, ESTADO DE CEARÁ	O Governo do Estado de Ceará	22
LEI ORGÂNICA DO MUNICÍPIO DE IRAUCUBA, SEÇÃO I: MEIO AMBIENTE	O Governo do Estado do Ceará	2
LEGISLAÇÃO ESTADUAL DE MEIO AMBIENTE	O Governo do Estado de Ceará	44
LEGISLAÇÃO REFERENTE À QUALIDADE DAS ÁGUAS	Ministério do Meio Ambiente, Secretaria dos Recursos Hídricos	50
A LEI DO MEIO AMBIENTE: LEI NO. 9.605 DE FEVREIRO DE 1998	Saneamento Ambiental, No. 55; VEGA Engenharia Ambiental S.A., São Paulo	8
COLETÂNEA DE LEIS AMBIENTAIS (LEGISLAÇÃO FEDERAL E DO ESTADO DE PERNAMBUCO)	Companhia Pernambucana do Meio Ambiente	119
LEI Nº 11.426 DE 17 DE JANEIRO DE 1997 DA POLÍTICA E DO SISTEMA ESTADUAL DE RECURSOS HÍDRICOS	Secretaria de Ciência, Tecnologia e Meio Ambiente; Governo do Estado de Pernambuco	59
LEI Nº 11.427 DE 17 DE JANEIRO DE 1997 DA CONSERVAÇÃO E PROTEÇÃO DAS ÁGUAS SUBTERRÂNEAS NO ESTADO	Secretaria de Ciência, Tecnologia e Meio Ambiente; Governo do Estado de Pernambuco	32
LEI Nº 11.516 de 30 de Dezembro de 1997 LICENCIAMENTO AMBIENTAL	Secretaria de Ciência, Tecnologia e Meio Ambiente; Governo do Estado de Pernambuco	17
LEGISLAÇÃO AMBIENTAL DO RN, NATAL/RN – 1998	IDEC – Instituto de Desenvolvimento Econômico e Meio Ambiente do Rio Grande do Norte	190
LEGISLAÇÃO AMBIENTAL DO RN, 2ª Edição, NATAL/RN – 1999	IDEMA – Instituto de Desenvolvimento Econômico e Meio Ambiente do Rio Grande do Norte	43



**PROJETO ÁGUA SUBTERRÂNEA NO NORDESTE DO  
BRASIL**  
**Cooperação Técnica Canadá-Brasil**

**ORGANOGRAMA**

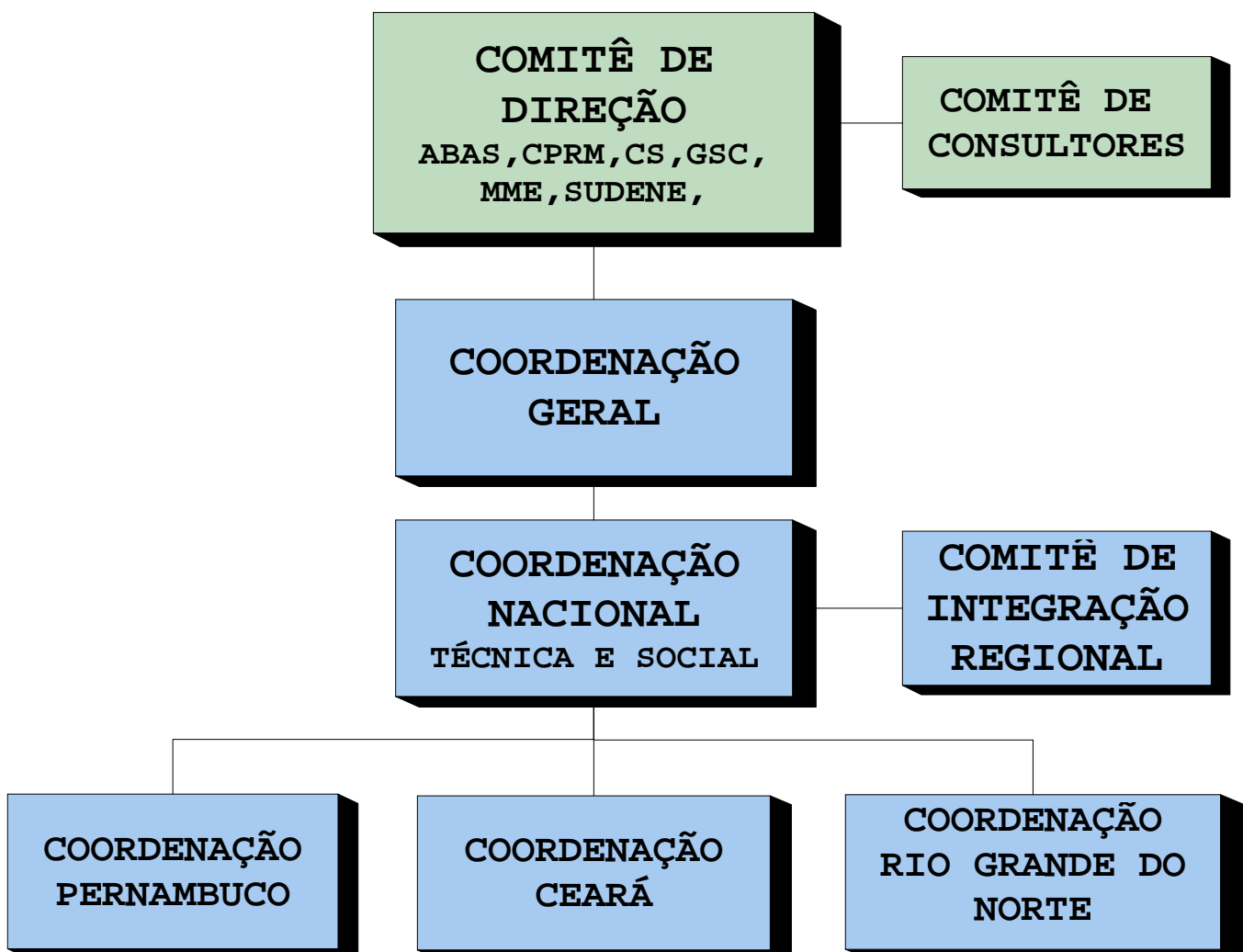


Figure 1 Canada-Brazil Technical Cooperation: Project Management Organogram