CONCEPT PAPER: SEWAGE TO MILK (STM):

Employing Canadian Environmental Technology to Improve Water Quality, Reduce River Pollution and Increase Milk Production under Drought Conditions by Using Municipal Effluent to Irrigate Solar-Power Fenced Rotational Pastures at a CPA in Bayamo, Cuba

Wendy Holm,
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Introduction

This paper is intended to provide the framework for stakeholder discussion of a project proposed by the International Centre for Sustainable Cities to convert untreated household sewage presently entering the river system upstream of the city of Bayamo into clean effluent to irrigate rotational pastures and increase the supply of milk to children, seniors and hospitals in a drought-stricken region of eastern Cuba.

Proposed Project Partners

Canada:
- International Centre for Sustainable Cities
- Canadian Urban Institute
- Eco Tek Ecological Technologies Inc.
- Canadian International Development Agency

Cuba:
- ANAP
- MINVEC
- Municipality of Bayamo

Focus

This project will develop a new model for economic and environmental sustainability at the peri-urban level, focusing on:

- Integrated Resource Use (nutrient recycling of municipal sewage)
- Food Security (increase in milk supply to surrounding community)
- Drought Mitigation (use of municipal “waste” water for effluent irrigation)
- Climate Change Mitigation (prolonged solution to continued drought)
- Environmental Pollution (eliminates sewage discharge into river system)
- Improved Water Quality (River clean-up improves quality of Bayamo water supply)
- Improved Municipal Infrastructure (more efficient sewage collection system)
- Agricultural Training and Extension (new peri-urban dairy production model)
- Community Education (learning to look at “waste” as “nutrients”)
- Economic Value Added (12 month milk and yoghurt production)
- Gender (women in charge of calf raising, value added yoghurt production)
- Farmer to Farmer Co-operation (Canada and Cuba, ANAP)
- Profile Canadian Environmental Solution Technology (Eco-Tek)
- Sustainable Energy Use (solar panels to power electric fences for rotational pastures)
- Sustainable Farm Practices (sustainable soil management, integrated resource use)

Background

During 2005, Sustainable Cities, ANAP and the Canadian International Development Agency undertook a farmer-led pilot project at CPA 25 Julio, Los Palos, Nueva Paz, Habana Province to develop a model for sustainable dairy production in a rural setting. The results of this pilot project were very promising. (See *S062848: Enhancing Sustainable Dairy Production Capacity in Cuba. Final Report to CIDA, March 2006* and *Enhancing Sustainable Dairy Production Capacity in Cuba, The Completion Project, April 18, 2006*)

Extension to Peri-Urban Model

Building on the success of the rural dairy model, this pilot project will develop a peri-urban model for sustainable dairy production that will:

- Identify a municipality upstream of the city of Bayamo currently discharging its sewage into the river system.
- Through the use of Canadian environmental technology, convert the community's raw urban sewage (blackwater) into a source of nutrient-rich effluent (grey-water).
- Use this effluent to irrigate new solar-power-fenced rotational micro-pastures at a nearby agricultural cooperative.

If successful, the outcomes of this project will be to:

- Eliminate one source of discharge of untreated sewage into the Bayamo River.
- Reduce pollution of the Bayamo River.
- Improve the quality and safety of the municipal water supply for the city of Bayamo.
- Develop a sustainable alternative to improve milk production under drought conditions.
- Through farmer to farmer skills transfer, provide increased supply of milk and yoghurt to children, seniors and hospitals in the surrounding area.
- Create a new peri-urban model for integrated resource use built on the principles of nutrient recycling, food security, the efficient use of energy, good soil and pasture management practices and the principles of economic and environmental sustainability.

Location

The final location of this project awaits final agreement by the parties. However, in consultation with ANAP, the Canadian Embassy and the Canadian Urban Institute, a rural municipality upstream of Bayamo was considered the best location to develop this pilot project because:

- Bayamo, in the eastern part of Cuba, is suffering an extreme and prolonged drought, which – among other things - severely limits milk production.
- Effluent irrigation offers an ideal source of nutrient-rich water supply.
- Bayamo is presently constructing one of Eco Tek's water purification units and so has experience with both the construction and the use of this technology.

Funding:

It is proposed that this project be funded under the Canada Community Development Fund.

- This project meets the Canada Community Development Fund support criteria for both Local Economic Development and Environmental Sustainability at the Community Level.

- The International Centre for Sustainable Cities is an eligible organization under the Canada Community Development Fund.

Time Frame and Budget:

Up to $300,000 over two to three years. Actual time frame and budget cannot be specified until:

- The location of the project is confirmed by MINVEC.

- The peri-urban municipality upstream of the urban centre is identified and discussions are held to ensure adequate sewage volume and any engineering works required to ensure same.

- A nearby CPA is identified by ANAP and site meetings are held with the CPA Board and Provincial ANAP representatives to assess capacity.

- A collaboration agreement is reached between Sustainable Cities, the Canadian Urban Institute and Kim Rink, Eco Tek Environmental Technologies.

Next Steps

- Agreement among parties to proceed to Project Proposal stage.
- Agreement on project location.
- Identification of upstream municipality and visit to same.
- Identification of near-by CPA and visit to same.
- Assessment of municipal infrastructure (rate of outflow of sewage collection systems).
- Assessment of any works required to guarantee adequate and consistent outflow.
- Identification of size of E-Pod (Eco-Tek's water treatment system) and cost to construct.

Consultations to Date

The following individuals have been involved in the preliminary discussion of this project:

- Raciel Proenza, MINVEC
- Mario La O, ANAP
- Catherine Ribas, Cooperation Desk, Canadian Embassy, Havana
- Sergio Novas, United Nations Development Program
- Rafael Betancourt, Canadian Urban Institute
- Kim Rink, Eco Tek

Very promising preliminary discussions have also been held, through Rafael Betancourt, with Jose Antonio Leyva, Provincial Delegate for Water, Province of Granma. Sr. Leyva has expressed strong interest in this Project and has asked for a copy of this Discussion Paper in Spanish. A translation is being prepared and will be forwarded as soon as available.