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Northeastern Brazil Groundwater Project (PROASNE)

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Natural Resources Canada

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The Project

Objective:

- To find long-term solutions to the problems caused by drought in the Northeast of Brazil

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Approach: Technology Transfer

- To enhance the capacity of Brazilian institutions to develop the region's groundwater resources by:
  - Training personnel in Brazil (courses, seminars, field demonstrations)
  - Training in Canada
  - Technical visits
  - Joint pilot scale projects

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Drought in the Northeast

Every 4 to 5 years, there is major drought in Northeast Brazil

Area/people affected

- 1 million sq km
- 25 million people

"The area is the size of Ontario and the population is just under that of Canada"

A way of life

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How Bad Does It Get?

In May 1998, the Food and Agriculture Organization of the United Nations reported that 4.8 million people in the northeast of Brazil were at immediate risk of starvation

Drought causes:

- Disintegration of agriculture
- Hunger
- Diseases
- High mortality rate
- Mass migration
- Civil unrest

INTERNATIONAL NEWS

Drought drives northeastern Brazilian state to despair

Infant-mortality rates skyrocket as government struggles to maintain aid programs; stagnant wells the only source of drinking water for many

THE GLOBE AND MAIL, March 13, 1999

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Even in Normal Years There Are Water Supply Problems in Brazil's Northeast

These are related to:

- Low annual rainfall
- Long dry seasons
- High evaporation
- Vulnerability of surface water to:
  - Evaporation
  - Pollution
  - Salinization

Typical reservoir at the end of the dry season in a normal year

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How Is CIDA Helping?

By developing the region's groundwater resources

- by providing new exploration and management tools to Brazilian institutions (technology transfer)
- by focussing on rural communities that are outside the reach of government programs
- by envolving the population through social and community programs

Abandonned community well in Ceará; nearly 50% of Ceará wells have been abandonned or have never worked

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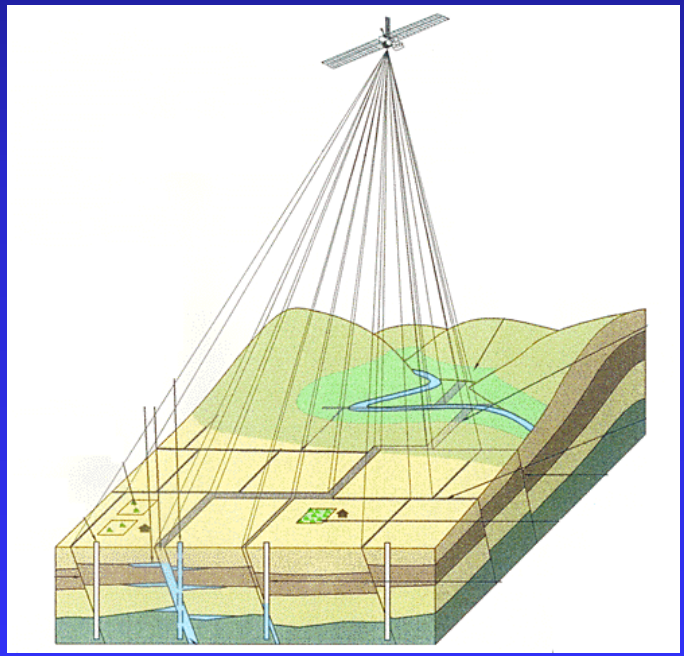
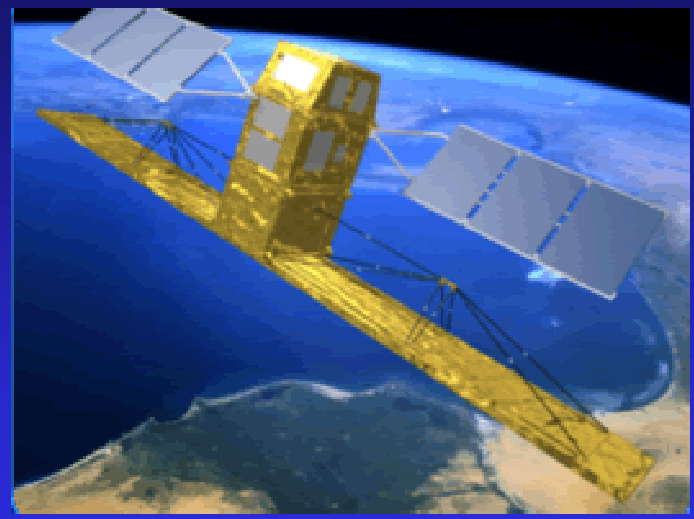
Examples of the Technologies Being Transferred

1. Mapping groundwater by Remote Sensing





CANADA'S RADARSAT

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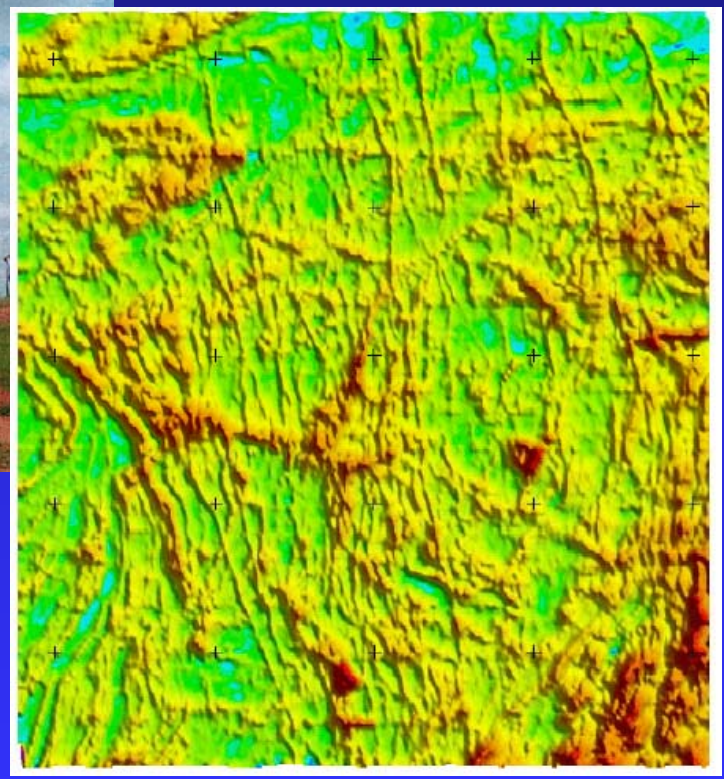
2. Mapping Groundwater With Airborne Geophysics



Fractures containing groundwater show up as lines on the electro-magnetic maps

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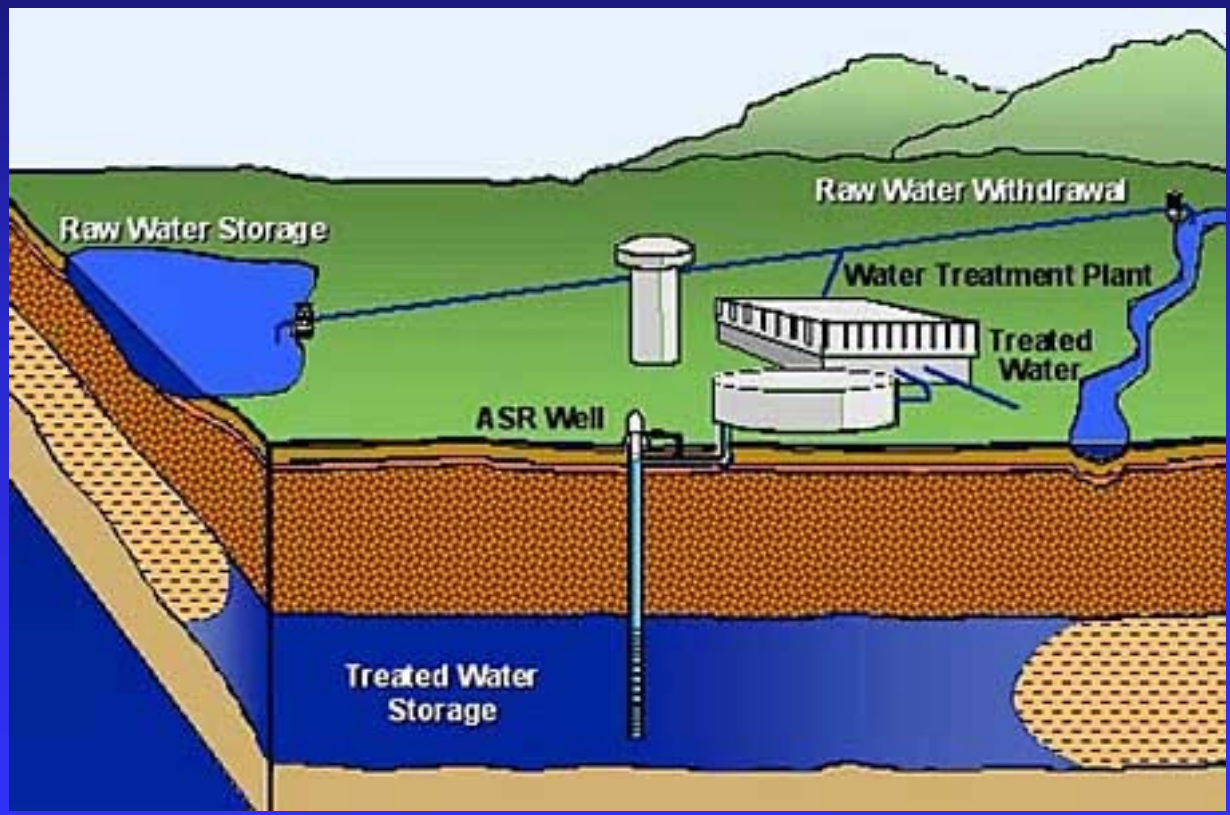
3. Storing Water Underground to Prevent Evaporation and Pollution



4. Using Solar Power in Water Management

Applications:

- Water delivery from remote locations identified in geophysical and remote sensing programs
- Low-cost energy for pumping and desalinization
- Solar irrigation

The Canadian technological contribution consisted of developing a special motor that improves the efficiency of solar power pumping and desalinization

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Some Projects Deal Specifically With Community Issues

- Consultation, sensitization and community participation
- Community solutions to simple water supply/quality problems
- Education programs (hygiene, equipment maintenance, water conservation)
- Agricultural issues (micro-irrigation, soil desalinization)
- Environmental issues (waste disposal, aquifer protection)
- Improving equity for women in the community

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Project funding
(2000 - 2004)

- CIDA: $1.6 million
- Natural Resources Canada: $0.4 million (in-kind)
- Brazillian Government: $6.8 million (mostly in-kind)

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Principal Brazilian Partners and Participants

- Associação Brasileira de Águas Subterrâneas (ABAS)
- Companhia de Águas e Esgotos do Rio Grande do Norte (CAERN)
- Companhia Pernambucana de Meio Ambiente (CPRH)
- Comunidade Solidária
- Fundação Joaquim Nabuco
- Instituto Hidroambiental Águas do Brasil (IHAB)
- Prefeitura Municipal de Caraúbas/RN
- Prefeitura Municipal de Custódia/PE
- Prefeitura Municipal de Irauçuba/CE
- Prefeitura Municipal de Itapajé/CE
- Prefeitura Municipal de Serrinha/RN
- Prefeitura Municipal de Tejuçuoca/CE
- Programa Universidade Solidária
- Secretaria dos Recursos Hídricos do Rio Grande do Norte (SRH/RN)
- Universidade Federal de Pernambuco (UFPE)
- CPRM
- SOHIDRA
- Universidade Federal do Rio Grande do Norte (UFRN)
- Universidade Federal do Ceará (UFC)
- Fundação Nacional da Saúde (FUNASA)
- CAGECE
- CAGERH
- SEMACE
- FUNCEME
- DNPM

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Principal Canadian Partners and Participants

- Waterloo Hydrogeologic Inc.
- CH2M Hill Canada
- Sunmotor International
- Fugro Airborne Surveys Ltd.
- Groundwater Services International
- MIR Télédétection
- University of Waterloo
- Bemex Consulting International
- Infotierra Ltd.
- Geological Survey of Canada
- Gender Equality Inc.
- Palacky Services
- Conflict Mediation Services of Downsview
- Komex International
- PCI Geomatics