# **BRAZIL INLAND FISHERIES**

Sustainable Livelihoods and Conservation

Proposal submitted to the Technology Transfer Fund, Canada-Brazil, Phase II

Canadian International Development Agency Brazilian Agency for International Cooperation

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# **Executive Summary**

The *Goal* of the project is to contribute to the equitable use of the Brazilian freshwater fisheries resource in a fashion that provides sustainability for the resource and the livelihoods that rely on it. The project will transfer technical, social and strategic components of the Canadian experience in fisheries management and conservation to a variety of recipients in Brazilian fishing communities, industry, academia, government and non-government organizations. The Canadian technology and experience will build on, and help integrate, Brazilian experience and efforts to create socially and environmentally sustainable riverine communities and resources through participatory fisheries management and conservation. The end result will be reduced poverty, resilient communities and long-term productivity of the fisheries resource.

Specifically, the project will combine Brazilian and Canadian expertise to:

- reverse the decline in the freshwater fisheries resource in the São Francisco basin
- foster sustainable multi-stakeholder use and management of the fisheries resource of this basin and elsewhere in the country
- improve and diversify returns to the artisanal fishing communities of the São Francisco basin in a gender-balanced and family-oriented fashion, while maintaining the artisanal fishery as a sustainable livelihood
- develop and implement a pilot model for socially and environmentally sustainable management of freshwater systems in the São Francisco basin, that can be replicated in other parts of Brazil...

Together, these initiatives will contribute to Brazilian capacity and policies that will maintain the resource, reduce poverty in riverine communities, address societal inequity and provide increased opportunities for those who need them most.

The **Purpose** of the proposed project is to create and implement a model for sustainable socioenvironmental river management.

Long-term **Impacts** of the project will be 1) reduced poverty and increased equity, gender balance and family well-being for freshwater fishing communities in Brazil, with a focus on northeast and central-west portions of the country in the São Francisco basin, and 2) long-term sustainability of freshwater fisheries resources.

In the fishing communities themselves, **Social Indicators** of project success will include increased average family income, increased livelihood alternatives, and quality of life attributes such as access to quality nutrition, education, and sanitation, and improved self-image on the part of fishermen and their families. **Environmental Indicators** will include improved fisheries yield and composition.

The **Project Approach** balances the transfer of "hard" fisheries technologies (as successfully pioneered in Fish Genetic Resource Conservation – Brasil) with a roughly equally weighted social

component, thus producing a fertile environment for sustainability. The project reflects current development principles in its underlying motivation of ensuring sustainable livelihoods, and recognizes the need to provide support for management of the resources those livelihoods are based on.

The project approach is participatory, from planning through implementation and management (see also Appendix 3). The project involves a number of partners and participants, both Brazilian and Canadian. There are two **Managing Partners** (WFT and UFSCar) who are signatories to the proposal and coordinators in Canada and Brazil respectively. Additional Brazilian **Partners** and **Participants** (a total do date of 32 groups) are directly involved in work in the São Francisco River pilot area or work in other parts of the country with a view towards adapting results from the pilot area to their regions of interest. "Partners" have officially committed to contributing counterpart resources, whereas "participants" are in the process of doing so or will participate less officially. Further partners and participants are expected to be added during the project implementation as further stakeholders are addressed. The Canadian team consists of 19 groups, including university, government and industry partners and consultants.

The project is divided into three major **Sub-Projects**, each of which comprises a suite of goals, activities and outcomes with some management autonomy. Each subproject has distinct outputs, activities and principal participants (presented in greater detail in Appendix 1), but integration between the subprojects is essential for the outcome of the project. This integration is provided through the planning and scheduling of activities in each of the subprojects and through attention to three **cross-cutting themes** that are important to the success of all of the sub-projects. These themes also have their own specific activities. The sub-projects and cross-cutting themes are:

- SUB-PROJECT 1 Build co-management capacity in fishing communities
- SUB-PROJECT 2 Build sustainable livelihoods
- SUB-PROJECT 3 Transfer technologies to secure and build the fisheries resource
- CROSS-CUTTING THEME A Help develop policies and social environments for sustainable fishing and community participation in resource management
- CROSS-CUTTING THEME B Help build awareness in stakeholders and the general public on Brazilian fisheries and aquatic ecosystems (including artisanal fisheries)
- CROSS-CUTTING THEME C Create gender-balanced, family, and youth opportunities

The project is projected to run for three years, beginning in the Spring of 2003. The CIDA contribution being requested is CAN \$2.99 M, with counterpart contributions valued at approximately CAN \$3.9 M.

# Acronyms

- ANA Agência Nacional das Águas
- CAP Centro de Apoio ao Pescador
- CEMIG Companhia Energetica de Minas Gerais
- CEPTA Centro de Pesquisas de Peixes Tropicais
- CETEC Fundação Centro Tecnológico de Minas Gerais
- CHESF Companhia Hidro-eletrica do São Francisco
- CODEVASF Companhia de Desenvolvimento do Vale São Francisco
- DFO Department of Fisheries and Oceans
- EMBRAPA Empresa Brasileira de Pesquisas Agropequario
- FEMA-MT Fundação Estadual do Meio Ambiente Mato Grosso
- Gerasul Centrais Geradoras do Sul do Brasil S.A.
- IARA Instituto Amazônica de Manejo Sustentável dos Recursos Ambientais
- IBAMA Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis
- IDRC International Development Research Centre
- IEF- Instituto Estadual de Florestas
- MMA Minstério do Meio Ambiente
- MAPA DPA Ministério de Agricultura, Pecuário e Abestecimento Departamento de Pesca e Aqüicultura
- Nupelia Nucleo de Pesquisa em Limnologia, Ictiologia e Aqüicultura
- PACDT Programa de Apoio ao Desenvolvimento Científico e Tecnológico
- PNDP Programa Nacional da Pesca
- SRH Secretaria de Recursos Hídricos

UBC - University of British Columbia

UFAL - Universidade Federal de Alagoas

UFMG - Universidade Federal de Minas Gerais

UFRJ - COPPE - Universidade Federal de Rio de Janeiro - Coordenação dos Programas de Pós-Graduação de Engenharia

UFSC - Universidade Federal de Santa Catarina

UFSCar - Universidade Federal de São Carlos

UNESCO - United Nations Educational, Scientific and Cultural Organization

UNESP - Universidade Estadual de São Paulo

UNICamp - Universidade Estadual de Campinas

USP - CRHEA - Universidade de São Paulo, Centro de Recursos Hídricos e Ecologia Aplicada

WFT - World Fisheries Trust

# Background: Rivers, Fish and People in Brazil

Rivers have always been places where human communities gather. Modern technology, industry, and transportation have pulled people away from many traditional uses of rivers, but rivers are still interwoven into all levels of human society. Rivers with fish remain particularly important for people that live on the river margins and continue to take their subsistence from the rivers. This is particularly important in countries such as Brazil with a large and growing economically and socially disadvantaged class. In Brazil, fish provide a means of support for both rural poor and economically marginalized urban people, including the traditional artisanal fishermen – a culturally distinct group that form an important part of the functional aquatic ecosystem. Unfortunately, it is precisely these fresh-water fisheries resources and ecosystems that have been recognized as the most threatened in the world, largely due to impacts of human development that in many cases is socially inequitable. At the same time, use of the dwindling fisheries resources is being increasingly contested by more affluent classes that wish to reserve them for recreational use.

In this proposal, the term **artisanal fishery** is used not only to describe a way of making a living, but also a lifestyle that it is important to preserve and important to the sustainability and conservation of the fisheries resource. The project recognizes these traditional fishermen not primarily as economic refugees, but as a cultural group anxious to build their ability for negotiation, collaborative management, and stewardship, and thus contribute to society in a meaningful and sustainable way. Traditional artisanal fishermen are thus essential partners of the project and have been included in its elaboration, recognizing their viewpoint as legitimate and valuable even at the expense of creating a more complex set of questions and solutions to an already very complex political, scientific, environmental and social problem. In the final analysis, the project aims to strengthen the "cidadania" of the artisanal fishermen through ensuring their sustainable livelihood<sup>1</sup>, and incorporate this advance into improved conservation of the fishery resources they, and other members of society, depend upon.

# **Current status**

Professional artisanal fisherfolk are currently amongst the poorest groups of people in riverine communities. They are also often socially discriminated against, receiving both the brunt of accusations of decimating fish populations and of losing their livelihood because of a reduced fish resource and restrictive management policies. Access to social and health services, education, and alternative livelihoods are generally limited, and living conditions are extremely poor. No effective mechanisms are in place for the fishing families to improve their own lives.

Fish stocks in the rivers and reservoirs are declining for a variety of reasons. Many of the native fish species are migratory and rely on seasonal flooding for spawning cues and access to larval rearing habitat. Almost all dams in Brasil interfere directly with the successful completion of the life-cycles of these fish, but agriculture, pollution (domestic and industrial), and habitat destruction also have

<sup>&</sup>lt;sup>1</sup> The term "livelihood" is used to refer to the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can recover from stresses and shocks, while not undermining the natural resource base. Adapted from Chambers, R. and G. Conway (1992). Sustainable rural livelihoods: Practical concepts for the 21<sup>st</sup> century. IDS iscussion Paper 296, Brighton: IDS.

significant impact, as does the lack of rain in the last five years. Introduced species (primarily peacock bass, tambaqui, and pescada from the Amazon & tilapia from Africa) are significant contributors to present-day fisheries, but also threaten the survival of native species. Stocking of rivers and reservoirs is carried out legally with native species by hydroelectric companies and sometimes illegally (but well-intentioned) with introduced species by sportsfishing and community groups. The effectiveness of both stocking activities has generally not been well assessed. A growing cage-culture industry is also contributing escaped tilapia to ecosystems, and pond-based aquaculture contributes a variety of escaped species. The impacts of fisheries (both commercial and sport) have not been accurately assessed in most regions, though pseudo-commercial fisheries carried out by sports fishermen appear to be threatening some stocks in the Pantanal and clandestine fisheries appear to be having as great or a greater impact in the Pantanal and southern Brazil compared to both other legal fisheries combined. A move to shut down commercial fisheries in freshwaters in a number of regions in Brazil (including artisanal fisheries) is controversial. Thus, inland fisheries in Brazil are in a state of painful transition. These changes are occurring in an environment of often acrimonious conflicts between user groups, fisheries management and policing that is unable to effectively control fisheries, and federal and local policies that are unclear and/or conflicting. The artisanal fishermen are generally the losers in all of these issues, with very few avenues for them to influence their own destinies.

In both Brazil and Canada, there is a demand for greater local community participation in management of the resource and ecosystem, using management schemes that incorporate social needs. In Brazil as in Canada, fishing communities want the tools to adapt to changing times and to be involved in the management of the resource they depend on. Between the two countries there is a great diversity in the way knowledge, practical expertise, technology, and dispute resolution have been integrated towards this goal - both have a lot to learn from each other and from other groups within their own countries.

# Geographic focus of the project

The project results will be relevant to most of Brazil, and the project includes participants from the entire country (Fig. 1). However, we have prioritized a geographic area to make the project manageable. The São Francisco River valley (Fig. 2) is an area where the livelihood of artisanal fishers is very precarious, conflicts for fisheries and water resources are recognized nationally, contains a great diversity in biomes and societies, as well as currently being areas of priority to both the Brazilian government and CIDA. In the upper and mid-portions of this valley, we have established partnerships that encompass the majority of the stakeholders important to resolving the problems. In this project, we will thus focus our work to initially produce results at the community level in the upper mid - São Francisco River (years 1-2), in the municipalities of Três Marias, São Gonzales, Januária, and São Francisco. Within the 2<sup>nd</sup> and 3<sup>rd</sup> years, this focus will expand down the São Francisco River into the lower sections, in the northeast portion of the country. During the 3<sup>rd</sup> year, communities in other river basins may also participate, depending on progress and development of supporting programs by participants in the project.

Fig. 1

Fig. 2

This geographic focus also characterises our Brazilian partnerships in the project. "Key" partners in a sub-project or theme are pursuing activities directly relevant to the pilot area (the São Francisco basin). The project will do its best to facilitate these activities and prioritize the participation of these partners in project activities, but will also promote participation, as far as possible, of other groups throughout Brazil and to include them in the project as it progresses. This approach includes making use of particular Brazilian expertise that resides outside of the São Francisco region. Interactions between organizations from the different river basins and states are thus quite broad and generally bilateral in nature (Fig. 3).



# Fig. 3. Characterisation of Partners in Different Geographic Areas of Brazil

Supplementary funding from CIDA's Dissemination, Replication, Information and Knowledge initiative (DRINK) will be pursued to help in the extension of project results to other areas of Brazil.

# **Reduction of Poverty and Contribution to Equity**

The outcomes of the project will foster a social and technical environment in which the enormous richness of Brazil's fisheries resources can stabilize and eventually rebuild so as to continue to feed people, today and tomorrow. The training and networking that will take place at all levels of society and in all kinds of institutions will promote *improved equity* for fishing communities by creating new opportunities for presently marginalized groups and allowing their participation in management of the fisheries resource.

*Poverty* in fishing communities will be reduced in part by ensuring a stable supply of fish, something the partners agree can only be achieved through improved knowledge, integration of fisheries and freshwater management, and greater public involvement. The project will also significantly increase public awareness of fisheries locally and internationally, a condition the partners believe is necessary for informed, lasting change. Poverty will also be addressed through the provision of new alternate family-based livelihood opportunities for fishing families (and other disadvantaged groups in the riverine communities) that can supplement returns from the wild fishery resource.

*Inequities* and *poverty* will both be addressed by building public appreciation of artisanal fishing as a culturally rich and important livelihood that contributes to the sustainability of riverine ecosystems.

*Principles of equity* will be incorporated throughout the project, including in the project management structure. Participatory project management in Brazil includes a project structure that allows for input from all participants, specifically through representation on a Consultative Committee and a multidisciplinary Executive Council, but also through a broad participants' network.

# The Canadian Technology

What does Canada have to offer toward the problems of fisheries conservation and management in Brazil?

In Canada, managers of freshwaters and fisheries (traditionally two very different disciplines) have learned that sustainability can only be achieved with public support. People need (1) to understand the issues, (2) to be involved in the creation of management plans and (3) to benefit from the process. Recent years have seen tremendous progress on all these fronts, with local communities devoting extraordinary time and resources for developing their own management plans, and large utilities such as BC Hydro forming planning alliances with government and communities that would have been unthinkable a decade ago.

The "Canadian approach" is remarkable in that it has gone a long way toward integrating views of many stakeholders and disciplines in fisheries management, in a framework that relies on solid technical data while respecting the social implications of management decisions. This collective Canadian expertise, which represents a truly participatory process and emphasizes respect for all stakeholders, is highly relevant to Brazil. Building on existing regional, national and international linkages, World Fisheries Trust and its Canadian partners will work with Brazilian scientists, government, NGOs and community groups to transfer and apply the tools of the Canadian experience

to biological studies, better water and fisheries management practices, the needs of communities, and public awareness in Brazil.

The suite of technologies that will be transferred includes methods for:

- Participatory monitoring and evaluation of socioeconomic conditions in targeted local fisheries communities
- Training in sustainable livelihood alternatives that recognize declining wild fisheries
- Participatory development of management options, including models for developing community management plans
- Adding value to fishery catches through improved processing, freshness, and marketing
- Improved fisheries enforcement alternatives, including community policing
- Fish population assessments, migration studies, and evaluation of stocking
- DNA fingerprinting of fish stocks
- Mitigation of effects of hydroelectric dams
- Evaluation of tributary and wetlands contribution to maintaining fish stocks
- Strategies for river and wetland recuperation
- Promotion of participatory fisheries management
- Displays, exhibits, programs and events that promote awareness

The technologies will be transferred using various methods including workshops, training in Canada and Brazil, and reciprocal site visits. All activities will be designed to complement Brazilian experience and know-how and to fit into a plan that ensures continuity of results and integration towards the common goal of sustainable socio-environmental river and reservoir management.

# **Description of Canadian partnership**

# **World Fisheries Trust**

World Fisheries Trust (WFT) is the lead Canadian partner in the project. WFT is a Canadian nonprofit organization that promotes the conservation and sustainable management of global aquatic biodiversity through research, training and public awareness. WFT is neutral and our programs are science-based. They reflect a belief in building linkages between researchers, managers and communities. WFT works with community groups, researchers, NGOs, government agencies, international agencies and corporations. WFT staff have a long history of working on fisheries projects in Brazil, and we recently completed a three year project as lead Canadian partner in the CIDA-funded technology transfer project *Fish Genetic Conservation* – *Brazil*. That project was highly successful in building linkages between the receivers of fisheries technologies and the various stakeholders affected by them, and laid the groundwork for the present proposal.

### **Other Canadian partners**

WFT has assembled leading Canadian expertise relevant to the Brazilian situation as partners and consultants for this project. Particular consideration has been given to selecting groups that are most likely to work well within the Brazilian context, either as shown through previous experience or through a community-sensitive way of doing business in Canada. Details of these partners and consultants are presented in Appendix 2. Other appropriate expertise will be identified and recruited as needed throughout the project.

# **Description of Brazilian Partnership**

# Universidade Federal de São Carlos (UFSCar): Pro-Rectorship of Extension (PROEx)

The Pro-Rectorship of Extension (PROEx) at the UFSCar is the focal partner for the project in Brazil. The Nucleus for Citizenship, part of PROEx, has a long history as one of the academic loci for the defense of human rights in Brazil, particularly for disadvantaged groups, through various activities that integrate teaching and research. One of these is focussed on the artesanal fishery through: (1) extension courses for the community on legal rights of this social group (supported by the Ministry of Justice and UNESCO); (2) the production of environmental education material for schools and the community that improves the public image of the fishing profession (carried out in collaboration with the Human Ecology Laboratory at the UFSCar and supported by the Ministry of Justice, UNESCO, USP, and others); (3) training courses for the fishing Colônias (supported by the Federal Delegacy of Agriculture in Minas Gerais state). Current research activities on the socio-economics of the fishery on the São Francisco River - which this nucleus is carrying out in collaboration with the Nucleus for Research and Documentation and the Human Ecology Laboratory of UFSCar (under the auspices of the Ministry of Science and Technology, under the Program for Assistance to Scientific and Technological Development (PACDT/Ciamb), coordinated by the UFMG) - are the basis of a significant part of the information on the current living and working conditions of the fishing community cited in this proposal.

# **Other Brazilian Partners**

This proposal has attracted an unusually broad cross-societal partnership and interest in Brazil. Partners directly related to activities in the São Francisco River include governments at all levels; university groups ranging from social scientists and engineers to extensionists; community non-profit organizations; industry; fishing "colonies" and fishing associations. Participants, and partners from other parts of the country, represent a similarly broad spectrum. Initial Brazilian partners and participants are briefly described in Appendix 2. Other relevant Brazilian expertise (e.g. Drs. Alpina Begossi at UNICAMP and Miguel Petrere at UNESP) and stakeholders (e.g. sport fishing groups and mining companies) will be approached to participate in the project as appropriate during its implementation.

# **Project description**

**NOTE**: To see the project "at a glance," please refer to *Appendix 1, Summary of Project Structure and Activities* and Fig. 4.

A crucial step in building fisheries co-management and conservation with community participation is to bring the various stakeholders to the planning table with adequate shared knowledge and respect for each other and the resource. This can be a very complex task, as it generally involves building government-recognized capacity in communities to assist meaningfully in management, collecting adequate data on the resource that are believed and understood by all, overcoming a variety of societal barriers that impede meaningful communication and respect between stakeholders, and resolving an adequate number of competing livelihood issues so that fisheries conservation and sustainability can become a meaningful priority. Subsequent legal reforms and policy changes that are needed to make community co-management a long-term reality build on this matrix, given adequate general public support, but can be long in coming and unpredictable. The current project targets primarily this goal of preparing stakeholders for meaningful discussion, with the transfer of appropriate Canadian technology and experience, but also proposes to carry a few pilot communities well beyond the discussion phase, contribute to building the social environment for necessary legal and policy changes, and, not least, build capacity in universities and other bodies to better facilitate this process for other areas and communities.

To deal with the complexity of the task we have divided the project into several *sub-projects* to address distinct conceptual or practical portions of the problem. Integration of these sub-projects, crucial to the overall success of the project, is provided to some extent through the scheduling of activities, but also by *cross-cutting themes* that represent critical issues that apply to all of the sub-projects. The proposed sub-projects and cross-cutting themes are discussed below, with more detailed descriptions of activities and their proposed scheduling given in Appendix 1.

Fig. 4

# SUBPROJECT 1 Preparing communities for co- management

#### **Background & current status**

Community-based fisheries management has been demonstrated to be a viable alternative to the more common centrally-controlled, "top-down" management in many parts of the world. Stable communities with a vested interest in adjacent fisheries resources, traditional knowledge of the resource and access to scientific knowledge, as well as a say in the resource management, have, in many cases, turned into excellent resource stewards and caretakers.

Currently, fishing communities in most of Brazil have little say in resource management decisions, with fisheries regulations set in Brasilia and/or state capitals and enforced through federal fisheries agents and state military police. Commercial fishermen are licensed as "professionals" if they can demonstrate that the majority of their livelihood comes from fishing. Most legal artisanal fishermen are organized in fishing colonies, which in turn are organized in state federations and a country-wide federal confederation. There is considerable variation in the country in terms of the levels of fishing effort, its organization, and the types of resource conflicts. In the case of the São Francisco River, the main conflict is between professional and sports fishermen.

Associated with conflicts on resource access and social depreciation, fisheries enforcement in Brasil has become more violent, arbitrary, and generally less effective. This clearly has considerable negative influence on the lives of fishermen, but also reduces the effectiveness of fisheries management. "Community policing", appointing community members to assist in enforcement and creating a healthier dialogue between enforcement agencies and the community, has been promoted as an appropriate resolution to this problem, and has been tried in some parts of Brasil, with results that are variable but predict substantial benefit from the transfer of Canadian technology.

Co-management of Brazilian fisheries has been implemented in the 1990s (1) as a government initiative by IBAMA with support from the Deutsche Gesellschaft für Teknische Zusammenarbeit (GTZ) in response to local pressures in the Amazon (Santarem and region) and some reservoirs of the northeast (e.g. Caxitore); (2) as university-led initiatives in the Amazon (UTAM-Manacupuru), also in partnership with IBAMA; (3) as a long-term local initiative in a coastal lagoon of Santa Catarina. Of these, the Santarém experience has shown the greatest replicability, through the activities of the NGO IARA. Replicability is rare in co-management, as it can be very dependent on local situarions. The Santarem experience thus appears to be the most applicable for building co-management in the São Francisco and will be exploited by the project as a starting point, incorporating Canadian experience and lessons learned from other areas.

#### Strategy

We will transfer technologies and know-how to fishing communities that will enhance their social and technical abilities to participate in resource management decisions – from decision making to implementation and evaluation. As policing of fisheries has been identified as critical in all Brazilian

co-management experiences, and has been identified by the communities in the Sao Francisco River valley and the police of Minas Gerais as problematic, this issue will also be addressed in the form of community policing. Activities to strengthen the social services and capacity of the fishing community and its associated riverine towns will be carried out in parallel as part of **Sub-Project 2**.

Participatory processes are the tools of choice for implementing the change to community-based resource management. This participatory approach, together with public awareness programs, ensures that the community itself is involved in creating changes from the beginning and thus also takes responsibility for the result. In addition, this approach reflects and builds on existing community strengths and skills, ensuring culturally appropriate development and sustainability of results. Both federal (IBAMA) and state (IEF) fisheries and environmental agencies will participate in this process.

Another key element to maintaining community support and involvement in our work will be to generate some fairly rapid and significant results, as well as an indication of a long-term commitment. We thus plan to address the situation in the São Francisco River with a strategy that incorporates existing Brazilian experience, provides relatively rapid returns to the community, and builds long-term capacity for change. This strategy consists of:

- 1) An external review of existing fisheries and co-management models in Brazil to help identify appropriate strategies and existing community elements in the São Francisco that co-management can build on;
- 2) A review conference that brings together Brazilian and Canadian experience in resource co-management and participatory development methodologies;
- 3) Transfer of the Santarém experience to several pilot communities in the São Francisco River, incorporating lessons learned from (1) and (2). This will take advantage of the proven expertise of the IARA team in building co-management within a Brazilian context, as well as make use of the regulatory inroads this group has already made in favor of community co-management. This will be the most expedient route to introducing fisheries co-management to the São Francisco.
- 4) Introduction of community policing approaches for fisheries, integrated with comanagement and community strengthening activities.
- 5) Enhance participatory research and co-management skills in the supporting university, government, and community groups of the São Fransisco and other river basins through their involvement in (1). This will assist in the adaptation of the Santarém experience, monitoring of effectiveness, and replication to other areas of the São Francisco river and the country.

#### Outcomes

Ability of pilot communities to participate in fisheries management using appropriate technical and social tools

Greater capacity of support groups to build fisheries co-management in other areas of the São Francisco and the country

#### **Activities**

External review of current fisheries; conference in Brazil to review participatory research technologies and application of participatory processes to building fisheries comanagement (universities, communities, NGOs from both Brazil and Canada); support for transfer of the IARA experience from the Amazon (including participatory workshops to assess community strengths and needs; training workshops for identified needs); technical visits and training workshops to build community policing capabilities.

#### Indicators

Number of fishing communities that have received co-management training; publications on co-management and the use of participatory processes in Brazil; strategy developed for implementing co-management in São Francisco fisheries training course curricula for community policing of fisheries in Brazil; strategy for implementing community policing programs; number of trainees in conference & workshops - disaggregated by gender and function

#### Integration & durability of results

Our strategy for community co-management integrates experience in Brazil with that of Canadians. This approach builds on research and management programs that already exist in Brazil, thus contributing to the durability of the results of the project. At the same time, a rapid return to pilot communities in the São Francisco through the application of lessons learned in the Santarém model, including its policy in-roads, will help build continuing community and government support for subsequent initiatives of the project.

Our strategy also includes improving the overall strength and health of the communities that house the fishing colonies, and improving the status of the fishermen within these communities (see sub-project 2). This helps establish an essential enabling environment for fisheries co-management to take hold, as well as addressing the immediate needs of disadvantaged people and families associated with fisheries in a variety of ways, and allows them to consider fisheries conservation and sustainability in a more objective manner. Community policing initiatives will build on existing experience in IBAMA, strong interest in the Military Police of Minas Gerais, and lessons of a previous CIDA project on police violence ("Human Rights and Police Accountability"). A focus on developing workshop curricula instead of simply implementing training workshops also will contribute to the durability of the effects of the project.

# SUB-PROJECT 2 Building Sustainable Livelihoods

#### **Background & current status**

The numbers of fish in Brazilian rivers and reservoirs and access to them are likely to continue to decline, despite efforts to rebuild stocks. Hopefully this will be a temporary trend, but to improve their living conditions, artisanal fishing communities will need to learn to make the best use of the fish they are still able to catch, and pursue alternate sources of income. The associated towns will need increase their capacity to provide social support services.

In terms of activities other than artisanal fishing, some professional fishermen have turned to guiding/ecotourism for alternative or supplementary income. This is apparently a particularly successful strategy in the Pantanal, where access is restricted and sports fishermen easily become lost, and is being promoted officially by the Programa Nacional de Desenvolvimento da Pesca Amadora (PNDP) of the federal government as a means to shift inland fisheries from commercial to sports. However, the approach has so far been successfully pursued by only a few individuals in the São Francisco, and, as in Canada, those profiting the most from sports fisheries are not the original professional fishing families.

Aquaculture has also been promoted in Brazil as an alternative activity for professional fishermen and as mitigation for fisheries reduced by the effects of dams. In particular, cage culture of tilapia (an introduced species) is being promoted by CODEVASF, though it is still illegal in many jurisdictions. The activity has been most developed in the Paulo Afonso and Xingó reservoirs of the lower São

Fransisco River, where tilapia is considered naturalized and can be legally grown in cages. Here it is taking two paths:

- large scale tilapia culture for export, promoted by the municipality of Paulo Afonso and to be carried out in cage culture by an Australian firm and in land-based raceways by an American firm;
- small-scale cage culture for community members, promoted by the Xingó project (an NGO that has evolved out of a project initially financed by the hydroelectric company CHESF). This project initially targeted professional fishermen, but now works primarily with community members of agricultural background. Tilapia is currently being cultured, but a number of promising native species are being targeted for development, with the surubim catfish considered the best hope for the project. Of particular interest in this project is an effort to develop value-added fish products, with regular training courses and a small co-operative filleting plant under construction.

Cage culture has also been pursued in other parts of the country, with both native and introduced species. Tilapia is officially considered by the federal government as the best candidate to increase Brazilian fish productivity by virtue of proven technology and export value. However, this position is controversial, in that the fish has little value in many local markets (with some regional exceptions) and is of concern as an escapee to the wild ecosystem. Fisheries regulations prohibit the cage culture of fish in water bodies where the species is not present either naturally or as a "naturalized" exotic, but this regulation is not uniformly applied. Cage culture also raises unresolved concerns about pollution, security, and, in the case of hydro reservoirs, liability by electrical companies for cages that become exposed as water levels drop. In very few instances in Brazil has cage culture of fish been a successful venture for professional fishermen, though there are some cases of lucrative ventures for established businessmen.

Fish culture in ponds is also considered an alternative to professional fishing, in most cases as a source of food fish, but in the states of São Paulo and Minas Gerais also as fee-fishing ventures. Pond fish culture is well-established in many parts of the country, but commonly uses introduced species (carp, tilapia, catfish) or artificial hybrids. Concerns with this activity include pollution and escapees, and a disadvantage as an alternative activity for professional fishermen is that land and financing for building ponds is not generally accessible to them.

A preliminary ad-hoc survey of professional fishermen in the São Francisco River indicates that few of the fishermen themselves would successfully adopt aquaculture, but other members of the family might.

Other sources of family income, such as handicrafts, are not widespread in the fishing communities. However, this has been a route used by a number of non-governmental organizations in Minas Gerais for recuperation of non-riverine communities, generally with the use of a distinctive product or products that are either traditional or novel. Preliminary discussion indicates that these NGOs are keen to pass on their experience.

In terms of social support services in the fishing communities, current conditions are quite precarious. The communities are generally in poorer neighbourhoods of riverine towns, in many cases without running water and with only poor sanitation. Income levels are adequate only for rudimentary subsistence and access to health and education are often poor<sup>2</sup>. Some riverine municipalities have taken this issue on with substantial investment – for example Três Marias has built a Centre of Assistance to the Fisherman (CAP), using a variety of funding sources, but currently still with limited functionality – and have programs for disadvantaged groups (including improving access to education, improving the status of women, etc. – see Gender and Social Analysis report, Appendix 5). However, these programs are very sensitive to politics, and some municipalities are doing very little. In some cases, non-profit organizations and/or university extension programs have been set up to lend continuity to efforts. In the area of the project, these include activities by the UFSCar and the "Elos" project proposed by the medical school of the UFMG, and, in non-fishing communities, the non-profit Community Association of Silva Campos and the Salão de Encontro of Betim. All are very keen for collaboration and new approaches to address the social problems.

#### Strategy

Our project proposes to transfer technologies to fishing communities that add value to existing catches, provide marketing and organizational skills to optimize returns from their products, contribute to the development of other appropriate income generators and then transfer these skills to trainers and the pilot communities. In parallel, we will contribute to the development of strategies for building accessible social services in the towns containing the fishing communities. Three key concepts will be built into this sub-project:

- 1) Alternative livelihoods will be designed and selected with ongoing community participation: we will not commit ourselves to promoting a livelihood that the community has no interest in. This does not preclude the introduction of new ideas, but means that these need first to be realistically presented to the community and carried through appropriate pilot phases for community approval and evaluation of appropriateness.
- 2) The whole fishing family will be considered in selecting and designing alternative livelihoods and improved access to social services: not only will the fishing member be re-trained or polled, but also the spouses and youths will be provided equal and/or specifically tailored opportunities.
- 3) Development of social service strategies will be carried out in a participatory fashion, modelled on the successful UBC-Sto. Andre project, and incorporating interchange between the pilot communities and the Sto. Andre municipality.

<sup>&</sup>lt;sup>2</sup> Felicidade, N., Leme, A.A., Martins, R.C., Teixeira de Mendonça, S.A., Goncalves, J.C., Mancuso, M.I.R., Mendonca, I. And Felix, S.A. (in preparation) "A precarização do trabalho no território das águas: limitações atuais ao exercício da pesca profissional no Alto-Médio São Francisco" [The fragilization of work in the aquatic territory: current limitations to excercising professional fishery in the High-mid Sao Francisco]. In: Godinho, H. & Godinho, A. The São Francisco River: review of biology and sociology. (article available from senior author (Norma Felicidade Valencio, UFSCar - current project proponent).

Good information is not yet available on community-approved appropriate alternative livelihoods, or the status of accessible social services in many of the communities, though some feed-back indicates options and how current efforts could be modified. We are thus proposing a combination of a consultative process and best-guess activities that will be subject to revision as required.

#### Outcome

Strengthened and accessible social services and policies in towns containing the pilot fishing colonies

Fishing communities with capacity for alternative livelihoods that provide a better return from the fisheries resource while reducing fishing pressure

#### Activities

Participatory workshops to assess community needs; strategy- building workshops for accessible social services; Brazilian community interchange to assist in the evolution of community development strategies; workshops and conference sessions to build capacity for and support development of environmentally benign aquaculture of local species; training and development of training courses for value-added processing of local catch; evaluation of and training in alternative livelihood contributors, including ecotourism, support for sport fishing activities, handicrafts, bait production and cooking.

#### Indicators

Increased average family income in fishing communities; increased quality of life in fishing community (access to nutrition, education, sanitation); number of social development comittees or associations created and/or revitalized due to the project; number of relevant municipal development strategies implemented; number of livelihood opportunities accessible to members of the fishing community (gender disagreggated); quantity, quality, and value of fish products being marketed; number of trainees - disagreggated by gender and function

# Integration & durability of results

The activities to help develop community services will build on expressed interest and existing programs of municipal, state and federal governments, university extension programs, and community development NGOs, thus helping to ensure that the investment will be carried forward once the project is over.

Aquaculture development and implementation will integrate with, and assist in, the appropriate development of existing aquaculture initiatives by CODEVASF, project Xingó, the Ministry of Agriculture and CEMIG in the São Francisco River, and similar initiatives by IBAMA in São Paulo state, Embrapa in the Pantanal, and UFSC in Santa Caterina, amongst others. Regulatory aspects will

contribute to supporting policy and regulatory development in IBAMA, MMA, and IEF (in Minas Gerais).

Ecotourism and integration of the fishing community with help optimise the existing PNDP national initiative, and integrate community-level efforts with training workshops being offered by UFMG's Elos project in the mid-São Fransisco River and UFAL and the Xingó project in the lower São Francisco river. Comparable mechanisms for community delivery are also expected to develop during the project with our partners in other parts of the São Francisco River and other river basins.

The development of handicraft alternatives will count on collaboration of the Salão de Encontro in Betim (MG) and the Silva Campos Community Association (MG), two Brazilian NGOs that have applied handicraft development to great advantage in the Upper São Francisco region, with particular focus on women, disadvantaged people, and youth.

Training in, and implementation of, value-added processing and marketing will build on existing initiatives of the project Xingó in the lower São Francisco, and help carry and adapt this experience to the rest of the São Francisco and to other areas of the country. The development of associations will build on existing fishing "colony" structure and integrate with the IARA project's emphasis on community associations in developing capacity for co-management.

# **SUB-PROJECT 3** Transfer technologies to secure the fisheries resource

# **Background & current status**

Many native freshwater fish stocks in Brazil are continuing to decline, despite considerable interest in recuperating them. Principal anthropogenic threats vary by region and include dams, habitat destruction, pollution, interaction with introduced species, and, in some cases, overfishing. The more valuable species tend to be migratory fish that are particularly sensitive to interruption of their migratory routes, interruption of seasonal flooding, and destruction of lagoons and vegetation along river banks.

Key elements in a strategy to halt the decline in fish stocks are 1) improved knowledge of the biology, behaviour, and numbers of fish; 2) the design and implementation of appropriately modified operational and management policies, (and in some cases, technological resolutions to problems) and 3) better public awareness of fish-related conservation issues to ensure public support and participation in mitigative measures. The first two of these are dealt with in this section of the proposal, while the third is dealt with in Cross-cutting Theme B.

Historic measures to mitigate impacts on fish populations in Brazil consisted primarily of stocking with hatchery-bred juveniles. The effectiveness of this activity is rarely measured, and the long-term effect may be reduced genetic diversity that will negatively influence future well-being of the species. Currently, there is considerable interest within Brazil in understanding the fish and the threats better, and building more effective mitigation and preventive measures that make use of this knowledge.

#### Key areas are:

#### 1) Definition of stock structure

High genetic diversity within a species of fish is crucial to the species' long term survival: this is how natural populations remain resilient to things like disease outbreaks and changes in environment and climate. Inappropriate fisheries or aquatic management can reduce this diversity substantially, by, for example, targeting distinct populations for extraction or impact and re-stocking with fish of different and less diverse genetic make-up. An understanding of genetic distinctiveness of different populations of fish is now recognized to be crucial to properly assessing impacts of fishing or developmental impacts and in designing appropriate mitigative policies. Recent advances in DNA technologies have provided powerful new analytical tools to assess genetic diversity of fish, and Brazilian institutions, already proficient in more classical genetic studies, are rapidly building expertise in the new technologies - in part with assistance of WFT's past CIDA project. DNA probes for use in a number of native fish species have now been developed, and a number of studies on population distinctions have been published. However, Brazilian fish species are very numerous, and the application of this new information to fisheries and development management is still in its infancy. Both this application and the efficient development and screening of DNA probes for other species can profit greatly from Canadian experience and know-how.

2) Better understanding of migratory behaviour

An understanding of the extent, timing, and navigation around obstacles during migration of native fish species is important for supplementing the genetic data on population distinctions, developing appropriate fisheries and aquatic management, and designing effective by-pass mechanisms for dams. Traditional tagging methods provided the early data on migration in the 1930s, but due to the scale of the problem, significant improvement in our understanding is only now becoming possible with the application of modern radiotelemetry.

3) Better assessment of fish stocks

Efficient and cost-effective assessment of the number of fish in a water body, particularly rivers, is notoriously difficult. However, these numbers are vital for management, for tracking changes in fish populations, and for establishing public support of fisheries policies.

Assessment of fish stocks is rare in Brazil, with fisheries policies driven more by strategies that limit fishing effort and by public impressions of fish abundance. Some leading fisheries groups, however, assess abundance by evaluation of trends in fish catches, and are world leaders in some aspects of this approach. However, alternative approaches are sorely needed and are being actively sought, with Canadian expertise particularly attractive.

A particularly interesting Canadian approach to stock assessment in rivers for community - based fisheries management (the Nisga'a Tribal Fisheries Management Program) has combined tagging with aboriginal fish wheel technology to produce some of the best stock data currently available on the West Coast of Canada. This will be one of the approaches to be considered for application to Brazil, as will hydroacoustic assessment, another particular strength amongst our Canadian partners.

4) Reducing the effects of dams on fish

Even the best environmentally benign dams kill fish during their operation, despite legislation to reduce mortality. The dams industry in Brazil has only recently become open enough to admit to fish mortality and seek solutions, in part a response to more stringent application of environmental regulations. CEMIG, in particular, is interested in finding solutions to mortality caused during operations, and is looking to the Canadian and North American dams industry for answers.

5) Improving stocking efforts

Stocking of natural water bodies is controversial in that it may be ineffective (particularly if the cause of fish decline is not also addressed), it may negatively affect remaining natural populations of fish (particularly if non-native species are used, but also if native hatchery fish with reduced or different genetic diversity are used), and it may be used as an excuse not to address the real threats to the fish populations. It is, nevertheless, a politically satisfying and highly visible activity, and if carried out properly can result in significant fisheries returns.

In Brazil, hatchery production of fish for stocking of reservoirs and rivers was adopted in the 1960s and 70s by most hydro companies as the technique of choice to offset effects of dams on fish populations. Initially, exotic species such as trout and tilapia were often stocked, but now a variety of native species can be bred, and hydro companies generally only stock with these species. Concern for appropriate genetic composition of the stocked fish is fairly recent, in part instilled by WFT in past projects, and effectiveness of the stocking programs is being broadly questioned. Currently, no good mechanism for assessing effectiveness of stocking is available in Brazil.

Stocking is also being carried out by private organizations, often sport fishing associations, generally with the sanction of government at some level. However, these activities are often poorly planned, and may involve extensive use of species that are not native to the water bodies being stocked. Thus, while public interest in fish conservation is expressed through stocking, awareness of issues associated with the activity is not yet well developed.

6) Water management

Management of water resources for multiple uses is a considerable challenge, but is being increasingly pursued throughout the world. Brazil is very reliant on water for generation of electricity, irrigation, domestic and industrial consumption. Historically, electrical generation in many cases had exclusive priority water use, with irrigation and flood control secondary priority uses. However, a recently revised water law (1997) and a commitment to sustainably diversify its sources of energy has, in many ways, put Brazil in the global forefront of water management policies, and the country is in the process of implementing these through multi-stakeholder basin-wide committees (through the Secretaria de Recursos Hídricos - SRH and the recently created Agência Nacional das Águas - ANA). Two other partners in the project (CRHEA-USP and UFRJ-COPPE) are also working with modelling multiple-user water management systems. Nevertheless, implementation is problematic in many areas, and fish, the aquatic ecosystem, and fishing communities are generally not specifically dealt with. The present project will assist in bringing the wild fish, aquatic ecosystem and fishing communities into this process, as well as contributing conflict management skills and training to the process.

7) Habitat improvement

Two priority issues require attention with regard to improving freshwater fish habitat and the health of aquatic ecosystems in Brazil: 1) recuperation and re-activation of the vegetation of river margins and seasonally flooded lagoons and 2) development of appropriate fish by-pass structures for dams. Both reflect long histories of human development and control of rivers. Both have received increasing attention in the past decade, but both are also far from being solved.

The river margins, their vegetation, and associated seasonally flooded lagoons and flood plains are particularly important for fish productivity, but are compromised by land clearing, agriculture, erosion, and flood control. Various local projects in the country are working on recuperating riverine vegetation and the integrity of river banks with varied levels of success (and a certain isolation). These activities have particular value in building community "ownership" and stewardship values within communities and can be important stepping stones towards effective co-management.

The creation of artificial floods to revitalize lagoons has also been promoted several times, but generally has been set aside due to costs, potential impact on colonized areas, and, most recently, a lack of stored water. Modifications of the river bed for optimizing fish productivity (as has been done in some cases in Canada) is currently illegal and has not been attempted.

Intact tributaries of reservoirs and major rivers are also likely to be key elements for maintaining fish productivity in the face of human impacts. Some efforts have been initiated to recuperate and protect some of these, but to date the activity is quite patchy. Canadian technology and experience can assist in assessing the relative importance and prioritizing tributaries and lagoons for recuperation and protection and can help develop means for their recuperation and protection.

Fish by-pass structures were a legal requirement for dams in Brazil since the early 1930s, but due to concerns that the available technology (fish ladders designed for

salmon) was not effective for Brazilian species, and poor enforcement, not many were built. Instead, during the early big dam cycle of the 1960s and 1970s, fish hatcheries were built to offset the effects of the dams on fish. More recently, it has been recognized that hatcheries are not resolving the problems of migratory fish at dams, and the by-passes are again being promoted, including a requirement in some states to retrofit existing dams (even though new dams are still being built without bypasses). There has been some progress on the development of more appropriate fish passages for the Brazilian fish fauna, though with limited success to date and generally in isolation: fish elevators, vertical-slot ladders, and by-pass rivers are all being tested and installed. However, quite often the appropriateness of the by-pass is not being considered, and subsequent downstream fish passage is not yet being discussed. Assistance is thus needed to create a dialogue to coordinate development efforts and to transfer technology for proper assessment and design of upstream and downstream bypass structures.

#### Strategy

Our strategy is to confront the factors viewed as critical to improvement in this area, identify activities that will complement Brazilian experience with appropriate Canadian expertise, and priorize these based on likely returns and community value. Both participatory evaluation of problems (workshops, technical visits) and implementation/training techniques will be used.

#### Outcomes

- Technical capacity in universities, government, industry and the community to collect and understand biological data and to develop and implement strategies to conserve fisheries resources;
- Understanding of technical advances at the community level;
- Community involvement in habitat improvement initiatives.

#### Activities

Training, technical exchanges, workshops, and conference sessions on radiotelemetry, DNA fingerprinting, evaluation of stocking strategies, stock assessment, fish passage and lagoon utilization design, dam operation protocols.

#### Indicators

Number of workshop and conference trainees (disagregated by gender and function); publications of scientific studies using transferred technology (including publication suitable for community understanding); published or internal agency policies on incorporation of fish and fisheries in water management plans; number and kind of dam

protocols implemented for reducing fish mortality; number of published stock assessments or agency policies on stock assessment protocols that incorporate local knowledge; published or internal Brazilian reports on stocking efficacy and changes in stocking protocols; publications on habitat improvement projects; number of community habitatimprovement projects instigated.

#### Integration & durability of results

This thematic area of the project consists of many "hard technology" fields of endeavour, which provides considerable opportunity to build on existing research and development projects amongst our partners in Brazil. An important function of the project will be to promote integration amongst these different programs and partners and the affected communities towards a common socio-environmental goal. Projects underway within the proposed partnership include :

- Radiotelemetry studies at UFMG/CEMIG and UFSC/Gerasul
- UFMG/CEMIG Institute on Fish Passages
- Water management research & implementation models at CRHEA, UFSCar, SRH, ANA
- DNA studies at UFSCar, UNESP (Botucatu), UFMG, Embrapa (Pantanal), IBAMA
- Fish stocking programs and research at CEMIG, CODEVASF, IBAMA (CEPTA)
- Water quality assessment and research at CETEC, UFSCar
- Fisheries management research and implementation at NUPELIA, IBAMA, IEF, and EMBRAPA
- Studies on operational protocols of dams at CEMIG/UFMG

# **CROSS-CUTTING THEME A:** Help develop policies for sustainable fisheries with community participation

#### Background, current status & strategy

Key elements to developing effective fisheries policies that involve communities include communication between the various stakeholders, basin-wide consultation on water and resource management, and capacity within the communities to represent themselves at the discussion table. Community participation in planning has recently been legitimized by the new water law of 1997, and in fisheries regulations, and a number of basin planning committees have been set up, including most recently for the São Francisco River. However, effective implementation of these goals is still problematic, especially representation of professional fishermen and environmental issues, a difficulty

that appears to stem from a lack of mechanisms or capacity for effective participation by these stakeholders and the lack of cross-societal links.

With this project, we propose to help build participation of communities and representation of fishery issues in the Basin Committee initiaves and to attract other stakeholders as the project progresses. The activities we propose will build capacity and communicative ties within and between the various stakeholders with a view to linking them to the Secretariat de Recursos Hídricos' multiple stakeholder basin committees. Building the technical and social capacity of fishing communities to participate better in this process (described above) is crucial to the effective implementation of this theme, as is public and technical awareness, particularly the exposure of key policy-makers to Canadian and international situations where multi-stakeholder integration is well accepted. The creation of personal links between otherwise antagonistic or indifferent groups is also a powerful means of building the basis for growing empathy, understanding, and policy changes.

The present project plans to create opportunities for these bridges to grow, something we believe may well be its most lasting impact, through cross-societal participation in workshops and other project activities, training of partners in dispute resolution and communication, and specific professionally facilitated workshops to identify and resolve communicative barriers between the various stakeholders in water and fisheries management.

#### Outcome

Participation of multiple stakeholders (including community members and project participants) in policy-developing meetings and committees at municipal, state, and federal levels as well as in industry;

Supportive multi-stakeholder network for collaborative fisheries management and problem resolution.

# Activities

Multiple stake-holder workshops for co- management and policy development; participation of key Brazilian trainers and policy developers in international congresses; integration of project members and results into Basin Planning Committees established in the course of the project; workshop for industry on responsible environmental and social policies.

# Indicators

Level of multi-stakeholder representation at planning meetings; number of new fisheries policies that specify community participation

# Integration & durability of project results

The Agência Nacional das Aguas (ANA) has a training program to help stakeholders participate in Basin Committees. We will work closely with this program to help develop the structure of these
workshops, particularly with regard to fishing communities. Replication of these workshops in other parts of the valley and the country will provide continuity for our efforts in the future. The Basin Committees themselves will also receive input from our efforts and help perpetuate the results.

# **CROSS-CUTTING THEME B:** Assist development of public awareness and education

# **Background & current status**

Public awareness and understanding of fishery, social, and environmental issues are key pre-requisites to the effectiveness and sustainability of social and policy changes. This awareness and understanding are not only crucial to appropriate decisions and behaviour amongst the immediate stakeholders in the aquatic ecosystem, they are also needed to create public opinion that will drive and support policy changes. International public awareness, including that of the Canadian public, is also important in creating an environment for policy change. In this sense, public awareness and education are critical cross-cutting themes, as well as requiring specific activities to enhance their effectiveness.

In general, public understanding of aquatic ecosystems and fisheries in Brazil is low. This public includes industry leaders and sports fishermen, as well as people that interact with the aquatic environment only superficially. In common with many other countries, improving public awareness in Brazil also appears to be generally of low "official" priority, with some notable exceptions for riverine communities. However, interest amongst the general populace appears to be great - in part judging from the number of sports fishermen and interest in public awareness events (such as events that CEMIG and CAP have done, and TV programs). There is, thus, an ideal environment to launch appropriate awareness programs for the general public.

Awareness at the fishing community level is mixed: there is considerable local knowledge in both the professional fishermen and some of the people involved in servicing the sports fishery, but relatively little interaction with, or trust of, the scientific community and more "mainstream" knowledge.

Canadian and international awareness of Brazilian fisheries issues being addressed by this project are important for several reasons:

- Fosters an international community aware of key issues in inland waters biodiversity and better able to promote their resolution through international instruments
- Provides a source of pride in the Brazilian public for their natural resources and livelihoods
- Develops an educated international public to help ensure corporate environmental responsibility as more Brazilian industry is sold to foreign ownership
- Assists the Canadian public in understanding how CIDA money is applied

Canadian public awareness initiatives within this project will receive some project funds, but will largely rely on contributions of venues from such partners as the Vancouver Aquarium. The key activity in Canada involves assistance in preparation of an exhibit on Brazilian artisanal fisheries at the Vancouver Aquarium.

#### Strategy

Effective public awareness efforts need to be tailored to the target, three of which we are recognizing in our proposal (with the understanding that they overlap): the general Brazilian public (including industrial and sportfishing stakeholders), the professional fishing and riverine communities, and the international/Canadian public. Thus, in addition to pursuing public awareness components in all of our activities, we are also proposing a variety of activities specifically targeting these different audiences.

#### Outcome

• Knowledgeable and supportive participation in fisheries management and conservation by all stakeholders, together with improved general public awareness and support for changes in fisheries management (national and international).

#### Activities

Incorporation of public awareness elements in key activities (in Brazil and in Canada); workshops to priorize, develop, and create educational and public awareness tools and strategies; workshop to catalyse development of public aquaria of various sizes.

#### Indicators

Number of games, booklets, teaching guides or displays designed and distributed; number of television programs and articles in other media; number and kind of community plans for construction of aquaria; number of awareness strategies for key issues; number of venues selected for awareness activities.

#### Integration & durability of results

The proposed activities will build on and integrate public awareness and education initiatives in Brazil being carried out by the various university, government, industry and NGO partners. These will provide continuity for the efforts when the project is over. In Belo Horizonte, the project will assist a public aquarium that is currently in the planning phases (with Brazilian financing), and we expect the same will occur in other cities such as Manaus, possibly for smaller installations. In Canada, continuity will be provided by the Vancouver Aquarium display and by other partnerships that are expected to develop during the project.

# **CROSS-CUTTING THEME C:** Assist in creating opportunities for women, family & youth

#### **Background & current status**

Sensitivity and responsiveness to opportunities for women and youth is an important element to incorporate in all activities of the project, as is a continuous consideration of impacts the project may have on family and community well-being. In this sense, the gender/family/youth theme is also a critical cross-cutting theme that requires several specific activities in order to be properly addressed.

At present women generally provide a supporting role to fishermen in the fishing community in Brazil, are professionally and socially undervalued, and have limited options. However, they continue to be very supportive of the profession. The family structure, which is patriarchal, is generally stable.

Young people in fishing communities, however, often do not consider professional fishing as a desirable or socially acceptable career, and few wish to pursue it. The parents in fishing families are very keen to have their offspring educated adequately to access other career opportunities.

The cohesiveness and organization of the fishing communities themselves varies considerably. In general, they are among the poorer people of the riverine villages and towns, and reside in the poorer "bairros" or neighbourhoods. Organization depends on the strength of the local "Colony", but many also operate outside this organizational structure. Marketing is either directly to the public at informal fairs or fishing stands and/or through informal arrangements with middle-men that market to larger population centres, often with substantial profit margins and minimal returns to the actual fisherman. When operating well, the "Colony" and its elected leader provide the fishing family with assistance in accessing social programs, getting government assistance, educational/betterment opportunities and general troubleshooting. In cases where these are not working well, the "colony" organization may be dominated by members of society who are making use of the "professional fishermen" designation illegally while also taking advantage of legitimate artisanal fisherman. Current policy of the Ministry of Agriculture and of IBAMA is to try to reduce the instances of this second kind of structure, so far with variable success.

At the professional level, opportunities for women in our partnership are excellent, reflecting a relatively high percentage of involvement in the social sciences.

# Strategy

We will address gender, family and community issues by:

1) ensuring that all activities provide equal opportunity for women and men (and youth, as far as possible);

- 2) designing activities that specifically address the needs of women and youth;
- 3) carrying out activities that strengthen social programs in the general community of the riverine population, while improving the access to these programs by the fishing community;
- 4) assisting in the strengthening of the fishing community organization.

#### Outcome

• Equal livelihood opportunities for women and youth in a manner that is supportive of families and the community.

#### Activities

Equal consideration of and opportunities for women in all activities; facilitate revision of special requirements for women and youth; training activities for assessment of women's role in fisheries, gender disaggregated reporting of data throughout the project.

#### Indicators

Gender disaggregated statistics on participation in project, including community participants; amount and kind of improved communication between community NGOs and municipalities regarding opportunities for women (meetings, reports etc); number of gender-specific problems related to community fishing identified; number of reports by youth participants in the project.

# Integration & durability of results

The project will build on the significant gender-specific work with fishing communities that partners at the UFSCar and UFMG have already carried out, as well as the gender-related public policy development being carried out at UFSCar and UNICAMP.

Dras. Norma Valêncio and Inês Rauter (UFSCar) will be primarily responsible on the Brasilian side for the execution of these elements in the project. On the Canadian side, geneder issues will be addressed by the UBC team from the Center for Human Settlements and WFT.

# **Risk management**

The most evident risks are failures to deliver on counterpart funding, changes in government policies and conflicts between different parties. All are mitigated considerably in our project by the breadth of our partnerships and the agreements signed by partners. A customized dispute resolution and risk management plan will also be developed with the assistance of the UVic Insitute for Dispute Resolution during the initial implementation mission for the project.

The other risk for the project lies in the management complexity resulting from the large number of partners involved. However, the management structure reflects Brazilian political and cultural realities and has been designed to be participatory while maintaining responsible control over finances. Conflict resolution mechanisms built into the management structure mitigate the risk inherent in this "balancing act." Results-based flexible management of the project will be important in maintaining project goals and strategies responsive to the realities of the situation on the ground.

Privatization of public utilities is an uncontrollable risk with regard to CEMIG's participation in the project. However, as we are focusing on the transfer of relevant technologies to both universities and power companies and building awareness and skills of individuals that will remain in the system independent of privatization and changes in government as well as industrial policy, long-term impacts of the project are likely to continue independent of privatization.

Risks for both Canadian and Brazilian partners include potential international travel restrictions. We have mitigated this risk as much as possible by focussing on in-country activities and bringing together existing Brazilian expertise.

# **Durability & Diffusion of Results**

Durability of project results, in the sense that immediate outputs of the project continue to grow into longer term impacts after the project is over, clearly relies on integration with existing Brazilian programs and the creation of an enabling legislative and policy environment in the country. A critical component of this durability is to recognize and build on existing Brazilian expertise and foster communication and collaboration between Brazilian groups. Facilitating this process is as important as bringing in Canadian experience and expertise. All of these considerations are built into our project, as described in greater detail above, and will also be pursued specifically with supplemental application for assistance from CIDA's DRINK initiative.

# **Benefits to Canada**

Canada will benefit from the project in a number of ways:

- Immediate and future business opportunities for Canadians;
- Opportunities for Canadian development organizations, such as IDRC, to collaborate and benefit from networks established by the project;
- Exposure of Canadian partners to alternate social and biological environments, including bilateral exchange of experiences, that will influence policy and research developments in Canada;

- Potential for new bi-lateral social development and research partnerships that will influence social and environmental development in Canada;
- Greater Canadian public appreciation of socio-environmental conditions in other parts of the world, which will contribute to improved resource stewardship in Canada and globally.

# **Gender Analysis & Strategy**

As described in the attached gender analysis summary (Appendix 3) and in details of the proposal above, the project partners are committed to providing opportunities to women and youth in the context of maintaining healthy family and community structures.

# **Environmental Impact & Genetic Conservation Considerations**

The project deals with environmentally sensitive issues, but primarily by mitigating environmental effects. Deleterious effects of pollution, water regulation, fish stocking, and aquaculture will all be reduced. The overall effect will be an improved environment.

In terms of conservation of biodiversity and respecting Brazilian and international laws related to the Biodiversity Convention, there will be no transfer of genetic material from Brazilian fauna and flora to Canada or any other country during or after activities of the project. All matters in relation to genetic conservation and traditional knowledge will comply with relevant Brazilian legislation, in particular Provisional Measure 2.186-16 of August 23, 2001. The national Council of Genetic Conservation Management (Diretoria do Programa Nacional de Conservação da Diversidade Biológica) have a seat on the project's Consultative Council as representatives of the Minisitry of Environment, and will also be consulted more specifically where project activities fall into their area of competence.

# **Management Structure**

Our management structure addresses the need to produce results while keeping bureaucracy to a minimum. It takes advantage of the diversity of knowledge, capabilities, practices and social situations represented in the partnership, and has mechanisms to manage conflicts that may arise within the partnership.

Overall responsibility for the project rests with the Project Coordinators (WFT and UFSCar), who are the project proponents and signatories. Project Coordinators are advised by a Consultative Council and a Steering Committee, and are assisted in project execution by an Executive Committee and an administrative Executive Secretariat (Fig. 5).



Fig. 5 Management Structure of Project

The Consultative Council consists of governmental representatives and of representation of the various interests covered by the project (e.g. gender, age, professional fishing, scientific endeavour). The government representatives will be appointed by their respective institutions and the others being selected for one-year terms by the Project Coordinators, upon consultation with partners and participants of the project, taking into account equitable representation of the different interests and institutions. This council will meet annually to evaluate progress and suggest changes if needed. Informal consultation between the coordinators, the council, and the general partnership will continue throughout the year, assisted by the project's web-page and newsletter.

The Steering Committee helps to interpret the deliberation of the Consultative Committee within the context of CIDA's and ABC's criteria and priorities through Annual Information Exchange meetings. This committee will meet shortly after the Consultative Committee meetings. It will be composed of representatives of the Project coordinators (WFT and UFSCar), CIDA, and ABC.

Annual reports on progress in the project, in English and Portuguese, will be made available to the Consultative and Steering Committees at least two weeks prior to meetings.

The Executive Committee assists in the execution of the project, through sub-coordinators for each sub-project and cross-cutting theme who report to the Project Coordinators and the Consultative Council. These "Executive Coordinators," who may include partnerships of two or more organizations, will be selected by the Project Coordinators, subject to an annual review with the Consultative Council and consideration of equitable representation of institutions and interests. The Executive Coordinators, working collaboratively with the Project Coordinators, will be responsible for the organization and execution of the activities of their respective sub-projects or themes, reports on activities (including reports of Brazilian counterpart contributions), organization of the monitoring of indicators, collaboration and integration with the other sub-projects and themes, and suggestions on improving how the project is running.

The executive secretariat will assist in all aspects of the Brazilian management of the project, reporting to the over-all project coordinators.

# **Monitoring Strategy**

Monitoring of progress of the project will be carried out at three levels: (1) directly by the coordinators, (2) through separately funded research projects accompanying the project, and (3) by the communities themselves. Indicators were selected to permit this monitoring strategy, but may be revised during the project. Indicators being monitored by researchers and communities will continue to be monitored after the project is over. Some indicators, and means of measuring them, will be refined during the project, with the assistance of longer-term Canadian biologists and sociologists.

# **Communication & Extension Strategy**

Communication and extension strategies are detailed within the public awareness and sustainability components of the proposal. Both are integral parts of the project. In addition, as part of the management strategy a website and a bi-monthly newsletter will be maintained to disseminate project information amongst partners and provide information to the public.

# Logical Framework Analysis (LFA)

NARRATIVE SUMMARY	EXECTED RESULTS	PERFORMANCE MEASUREMENT	ASSUMPTION/RISK INDICATORS
<b>Goal</b> Sustainability of the Brazilian inland fisheries resource and the livelihoods based on it.	Long term results Reduced poverty and increased equity for freshwater fishing communities, with sustainability of the resource (improved yield and more diversified composition)	<b>Performance indicators</b> Fish harvest and distribution statistics; fishing family livelihood opportunities, income and well- being; quantity and quality of fish products marketed.; new fisheries policies and legislation	Assumptions: Management is a significant factor in fish abundance; stable Brazilian economy Risk indicators: Climate change overwhelms impact of management; government participation reduced
<b>Purpose</b> Build capacity for co-management of inland fisheries of the São Francisco River by transferring biological and social technologies and linking stakeholders	Medium-term results Fisheries co-management established in pilot areas in Sao Francisco Basin, with multi- stakeholder participation including communities.	Performance indicators Written documentation of management meetings; media reports; communities with policing and value-added programs; data on fish behaviour and numbers; stock assessment and dams protocols created; publications on stock structure; insertions in TV programs and other media reports	Assumptions: Political climate allows participatory management Risk indicators: Government willingness to co-manage reduced; funding for fisheries and social research reduced; dam privatization removes incentive to participate
<sup>3</sup> Resources (activities) Multi-stakeholder, cross-societal training workshops to prioritize and deliver technical and social tools for co-management, participation of key Brazilians in international congresses, network-building, development of awareness and education vehicles that build broad support for sustainable co-management.	Short-term results Communities, government agencies and industry with technical and social capacity for participatory inland fisheries management; linkages established; role of women in fisheries evaluated, recognized and incorporated in pilot schemes; increased public awareness of fisheries resource and issues.	<b>Performance indicators</b> No. of trainees; written strategy for co-management in SF communities; community policing plans; data on role of women and gender-specific fisheries issues; awareness designs and strategies; reports and participation by youth; number and kind of DNA probes developed and employed	Assumptions: Brazilian partners able to fulfil counterpart duties and identify and maintain trainees <b>Risk indicators:</b> Strikes or cutbacks eliminate partners and participants

<sup>&</sup>lt;sup>3</sup> See susidiary table for detailed LFA on activities

**Detailed LFA of activities** 

Timetable

# Appendix 1: Summary of Project Structure & Activities

#### Purpose

• Create and implement a model for sustainable socio-environmental river management for the São Francisco River that provides sustainable livelihoods to artesanal fishing communities, secures the fish resource, and has application in other areas of Brasil.

#### Impacts

- Reduced poverty and increased equity, gender balance, and family well-being for freshwater fishing communities.
- Long-term sustainability of freshwater fishery resource.

#### Indicators (long term)

- Increased average family income, livelihood alternatives, and quality of life for fishing families (including access to social services and improved social status).
- Improved fishery yield and composition.

# Sub-project 1: Preparing communities for co-management

# Outline

Activities within this sub-project prepare pilot communities in the São Francisco, universities, and government for fisheries co-management, building on the experiences in other parts of the country and Canada. The activities are grouped within 3 main areas and will be integrated with the agenda of sub-project 2 as appropriate. Linkages to cross-cutting themes 1-3 will be made through their consideration in the individual activities.

#### **Desired outcome**

- Ability of target communities to participate in fisheries management using appropriate technical and social tools;
- Greater capacity of support groups to build fisheries co-management in other areas of the São Francisco and the country.

#### Indicators

- Number of publications on co-management and the use of participatory processes in development in Brazil;
- Number of fishing communities that have received co-management training;
- Published evidence of strategy for implementing co-management in São Francisco fisheries;
- Curricula for training workshops for community policing of fisheries in Brazil.;
- Strategy for implementing effective community policing programs;
- Number of trainees disaggregated by gender and function.

#### **Activities**

# **1. Participatory assessment and revision of co-management strategies and participatory processes**

• Technical visit of Canadian experts on fisheries co-management and integration of local and scientific biological knowledge for resource management.

• Conference and workshops for co-management facilitators on (1) fisheries comanagement and integration of local and scientific biological knowledge for resource management in Brazil and (2) participatory research and development approaches (including experiences from throughout Brazil and Canada).

# Results

Report on current status and strategies for fisheries co-management in the Brazilian context; improved awareness on the part of government (IBAMA, IEF), communities and universities of options and realities of participatory fisheries management; review publication of participatory processes in development for Brazil; training of partners in communication and dispute resolution; revised initial strategies for building community co-management of São Francisco fisheries, based on other Brazilian and Canadian experiences.

# **2.** Adaptation and transfer of Amazonian fisheries co-management experience to the São Francisco River

- Transfer of the IARA experience to two trial communities on the São Francisco River (including participatory community workshops, training workshops, educational publications; co-funding from IDRC expected).
- Long-term Canadian fisheries biologist in Brazil to assist in implementation and monitoring of transfer process.

#### Results

Implementation, with monitoring, of fisheries co-management in pilot communities based on experiences in other parts of Brazil; Model for adaptation of co-management to other parts of São Francisco River and other river basins.

# **3. Assessment of strategies and implementation of community policing for fisheries issues and community strengthening**

- Technical visits of Canadians to Brazil and key Brazilians to Canada to evaluate approaches to community policing of fisheries issues.
- Mini-workshops in Brazil to identify appropriate approaches to implement community policing and to develop training courses for policing agencies and community members.

#### Results

Strategy for implementing appropriate community policing, including better linkages between police and the community, curricula for training courses.

#### <sup>9</sup>Brazilian participants

#### Key

UFMG (Alex Godinho and Elos Project), Nupelia, UFSCar (Ciências Sociais and Ethnoecology), IBAMA (Brazilia, Minas, CEPTA, ProVarzea), UFRJ, CAP, Policia Militar, IARA, Colonias de Pesca, UNICAMP, Federacao de Pesca (Minas), UFAL, IEF, and Ministério da Justiça (DPDH).

#### **Participants**

SRH, USP – CRHEA, UFSC (Saneamento and Aqüicultura), Embrapa, PUC - Minas, MA, UESC, CEMIG, PNDP, MMA, Xingo, and UTAM.

#### Interested

UFRN, UNESP, CODEVASF, MMA - Pantanal, SPDS

#### **Canadian participants**

F. Berkes (University of Manitoba); Center for Human Settlements (UBC) - Erika de Castro and team; Dispute Resolution Centre (UVic) - Maureen Muloney and Alex Grybowsky; WFT and other co-management expertise.

#### **Brazilian activities that ensure continuity**

#### In the São Francisco:

UFSCar, Projeto Elos (UFMG), UFAL, Projeto Xingó, and IBAMA.

#### In other regions

Nupelia – Rio Parana and the upper Pantanal, Embrapa – lower Pantanal, IBAMA – Amazonas, reservoirs of northeast Brazil, UFSC – lagoons and rivers of southern Brazil, UFAM – Amazonas, UFRN – Rio Grande de Norte, UESC – Bahia (fresh & saltwater), CRHEA – USP São Paulo state.

#### National and state levels

IBAMA and IEF.

<sup>&</sup>lt;sup>9</sup> "Key" = related directly to impact on SF pilot areas - priority in participation & funding; "Participant" = primary impact in other areas of country but with immediate implications to SF; "Interested" = impact in other areas of country.

# <sup>10</sup>Organization

#### Brazil

Pro-Varzea/IARA.

#### Canada

World Fisheries Trust.

# Sub-project 2: Building sustainable livelihoods

#### Outline

Activities within Sub-project 2 aim to strengthen the communities that contain the fishing colonies, particularly in the services they can provide to fishing families, and to help build new options for fishing families to pursue sustainable livelihoods. Linkages to community policing (Sub-project 1) and Cross-cutting themes 2 and 3 (Public Awareness and Gender/Family/Youth) are essential and will be provided by coincident scheduling of events and/or incorporating their consideration directly into the activities.

# **Desired outcomes**

- Pilot riverine communities with strengthened social policies and services that are accessible to fishing families;
- Communities with capacity for alternative activities that provide a better return from the fisheries resource while reducing fishing pressure.

# Indicators

- Average family income in fishing communities;
- Increased quality of life (access to quality nutrition, education, and sanitation) in fishing community;
- Number of social development committees or associations created and/or revitalized;
- Improved quantified opinion of well-being by fishermen and their families;

<sup>&</sup>lt;sup>10</sup> Candidates for initial Executive Sub-coordination.

- Number of relevant municipal development strategies implemented;
- Number of livelihood opportunities accessible to members of the fishing community (gender disagreggated);
- Quality, value, and diversity of fish products being marketed;
- Number of trainees disagreggated by gender and function.

# Activities

# **1. Participatory assessment of community attributes and needs**

• Workshops and surveys in the communities on development and well-being, using participatory methods, including: assessment of existing strengths, requirements, and interests to find ways to improve living conditions for the fishing community (3 pilot communities in the mid - São Francisco); appropriate livelihood options, and methods to achieve better educational opportunities (for both youth and adults);

These workshops and surveys, carried out over 1-2 weeks, will focus on community participation, but will include both Canadian and Brazilian personnel in the role of facilitators, thus taking advantage of experience from both countries and building facilitation expertise and workshop agendas to apply to other communities. Selected police will also be involved in the process to help build the community policing component of the project.

Implementation of strategies developed will be assisted by:

- Long-term Canadian social scientist in Brazil and follow-up rewiew workshops;
- Building network of non-profit community development organizations;
- Strengthening of networks of municipalities.

# Results

Assessment report of current community status; strategies provided to municipalities for improving community services and building alternative livelihood options; improved facilitation capacity in university and government partners.

# **2. Evaluation and adaptation of pre-identified alternative activities that already have broad acceptance in Brazil**

• Training visit of key Brazilians in Canada to look at aquaculture risks and mitigative strategies.

- Conference session and subsequent workshops on benefits, risks, and technologies for community-based cage and pond aquaculture, including discussion on appropriate development strategies, the use of introduced species and hybrids, and pursuing environmentally benign approaches. Based on our preliminary survey, women, youths, and cooperative associations will be targeted. Government agencies and hydrocompany participation in this development will be essential to ensure appropriate regulatory and financing environments.
- Training mission to Canada on value-added processing of fisheries products, followed by a Canadian mission to Brazil to help design facilities and training courses, initially through the Xingó project in the lower São Fransisco and CAP in the upper valley.
- Evaluation and two pilot development workshops on marketing mechanisms, including product certification and establishing fishermen's associations or cooperatives (if appropriate). These activities will recognize that market development cannot be built on increased wild harvest, but more on maximizing returns on existing harvest and incorporating aquaculture products. Appropriate workshop and training course agendas and curricula for application in other communities will be developed from this experience.
- Special session at aquaculture conference in Brazil on assessing and resolving needs of aquaculture of native fish species, in particular native catfish.
- Training trip to Canada (2 Brazilians) to develop economic feed for native catfish to be used in aquaculture (or other key problem in the development of aquaculture of native fish species).
- Workshops on ecotourism options, including those created by supporting the sportsfishing industry. Discussion will include experiences from Canadian representatives of coastal fishing communities that have incorporated ecotourism options.
- Technical tour by key Brazilian community leaders and government representatives of Canadian communities that are struggling with fisheries down-turns. This visit, if possible, will also include participation in the World Congress on Ecotourism in Quebec in May, 2002.
- Workshop week in communities to develop other alternative livelihood options in target communities (ecotourism, handicrafts, bait, cooking + others) with refinement of training protocols (organized by longer-term Canadian visit by an expert in social sciences).

# Results

Key government people and community familiar with international trends in ecotourism & effects on community structure; development of appropriate strategies for fish-related ecotourism in Brazil; strategy for developing and implementing community-based environmentally sensitive fish culture; centers developed for training in artesanal fish processing and marketing; selection and strategy for training and development of appropriate other alternative livelihood options.

#### **Brazilian participants**

#### Key

UFMG (Elos), Colônias and Federação, PNDP (IBAMA), CAP/Municipio de TM, UFAL, Ministerio de Agricultura, and UFSCar.

#### **Participants**

Embrapa, IARA, IEF, IBAMA, Pro-Varzea, and Nupelia.

#### **Canadian participants**

WFT, UBC, Memorial University and Marine Institute, DFO, LGL, and Communities.

# Brazilian activities that ensure continuity

#### In the S.F.

UFSCar, Elos, UFAL, Xingo, and IBAMA.

#### **Other regions**

MMA, PNDP, and MA.

#### **Organization/coordination**

Brazil

Ministerio de Agricultura.

#### Canada

WFT and UBC.

# Sub-project 3: Transfer technologies for securing the fisheries resource

#### Outline

Activities within this subproject build technical expertise to support the maintenance and re-building of fish stocks both in terms of improved collection and interpretation of biological information and in terms of improved operational strategies for management and mitigation of human impacts.

# Outcome

• Improved capacity in universities, government and communities to rebuild & manage native fish populations;

• Improved strategies to mitigate & manage human impacts.

#### Indicators

- Number of publications reflecting the use of transferred technologies, including publications targetting community understanding of advances;
- Number of policies published or adopted by agencies that incorporate fish and fisheries in water management;
- Number and type of new or revised operational protocols for dams implemented to reduce fish mortality;
- Number of stock evaluations or published policies that integrate local and scientific knowledge;
- Number of reports and publications reporting effectiveness of stocking and changes in stocking practices;
- Number of publications on habitat improvement projects;
- Number of community projects initiated for habitat improvement;
- Number of participants at workshops, conference sessions, and training trips (disagreggated by gender and fucntion).

# Activities

# **1.** Improve fisheries management through increased ability to evaluate stock structure of fish populations with DNA technology

- Technical visits (3 or 6 months each) of Canadians to Brazil to assist in implementing and developing DNA probes and the application of genetic information to fisheries management, including mini-courses on the topics;
- Short-term technical interns in Canada to learn techniques for DNA probe development and applications to fisheries;
- Review workshop in Brazil to help create functional networks, assess progress, and define future directions (as part of established conference).

#### Results

Increased Brazilian capacity to monitor fish populations using genetic procedures and ability to incorporate this information in fisheries management.

# 2. Improve ability to study and understand migratory behaviour of fish to improve fisheries management and design mitigative measures

- Technical visit to Canada of key Brazilians to review and train in approaches and technologies to assess migratory behaviour of fish (coincident with review mission of industry problems);
- Technical assistance by Canadians in Brazil to help set up contrasting radiotagging projects reflecting Brazilian priorities (involving community members);
- Workshop combining Brazilian, Canadian & international expertise in fish migration to assess progress and define future directions, including incorporation of local knowledge (within SBI conference).

#### Results

Increased Brazilian capacity to study and understand migratory fish in relation to their appropriate management and conservation - both at scientific and community levels; strategy developed for addressing this issue.

#### 3. Improve ability for stock assessment

We will help review approaches to stock assessment in the Brazilian situation and then assist in the implementation of promising approaches that highlight Canadian expertise.

- Workshop combining Brazilian, Canadian and international expertise to identify stock assessment and monitoring procedures most likely to be applicable to the Brazilian situation, including the incorporation of local knowledge (within SBI conference);
- Canadian missions to Brazil to help implement Canadian technology for assessing fish stocks (e.g. hydroacoustic applications in reservoirs and fish wheels in rivers);
- Longer term visit by Canadian fisheries biologist to assist in the implementation of technologies;
- Evaluation workshops to assess progress and appropriate directions.

#### Results

Increased Brazilian capacity to carry out stock assessment of fish within the Brazilian situation; strategy developed to continue building this capacity and an understanding of the process in both scientific and local communities.

#### 4. Reducing industry impacts

Three components are needed to reduce environmental impacts of dams: 1) assessment and identification of problems; 2) identification and transfer of appropriate technology and

3) an integrated program of institutional and public awareness. Thus, activities we will carry out are:

- Technical visit to Canada and NA by key Brazilians to view Canadian hydroelectric operational problems and resolutions;
- Priority-setting workshop in Brazil for mitigating effects of dams (Brazilian & Canadian participation);
- Technical visits to Brazil by Canadians to transfer required expertise and technologies (e.g. hydroacoustic fish counting expertise coincident with stock assessment);
- Workshop in Brazil on the corporate advantages of healthy, open, and inclusive environmental and social policies, and strategies to achieve these (Brazilian and Canadian participation);
- Brazilian interns in Canada to train in non-monetary valuation of environmental and social components of impact assessment and management.

#### Results

Improved protocols and strategies within the Brazilian hydroindustry (specifically CEMIG) to deal with negative effects dams have on fish; improved hydroindustry policies for dealing with environmental and social issues.

#### 5. Stocking effectiveness

There is a need in Brazil to both familiarize practitioners and the public on philosophies and risks of stocking and a need to transfer technologies to assess its effectiveness. Thus, we will carry out these activities:

- Conference session on stocking (Brazilian, Canadian, and international participation) to discuss and adapt philosophies and identify technologies and policies required for the Brazilian situation (part of SBI conference; issue also to be addressed with public awareness theme);
- Training workshops on alevin tagging to assess effectiveness of stocking (tied to SBI conference).

#### Results

Improved public and scientific understanding of issues related to stocking; suggested code of best practices with regard to stocking in Brazil; improved Brazilian capacity and strategies for monitoring the effects of stocking.

#### 6. Water management

The project needs to help the evolution of water management models and practices in Brazil that allow for multiple user groups but also incorporate social and environmental components that address the effects on the aquatic ecosystem and fishing communities. We will build on previous CIDA investments in water management technology in Brazil through the following activities:

- Technical visit to Canada by key Brazilians to review water management practices.
- Canadian professional in Brazil to help develop a hybrid Brazilian-Canadian model suited to the Brazilian situation.

#### Results

Improved understanding by key Brazilian policy-makers, scientific community, and local communities of international issues with regard to water management practices; improved water management model available in Brazil that incorporates social and environmental components.

#### 7. Habitat improvement

We will address two issues: recuperating habitats along the margins of rivers utilizing and fostering community interests, and fish by-pass structures for dams.

- Technical visit of Canadians to Brazil and workshop to help priorize and implement technologies that assess relative importance of habitat components to ecosystem function incorporating local knowledge and community activities.
- International workshop in Brazil to review current status of fish by-pass structures and how they relate to tropical fish fauna, in particular migratory fish of Brazil (part of SBI conference).
- Technical assistance in the implementation of radiotagging studies that characterize fish behaviour adequately for design of appropriate by-pass structures.

# Results

Improved Brazilian capacity and understanding of aquatic habitat recuperation and structure and application of fish passages; strategies and networks for developing this field in the future.

# **Brazilian participants**

# Key

UFSCar, CEMIG, UFMG, PUC-Minas, UNESP-Botucatu, Colônia de Pescadores Três Marias, CODEVASF, SRH, IEF.

#### **Participants**

Nupélia, UFSC (Aqüicultura), Embrapa, IARA, CEPTA, UFAL, Provarzea, IEF, Unicamp, CRHEA - USP, and COPPE-UFRJ.

#### Interested

UFRN, and UESC.

#### **Canadian participants**

SeaStar BioTech, Chris Wood, DFO; Mulligan (hydroacoustics), DFO, LGL, WFT, and Variedade de peritos internacionais.

#### Brazilian activities that ensure continuity

Variety of research and extension projects of partners.

#### **Organization/coordination**

Brazil

UFMG (Alexander Godinho) and IBAMA.

#### Canada

WFT.

**Cross-cutting theme A: Assist in the development of policies for sustainable fisheries with community participation** 

#### Outline

While our project cannot claim to write new fisheries policies, it can influence policy development through various means: inclusion of policy-writers in the project, multi-stakeholder participation in all project activities to build collaborative ties (cross-cutting components), and training of participants to partake in multi-stakeholder meetings more meaningfully.

# Outcomes

- Supportive networks for community-based fisheries co-management;
- Partners involved in developing policies favourable to sustainability of fisheries resources and artisanal fishing livelihoods.

#### Indicators

- Level of multi-stakeholder representation at planning meetings;
- Number of new fisheries policies that specify community participation;
- Number of Brazilians contributing to international aquatic resource management events.

#### Activities

- Multi-stakeholder meetings in pilot fishing communities to identify barriers to communication and collaboration;
- Develop training workshops for the various stakeholders, in particular the fishing communities, to participate in Basin water planning committees;
- Facilitate participation of key Brazilians in international water management and fisheries policy conferences in Canada and elsewhere.

#### Results

Improved communication pathways between stakeholders; improved stakeholder understanding of relevant international fisheries issues; improved capacity of communities to participate in stakeholder meetings.

#### **Brazilian participants**

#### Key

UFSCar, UFRJ, IBAMA, MA, DPDH and SRH.

#### **Participants**

Unicamp, USP-CRHEA, Provarzea, and Iara.

#### Interested

ANA.

#### **Canadian participants**

UVic (Dispute Resolution Centre), and WFT.

# **Organization/coordination**

# Brazil

UFSCar, Federação de Pescadores.

# Canada

WFT

# **Cross-cutting theme B: Build public awareness and education**

# Outline

Improved public awareness of fisheries issues and the fishing community are key elements to lasting change in how the fishery is managed. In this sense, public awareness and education are integral to the success and implementation of all aspects of the project. Canadian expertise will contribute to the definition of targets, design of the awareness strategies, and design and production of pilot products in each target area.

# Activities for riverine community target

Public awareness at the riverine community level needs to involve youth to ensure sustainable and appropriate stewardship skills and ethics. The professional fisherman needs to be recognized and valued, and local knowledge integrated with more technical knowledge to build stewardship skills. Activities will consist of:

- Review & training mission by Canadian expert to review needs and develop strategies.
- Workshop to identify and develop appropriate public awareness venues, educational material and events, including discussion on how to select, design and implement public awareness events at the community level; (coordinated with initial workshop of sub-project 2).
- Create pilot educational tools and materials (games, booklets, teaching guides, folders, and/or displays as prioritized in workshop) that integrate local and scientific knowledge, and recognize the role of the professional fishermen in society.
- Workshop on development of small public aquaria as interpretative tools for the environmemt at a community level.
- Workshop to implement school aquaria programs that bring live fish into the classroom with an associated interpretative program (Três Marias).
- Facilitate development of an interpretative radio or television program on fisheries issues.

# Activities for broader Brazilian target

The general Brazilian public will be less exposed to the aquatic environment on a daily basis than the riverine communities, but may be more likely to do damage during their occasional contact or through secondary effects. The focus will be on making people aware of the valuable aquatic resource they possess and the people that depend on it, threats to this resource, and things they can do to help.

- Workshop on defining priority audiences and on display, folder, and interpretative designs to address the different audiences (part of workshop above);
- Development of pilot travelling displays/stands and folders that integrate local and technical information to present the Brazilian aquatic ecosystem (selected according to priorities identified in workshop);
- Contributing project experiences to locally produced television shows on fisheries issues;
- Development workshop on public aquaria in larger population centres to assist Brazilian groups in planning.

# **Canadian/international target activities**

The principal purpose of Canadian and international public awareness of Brazilian aquatic ecosystems is to foster a climate for appropriate international participation in stewardship and conservation. This also helps create a greater pride amongst Brazilians for their resource.

- Assisting design and implementation of a new Brazilian fish gallery at the Vancouver Aquarium;
- Promote television and print coverage of the project in Canada.

# Indicators

- Number of games, booklets, teaching guides or displays designed and distributed;
- Number of TV programs and articles in other media;
- Number and kind of community plans for construction of aquaria;
- Number of awareness strategies develped for key issues;
- Number of venues used for awareness in Brazil and Canada.

# **Brazilian participants**

# Key

UFSCar, UFMG (Elos), Policia Militar, Nupelia, Colônias and Federação de Pescadores, CAP, Xingó, UFAL, SRH, DPDH, and IBAMA.

# Participant

Embrapa, IARA, IEF, USP-CRHEA and Provarzea.

#### Interested

UTAM and UESC.

# **Canadian participants**

Vancouver Aquarium, Imagecraft Studios, and WFT.

# **Organization/coordination**

#### Brazil

UFMG/ Elos

#### Canada

WFT

# Cross-cutting theme C: Create opportunities for women, youth and family

# Outline

Provision of equal opportunity for both men and women in all project activities and building opportunities for youth and family well-being will be a priority throughout the project. Identification of gender/youth/family problems and needs will be a theme in most workshops and interviews throughout the project (both Brazilian and Canadian participation). This will include:

- Gender disaggregated monitoring of training and participation opportunities;
- Component in workshops in pilot communities and associated fishing communities to identify social & educational needs and resources and how to strengthen them;
- Support for networking between community-based NGOs and municipalities that focus on opportunities for women and underprivileged social classes (also indicated above).

#### Outcome

- Equal and new livelihood opportunities and access to services for women and youth in fishing communities;
- Increased awareness of gender, youth, and family issues in pilot communities;
- Increased capacity for healthy family subsistance in fishing community.

#### Indicators

- Gender disaggregated statistics on participation in the project, including community participants;
- Amount and kind of improved communication between community-based NGOs and municipalities reagrding opportunities for women (meetings, reports, etc.);
- Number of reports, articles, and events on the environment by youth.

# Activities specific to theme

• Specific workshops and associated interviews with women and other community members in pilot communities focussing specifically on health, nutrition, and livelihood issues, as well as identifying gender-specific problems and barriers to their resolution and including design of approaches to transfer the process to other communities (coincident with community workshops mentioned above);

- Training/technical visit of 2 gender specialists from Brazil to Canada to review gender issues and strategies and nutritional and health components of family well-being;
- Support of youth representation from fishing communities of the São Francisco at the UNEP Children's Conference on Environment in Victoria, BC in May, 2002, including interchange with youth of a Canadian fishing community;
- Workshops for youth in 3 communities identifying problems and means for youth to participate in the project and community programs.

#### Results

Gender and youth specific data on community well-being; strategies on how to address problems and inequities and how to build new opportunities.

#### **Brazilian participants**

#### Key

CAP/Municipio de TM, UFAL, UFSCar (Inês e Nivaldo), Elos, DPDH, and Federação de Pescadores.

#### Participant

Miriam Leal (IBAMA), and UFRJ.

#### **Canadian participants**

WFT and UBC.

# **Organization/Coordination**

**Brazil:** 

CAP

Canada:

WFT, UBC

# Communication

#### **Overview**

Communication of project activities will be integrated with the public awareness theme. Means of communication will include a web-page and bi-annual newsletter, as well as videos of key

components. In addition to communication amongst the partners, television and print media will be accessed as possible to provide public awareness of the project to the general public in both Brazil and Canada.

# Activities specific to theme

- Creation and maintenance of a web-page for the project;
- Creation and production of a newsletter for the project;
- Creation of other publicity material for the project.

#### Results

Awareness of partners and funders of project progress & opportunities; venue for participant feedback to project coordinators; increased public awareness of project.

# **Brazilian participants**

# Key

CAP/Três Marias Municipality, UFAL, UFSCar, Federação de Pescadores.

# **Participant**

UFRJ, SRH, IBAMA, and MA.

# **Organization/coordination**

# Brazil

UFAL and UFRJ (Antonio Marcos).

# Canada

WFT

# **Canadian participants**

WFT, UBC, Imagecraft Studios, and Vancouver Aquarium.
# **Appendix 2: Partners and Proposal Evolution**

#### **Project evolution**

The present project had its origins in WFT's CIDA-funded project "Fish Genetic Conservation" blended with UFSCar's ongoing involvement in social issues of the São Francisco fisheries. WFT's first project, with key partners in Minas Gerais, Sta. Catarina, and the Pantanal, focussed on technical elements of fish conservation in Brazil - specifically strategies to maintain genetic diversity of natural and stocked fish populations. The project was highly effective in leveraging modest funding into a very broad project reach. However, in its implementation it became clear that we were not adequately addressing the social implications of fisheries conservation and management. We thus started building broader partnerships and surveying different stakeholders (including artisanal fishermen) so that we could address the "big picture" of Brazilian freshwater fisheries. The idea for the present project grew collaboratively out of this survey, as did a review volume on South American fisheries (to be published by the World Bank). A Concept paper based on these ideas gained preliminary approval from CIDA, pending further strengthening of its social component and management plan.

At this point WFT approached Dr. Norma Valêncio, of the UFSCar, to advise on the Brazilian social component of the proposal and to assist with over-all Brazilian coordination. Dr. Valencio has been working with social issues of fishing communities in the São Francisco River for over a decade, as well as being very active on a national level in various initiatives to study and improve "cidadania" of underprivileged groups. She thus contributed considerably to the development of the project and to forging additional partnerships that better represented social science and participatory process expertise in Brazil. A new concept paper was subsequently submitted to CIDA and ABC, jointly by WFT and UFSCar.

Upon approval of the new concept paper, CIDA provided proposal development funds to WFT at the end of 2001. WFT used these to hold, together with UFSCar, a participatory meeting of potential partners in Brasília to consult on proposal content and implementation, to convene a development meeting with fishermen at Três Marias, to make an evaluation visit to the lower São Francisco, to visit Santarém to evaluate existing fisheries co-management expertise, and to correspond with the many Brazilian and Canadian partners in preparation of the final project proposal. Professional artisanal fishermen participated in the elaboration of the proposal, represented by leaders of three fishing colonies in the proposed pilot area of the São Francisco as well as the president of the Federation of Fishing Colonies of the State of Minas Gerais.

A proposal was developed by WFT and UFSCar based on this meeting and on consultations with a variety of partners and submitted in March of 2002. Revisions of this proposal were made in response to feed-back from CIDA and ABC in July and September of 2002, with this final proposal submitted in October of 2002.

#### Brazilian partners

# Universidade Federal de São Carlos (UFSCar): Pro-rectorship of Extension (PROEx) (Overall Coordination)

The Pro-rectorship of Extension at the UFSCar is the focal partner for the project in Brazil. The Nucleus for Citizenship, part of the Extension Pro-rectorship at the university, has a long history as one of the academic loci for the defense of human rights in Brazil, particularly for disadvantaged groups, through various activities that integrate teaching and research. One of these is focussed on the artesanal fishery through: (1) extension courses for the community on legal rights of this social group (supported by the Ministry of Justice and UNESCO); (2) the production of environmental education material for schools and the community that improves the public image of the fishing profession (carried out in collaboration with the Human Ecology Laboratory at the UFSCar and supported by the Ministry of Justice, UNESCO, USP, and others); (3) training courses for the fishing Colônias (supported by the Federal Delegacy of Agriculture in Minas Gerais state). Current research activities on the socio-economics of the fishery on the São Francisco River - which this nucleus is carrying out in collaboration with the Nucleus for Research and Documentation and the Human Ecology Laboratory of UFSCar (under the auspices of the Ministry of Science and Technology, under the Program for Assistance to Scientific and Technological Development (PACDT/Ciamb), coordinated by the UFMG) - are the basis of a significant part of the information on the current living and working conditions of the fishing community cited in this proposal.. The UFSCar management team will build on these results, integrated with those of the other units of UFSCar involved in the project (see below).

#### UFSCar - Laboratorio de Ecologia Humana e Etnoecologia (LEHE)

The LEHE has been very active in the São Francisco river valley in developing a pioneering field of "ethnobiology" of freshwater fishing communities, consisting of the participatory documentation and analysis of the artisanal fishing practice. The interest includes improving life in the fishing community and enhancing the sustainability of the fishing livelihood. The LEHE will participate in all relevant aspects of the project, including developing customized research and extension projects to assist and complement project outcomes.

#### **UFSCar - Departamento de Genética**

The Genetics Department of the UFSCar is one of the leaders in Brazil in studies of fish population genetics, and has some current projects in the São Francisco basin. This group has recently started to employ modern DNA fingerprinting technologies, and is very interested in improving this expertise and applying it to the fisheries problems of the São Francisco river. The Canadian DNA expert will be hosted here for a portion of his visit to help implement the DNA technology and give courses, and some of the Brazilian interns to train in Canada will come from this group. The group leader, Dr. Pedro Galetti, is also pro-rector of research at UFSCar, and will facilitate project management as needed.

# UFSCar - Núcleo de Pesquisa e Documentação (NPD) do Departamento de Ciências Socias

The Nucleus for Research and Documentation (NPD) at UFSCar carries out a program on public policy, which is divided into two sub-programs: one that studies living conditions and a second that organizes and analyses social indicators of inequity. The two programs have carried out numerous studies by students and professors. Through the Nucleus' coordinator, Professor Maria Inês Rauter Mancuso, it has collaborated with the Cidadania Extension Nucleus of UFSCar with research on the current socio-economic conditions of the fishery of the São Francisco river, and will continue in this capacity in the present project.

# UFSCar – Pós-Graduação em Engenharia Urbana (PPGEU)

Dr. João Sérgio Cordeiro, professor at the PPGEU, has worked for over 20 years towards social and environmental responsibility of civil engineers in Brazil. Dr. Cordeiro is currently president of the Brazilian association of Engineering Schools, and in this capacity, is instrumental in the implementation of new regulations that mandate the inclusion of these topics in engineering curricula. He has also taught numerous specialization courses for certified engineers, and in this project will contribute to the efforts to build environmentally and socially responsible policies in industries related to continental fisheries.

# Centro de Apoio ao Pescador (CAP)

CAP is a foundation of the municipality of Três Marias, a small city in northern Minas Gerais on the upper portion of the middle São Francisco river. This center was constructed in the late 1990's, with assistance from the Interamerica Development Bank and the support of a variety of local organizations. Its planned function is to provide training and facilities to assist artesanal fishermen, including livelihood alternatives such as value-added processing and fish culture. CAP will be a central component of implementation of the project's activities at the level of the fishermen.

# Companhia de Desenvolvimento do Vale São Francisco (CODEVASF)

CODEVASF is a federal government enterprise, established in the 1930's, with the mandate of assisting development of the Sao Francisco valley. In this capacity, it is concerned with flood control, irrigation, and agricultural development, but is also very active in the development of fish culture. CODEVASF owns the dam at Tres Marias and, together with CEMIG, operates a fish culture station at its base, whose function it is to stock local waters with native fish species. This station is also providing advice and young fish to the CAP. CODEVASF will participate in stocking and fish culture activities of this project.

# Colônia de Pescadores: Pirapora, São Francisco, Januária, Três Marias

"Colonias" of fishermen is the community level of organization for artisanal fishermen in Brazil. Three of these, nominally associated with the municipalities of Tres Marias, Pirapora, and São Francisco, represent approximately 300 artisanal fishermen living in towns along a 600 km stretch of the upper mid-São Francisco river. These fishermen will be the pilot communities targetted by the project's activities. Their respective base municipalities will also be the targets of community development initiatives, with initial participation through a local network represented by Três Marias.

#### Empresa Brasileira de Pesquisas Agropecuario (Embrapa) - Pantanal

Embrapa is a Brazilian federal research company for agriculture, recognized worldwide for some of its work. In the Pantanal, the company is concerned with fisheries management, working closely with the state government of Mato Grosso do Sul. In this capacity, they are very interested in technology to improve fisheries management. As a relatively undeveloped Brazilian wetland and an area where sportsfishing is strongly developed, the Pantanal will provide excellent contrast and valuable lessons for the São Francisco situation.

# Federação de Pescadores

The Federations of Fishermen, one for each state, represent the artisanal fishermen at the federal "Conferedataion" level, and are responsible for communication with, and supporting activities of, the 'Colônias" in their state. The head of the Federation of Minas Gerais resides in Três Marias, and is part of the Colônia of this area. The Minas Gerais Fishermen's Federation will thus be essential to the implementation of project activities in the pilot region, and will be important in carrying project results and co-management processes developed to other states of the São Francisco valley and the rest of the country.

# Instituto Amazônica de Manejo Sustentável dos Recursos Ambientais (IARA)

IARA is a non-profit organization working out of Santarém, Amazonas State, on community-based fisheries management. The organization evolved out of a joint IBAMA/GTZ project of the early 1990s which targetted the development of processes for fisheries co-management in the Amazon. The group has gone on to not only continue assisting pilot communities of the IBAMA/GTZ project, but also to initiate similar processes in adjacent municipalities. In this project, IARA, together with the Projeto Varzea of IBAMA in Manaus, will make use of this experience and Canadian input to help initiate the co-management process in the Sao Francisco valley. Complimentary funding from the International Development Research Council is being sought to assist in this process.

# Ministério da Agricultura, Pecuária, e Abastecimento (MAPA) - Dept. da Pesca e Aqücultura (DPA)

The federal MAPA-DPA has relatively recently regained jurisdiction of fisheries development from the Ministry of the Environment (MMA), with a mandate of developing fisheries and aquaculture potential, as well as regulating some aspects of fishing activities (such as licencing). The group is thus very interested in the project, particularly for value-added processing of fisheries products and aquaculture. They will thus be initial executive coordinators of sub-project 2 (Building Sustainable Livelihoods).

#### Ministerio de Justícia (MJ)

The federal MJ is concerned with ensuring that Brazilian citizens have the opportunity to exercise their legal rights. In this respect, they have worked closely with the Brazilian proponent (UFSCar) on several projects in developing the "cidadania" of disadvantaged groups. In the current project, the MJ is likewise interested in approaches to enhancing the fishing communities' access to respectable livelihoods, and will coordinate the activities of the Cross Cutting Theme 2 (Gender, Family & Youth).

# Ministerio do Meio Ambiente (MMA): Instituto Brasileiro do Meio Ambiente e Amazonas Leal (IBAMA)

IBAMA is the federal agency within the MMA that is in charge of environmental protection and fisheries management. In this regard, they are very interested in the technology and experience to be transferred in this project. A number of components of IBAMA will be involved in the project, including, the Fisheries Enforcement Department and the Sport Fishing Development Program (both in Brasília), the local fisheries office in Belo Horizonte, the special project for fisheries management of the Amazon (Pro-Varzea), and a fisheries research station in Pirassununga, SP (CEPTA). IBAMA will share exectuive coordination duties for both Sub-projects 1 (Preparing Communities for Comanagement) and 3 (Securing the Fisheries Resource).

#### MMA/Secretaria de Recursos Hídricos (SRH) - Brasilia

The SRH is the component of the MMA that has the responsibility of managing aquatic resources in the country. In this capacity, they set policy and regulations for water use in the country. Since its creation in the mid-90s, this has included the formulation of a new water law and the introduction of hydrographic basin-based water management planning. The SRH has expressed exceptional interest in the project, particularly in its integrative character that can make water management more effective, and has been one of the project's greatest promoters. The recently created Agência Nacional das Águas (ANA) is currently taking on the implementation responsibility for SRH policies, and one of the functions of the project will be to prepare fishing communities to better participate in the planning activies of ANA.

#### Polícia Militar - Minas Gerais

Enforcement of fisheries regulations is generally seconded to state police, though some enforcement also occurs by federal IBAMA agents or state environment agents. In Minas Gerais, including the upper and middle Sao Francisco, enforcement of both federal and state regulations is carried out primarily by special units of the state Military Police. However, compliance with regulations can be low, and policing can be patchy and at times disproportionately violent. Both comunities and the police recognize that the current situation is not working well, and are looking for alternatives. Community policing and education are considered the most likely avenues towards improved policing, and the Military Police of Minas Gerais are committed to full involvement in pursuing both of these components of the project - including incorporation of information into their training

programs, modifying their way of doing business, and embracing greater community involvement in policing efforts.

### Pontifícia Universidade Católica de Minas Gerais (PUC -Minas)

Dr. Hugo Godinho, of the Graduate Program of Vertebrate Zoology at PUC-Minas, has been researching and teaching about fish and fisheries of the São Francisco and Rio Grande rivers for over two decades, and was one of the principal partners in WFT's previous CIDA project in Brazil. He and others of his department will be involved in all aspects of the project, as appropriate.

# Universidade Estadual de Santa Cruz (UESC)

UESC carries out various research and activities in Bahia with freshwater and marine fish and fisheries, from population studies, pollution, and aquaculture to environmental education and sociology (including participatory research and community-driven conservation programs). UESC has expressed interest in all areas of the project, and will participate in activities as is practical to carry lessons learned to the Bahia.

# Universidade Federal de Alagoas (UFAL)

The Extension department at UFAI has been active in participatory action research of the socioeconomics of artisanal fisheries in the lower São Francisco river for many years, most recently in collaboration with groups at the UFSCar. In the present project they will be intimately involved in the implementation of the project in the upper São Francisco, and subsequently will be responsible for the application of results in the lower river valley. The group also is active in electronic communication media, and, together with members of the UFRJ group, will assist with the coordination of the Communication aspect of the project in Brazil.

# Universidade Federal de Minas Gerais (UFMG) - Faculdade de Medicina

The medicine faculty of UFMG, through Professor Dr. Elza Machado de Melo, has been active for some time in community development and addressing sub-standard living conditions in the upper and middle São Francisco river basin, most recently through a proposed multi-disciplinary program "Elos". This UFMG group will participate in many aspects of the proposed CIDA project, creating linkages with the Elos project as appropriate. They will also assist with the executive coordination of the Cross-cutting theme on education and public awareness.

# UFMG - Centro de Estudos em Mecanismos de Transposiçao de Peixes, Instituto de Ciências Biologicas (ICB), e Laboratorio de Hidráulica

The Biological Sciences Institute of UFMG has been a Brazilian leader in fish research for many years, including activities in basic and applied biology, conservation and fisheries, and, most recently, bio-engineering. UFMG was one of the principal partners in WFT's previous project in Brazil. The university is one of the principal sources of technical expertise for CEMIG and the hydroelectric

industry in general, particularly through Professors Alexander Godinho and Carlos Martinez and Ricardo Junho (MSc) of the Study Center on Fish Passage, recently established with support from the Global Environment Facility, through Fundo Brasileiro para Biodiversidade - FUNBio, and CEMIG. Dr. Evanguedes Kalapathakis, of the ICB, carries out leading-edge genetic research, and has initiated work on fish population genetics, with some assistance from WFT's previous project, that is complementary to the work on fish passages and the effects of dams. These UFMG groups will participate in all appropriate aspects of the project, with Dr. Godinho also assisting in the co-ordination of Sub-Project 3 (Securing the Fisheries Resource).

# Universidade Federal do Rio Grande do Norte (UFRN) - Departamentos de Oceanografia e Limnologia, Biologia Celular e Genetica, Economia e Extensão.

The UFRN, within its various departments, researches local fish fauna, aquaculture, and socioeconomics of resource utilization, as well as striving to translate these activities into benefits for the local communities. UFRN will participate in activities of the project as is practical, with a view towards applying lessons learned to reservoir fisheries and fishing communities in Rio Grande do Norte.

# Universidade Federal de Rio de Janeiro (UFRJ) - Coordenação dos Programas de Pós-Graduação de Engenharia (COPPE)

Representatives of UFRJ in the project are tied to COPPE, which, after pioneering the field of Engineering Science with the blending of basic science and engineering, has built an outstanding reputation in Brazil through its 35-year existence.

Dr. Michel Thiollent, of the Area of Technological Innovation and Industrial Organization, has coordinated projects and supervised master's and doctoral theses on participatory methodology applied to teaching, research and extension, particularly for organizational training of industry, cooperatives, and public entities.

Dr. Mauricio Tolmasquim is the coordinator of the Post-graduate Program for Electrical Planning (PPE), which focusses on the role of studies in energy planning, with particular interest in the impacts of the radical changes induced during the 1970's with the production, transformation and use of energy.

Antonio Marcus Muniz Carneiro, PhD candidate in Culture and Communication, applies modern methods to studies of language and cognition, in particular the emergence of facilitation as a constructive mechanism in socio-technical projects.

#### Universidade Federal de Santa Caterina (UFSC) - Departamento de Aqüicultura

The Aquaculture Department of UFSC, through Professor Evoy Zaniboni, is active in studying and alleviating the effects of hydroelectric development of the Uruguai River, recuperating fish populations in this drainage basin, and developing aquaculture technology and strategies for local communities. A particular interest is in environmentally sound aquaculture practices. Dr. Zaniboni

was one of the key partners in WFT's previous CIDA project in Brazil. This group will participate in all project activities as is practical, with a view towards carrying lessons learned into the Uruguai basin, particularly those associated with studies of fish migration, radiotelemetry, and aquaculture. This group also has considerable aquaculture expertise and valuable lessons from a contrasting river system to contribute to the project evolution.

# UFSC - Departamento de Engenharia Sanitário e Ambiental

Professor Daniel da Silva of this department at UFSC has worked on community development in all of Brazil, being well-known for participatory planning and strategy-building in development. In this project, Dr. Silva will participate in workshops and conferences on participatory development, as well as participating in other parts as appropriate.

# Universidade de Campinas (UNICAMP) - Departamento de Administração e Política de Recursos Minerias (Instituto de Geociências, Campinas)

Dr. Rachel Negrão Cavalcanti and her team are recognized researchers in the area of "Development, Environment and Natural Resources", with special emphasis on managing the use of mineral and water (superficial and subterranean) resources with controlled and minimal environmental impact. The team wishes to learn some of the Canadian technologies for analysing sustainability of water resource use, integrated with geological, social, political, economic, and technical components, to adapt these to the situation of the São Francisco basin. They will collaborate with elabortion of community-based participatory policies and mechanisms for environmental management of the São Francisco, as well as the integration of these with community, governmental, and media activities. Together, these may be a more effective means of reducing environmental impacts of social development of the region.

# Universidade de São Paulo (USP) - Centro de Recursos Hídricos e Ecologia Aplicada (CRHEA)

CRHEA is one of the leaders in Brazil for modelling and implementing water use strategies, with a long and internationally-acclaimed history of integrated approaches to reservoir characterisation and management. Current specialization includes dealing with multiple-user conflicts and environmental education, and has a strong interest in Canadian experiences in this area. This group will participate in water management-related activities of this project, together with the SRH, and will assist in hosting courses and workshops with Canadians.

# Fundação Estadual de Meio Ambiente de Mato Grosso (FEMA-MT)

The Environment Department for the state of Mato Grosso (FEMA-MT) is responsible for making, implementing, and policing environmental policies for the state, including those that target the maintenance of the integrity of aquatic ecosystems and populations of native fish species. Participation in the project will be through the Fish and Fish Culture Section (Coordenadoria de Pesca e Piscicultura), which, through their Programa Pantanal and "Management of Fisheries Resources of the Pantanal" project monitor the reproductive activities of riverine species in the sub-basin of the Rio

Juruena and the Pantanal as well as, through GEF funding, monitoring the collection and sale of life bait.

# **Brazilian Participants (to date)**

### Agência Nacional das Águas (ANA)

ANA is a recently created Brazilian federal corporation with the mandate to implement the new policies created by the Secretaria de Recursos Hídricos. This group is thus in charge of both enforcing policy and in implementing the multiple stake-holder Basin Committees that will develop water use policies for the different river basins of Brazil. As such, ANA is a crucial target for the activities of the project, and they have expressed considerable interest in its activities - particularly those associated with training community groups to better participate in the Basin Committees. We are thus requesting ANA to provide input to these activities and to participate, as far as possible, in activities associated with water policy implementation and education.

### Companhia Energética de Minas Gerais (CEMIG )

CEMIG is the state electrical company for Minas Gerais, currently part owned by AES of the United States. The company operates the dam at Tres Marias, as well as over 30 other hydroelectric installations throughout the state. CEMIG's environmental department is concerned with reducing and mitigating environmental impacts of its operations, and as such is central to this project's efforts to reverse declines of fish populations. The company is also interested in mitigating social effects on fisheries, and is thus very interested in the experiences and technology being transferred, and will participate in these activities.

#### Fundação Biodiversitas

The Fundação Biodiversitas is a primiere non-profit organization in Belo Horizonte, Minas Gerais, working in the area of conservation. This goup has particular skills in public communication and awareness, and was part of WFT's last project in Brazil. They will be involved again in this project in the areas of public awareness and education as possible.

#### Instituto Estadual de Florestas (IEF)

The IEF is the state agency of Minas Gerais responsible for environmental issues, including fisheries and aquatic ecosystems in rivers designated as under state jurisdiction. The institute is active in fisheries management, both for sport and commercial, and has formulated recent fisheries regulations that supplement federal. Recent initiatives also include programs to recuperate seasonal lagoon habitats and to rescue fish trapped in such lagoons. The Institute is thus interested in many aspects of the project as they relate to management issues and environmental recuperation.

#### Núcleo de Pesquisas em Limnologia, Ictiologia e Aqüicultura (Nupelia)

Nupelia is a research center at the State University of Maringá, Parana State, that has produced some of the foremost research on Brazilian freshwater fisheries and reservoir biology - primarily from south-central Brazil, but also in the upper Pantanal. The organization is interested in all aspects of the project, and will participate as is possible, with a view towards carrying lessons learned to other areas of the country.

### Projeto Xingó

The non-profit Xingó Project develops technology that improves the lives of disadvantaged communities of the lower São Francisco River basin, including aquaculture. Currently, the group is carrying out one of the leading projects in artisanal - level fish processing. It recieves funding and technical support from CNPq, CODEVASF, UFAL, and the hydroelectric company CHESF. The Xingó group will participate in this project primarily in the portion of fish processing, including improving their procedures with Canadian input and participating in their transfer to CAP and other parts of the São Francisco River.

# Universidade do Estado do Amazônas (UTAM) - Instituto de Tecnologia da Amazônia - Departamento de Engenharia Florestal

Dra. Elisabete Brocki of the Forest Engineering Department of UTAM works on community organization on resource management for bio-sociodiversity through participatory action research and extension activities. Her experience with people living on the river includes the retrieval of traditional knowledge on fish and their relationship with the environment. In addition, together with the fisheries enforcement group of IBAMA, she works with natural resources and revitalization of communities through habitat improvement: recuperating riverine vegetation, educational material for environmental awareness, and training of community environmental groups.

# Universidade Estadual de São Paulo (UNESP) - Botucatu - Insituto de Biosciências

The fish genetics group at UNESP, lead by Dr. Fausto Foresti, is one of the Brazilian pioneers in this area of investigation, and continues to be one of its principal leaders. The group has also recently taken on modern DNA techniques for studying fish, particularly the effects of stocking on population structure of wild fish and the development of aquaculture strains. Dr. Foresti is particularly interested in making his work relevant at the community level. The group will help host the Canadian DNA experts and associated mini-courses, as well as taking part in other aspects of the project as appropriate.

### **Canadian partners and participants**

### World Fisheries Trust (Co-ordenator)

World Fisheries Trust (WFT) is the lead Canadian partner in this proposal. WFT is a Canadian nonprofit organization that promotes the conservation and sustainable management of global aquatic biodiversity through research, training and public awareness. WFT is neutral and our programs are science-based. They reflect a belief in building linkages between researchers, managers and communities.

WFT works with community groups, researchers, government agencies, international agencies and corporations. WFT staff have a long history of working on fisheries projects in Brazil, and we recently completed a three year project as lead Canadian partner in the CIDA-funded technology transfer project Fish Genetic Conservation – Brazil. That project was highly successful in building linkages between the receivers of fisheries technologies and the various stakeholders affected by them, and laid the groundwork for the present proposal.

#### Calgary Police - Rick Haddow

The Calgary Police force are pioneers in effective community policing in Canada. Starting in 1972, they have built a globally recognized program that integrates policing very effectively with the building and maintenance of community health. While community policing has no distinct department within the police force - being considered an overall "way of doing business" - Rick Haddow is one of its chief proponents on the force and was instrumental in its effective implementation and evolution. He is also a representative on a variety of Community Development boards, and participated in a recent CIDA-funded project in Brazil on police violence. He will bring this expertise and experience to the issue of community policing and community development of fishing communities in our target area. The project will also incorporate key Brazilian police that were involved in the past CIDA project to ensure continuity of the investment already made.

#### University of British Columbia (UBC): Centre for Human Settlements (CHS)

The Centre for Human Settlements is a legacy of the 1976 United Nations Conference on Human Settlements, Habitat I, held in Vancouver. It is a unit within UBC's School of Community and Regional Planning (SCARP), and conducts multidisciplinary research and capacity-building programs related to regional, urban, and community development with faculty and student associates from various departments. In 1990, CHS was named a "Centre of Excellence" in human settlement planning by the Canadian International Development Agency.

Faculty associates are currently undertaking policy-oriented research on gender equity, healthy and sustainable communities, rural-urban linkages, metropolitan governance, disaster preparedness, risk analysis, and participatory planning.

Current major capacity-building projects focus on localized planning for poverty reduction and infrastructure in Vietnam, regional water management in China, watershed management in Brazil and planning school development in Sri Lanka.

Dr. Erika de Castro will be the coordinator of the CHS participation in the currently proposed project. Erika is a native Brazilian and is also working on the CIDA-sponsored CHS project on community development and watershed management in Brazil near São Paulo. Experience and ties to this other project will be brought to bear on the present project to enhance its success and to build on previous CIDA investment in the country.

### University of Victoria (UVic) - Institute for Dispute Resolution (IDR)

The Institute for Dispute Resolution (IDR) at the University of Victoria, British Columbia, is an interdisciplinary centre focused on effective dispute resolution and alternative dispute resolution (ADR) theory and practice. Since its inception in 1989, the Institute for Dispute Resolution (IDR) has participated in a number of international projects, including work in Thailand, Cambodia, the Philippines, Cuba and South Africa.

**Maureen Maloney** is the director of the Institute for Dispute Resolution and the Lam Professor of Law and Public Policy at the University of Victoria. Prior to this she was the Deputy Minister (1993 to 2000) and Deputy Attorney General of the Province of British Columbia (1997 to 2000) and the Dean of Law at UVic. She has considerable experience in conflict resolution and governance building both in Canada and internationally. She has been involved in conflict resolution and human rights projects in South Africa, China, Guatemala, Cambodia and Brazil. She has also considerable experience in Canada working in environmental, fishing and treaty conflicts and has worked in particular with First Nations Bands and Associations of Canada. She is a board member of the Canadian Human Rights Foundation and the International Centre for Criminal Law Reform and Criminal Justice Policy (United Nations Affiliated) and a member of the International Advisory Committee for the Centre for Global Studies.

Alex Grzybowski, M.A., provides mediation, facilitation and process design services to assist in the resolution of multi-party disputes in the public and private sectors. Mr. Grzybowski has extensive experience dealing with land use and related resource and environmental conflicts in Canada and internationally. In Canada, he has designed and mediated negotiation processes relating to forestry, tourism, agriculture, mining, fisheries, private land management, water, environmental conservation and indigenous peoples' rights. Internationally, Mr. Grzybowski has participated in a wide range of conflict management projects focused on institutional development and capacity building as well facilitating negotiations of specific disputes. Mr. Grzybowski is routinely retained to assist with the management of large scale and highly controversial land use conflicts by mediating negotiations, training negotiators and facilitating strategic planning for dispute prevention. Mr. Grzybowski is an Associate of the University of Victoria Institute for Dispute Resolution and the Sustainable Development Research Institute at UBC.

Both Maureen and Alex have been involved in Brazil in the past, and will bring their experiences to bear on the current project.

# Department of Fisheries and Oceans (DFO) - Pacific Biological Station (Dr. Chris Wood)

The Pacific Biological Station conducts research on fish physiology, conservation, migration and management. Chris Wood is currently the head of Biodiversity Programs for DFO in Western Canada, and was one of the principal authors of DFO's Wild Salmon Policy. He is an internationally-recognised expert on the application of genetic information to fisheries management problems and designing appropriate stock recuperation strategies. Chris was a participant in our previous project, and will continue to provide expertise on biodiversity aspects of fisheries management in Brazil, both by hosting Brazilian trainees and through technical visits and training workshops in Brazil.

# **DFO - Community Policing and Guardian Program**

DFO integrates community policing with enforcing duties on an informal basis that varies region to region, but is thus locally adapted. In addition, Guardian Programs with indigenous and community groups have created community "enforcement" teams in some parts of the country. The Western (Pacific) region of Canada contains a variety of examples of these approaches to fisheries enforcement, including several that are closely linked to evolving community co-management agreements. Chris Dragseth (Director of Conservation and Protection - Western Region) and Don Radford (Director of Resource Management - Western Region) both have extensive experience in the field and in policy development associated with these community policing and co-management developments. Don also has Brazilian experience. Chris and Don will participate in the project through hosting Brazilian trainees in both policing and co-management (including field experience in a variety of communities) and by assisting in the development of appropriate strategies and training programs in Brazil. This group also has an interest in developing long-term ties with Brazil for exchanges on fisheries enforcement.

# Fikret Berkes, University of Manitoba, Natural Resources Institute

Dr. Berkes has considerable Canadian and international expertise in evaluating, monitoring, and helping set up fisheries co-management programs, as well as incorporating traditional knowledge into management strategies. He has authored, co-authored, and edited several books and many papers on the topic in the last few years alone, and regularly carries out review missions of Ford Foundation fisheries projects. Dr. Berkes will carry out a review of Brazilian freshwater fisheries to suggest strategies on how to best build co-management with target communities if needed. Dr. Berkes may also participate in co-management workshops associated with this visit and contribute to the co-management conference.

# LGL Environmental Associates Ltd.

LGL Environmental Associates is one of Canada's largest environmental consulting companies. The office in Sidney, BC, under the leadership of Karl English, specializes in fisheries biology and management, including the development and implementation of fisheries co-management systems for First Nations in B.C. and the development of fisheries and watershed recovery plans. Karl collaborated with WFT in the previous Brazil project to present a radiotelemetry application review at

a conference, present a highly successful radiotagging workshop, advise Brazilian partners on project design, and by hosting Brazilian trainee – all with donated time. He is also currently a co-advisor on a Brazilian fish radiotelemetry thesis. LGL will again provide expertise to the current project, particularly to the areas of radiotagging, stock assessment, fisheries management, and watershed recovery plans.

#### SeaStar Biotech – Dr. John Nelson

SeaStar Biotech is a Victoria company specializing in the application of DNA techniques to fisheries research and management. A particular expertise is the development and application of micro-satellite DNA probes - a relatively recent innovation that is showing the greatest promise for use in assessment of fish populations. Seastar Biotech was also a partner in WFT's previous Brazil project, and will build on this experience in the present project with both the hosting of Brazilian trainees in Canada and technical visits and training courses in Brazil. For this project, Dr. John Nelson will spend a period of 3 months in Brazil at several fish genetics laboratories to assist in the implementation of DNA technologies and to deliver mini-courses on this topic. Seastar will also host Brazilian interns in Canada.

### **BC Hydro and Power Corporation (BC Hydro)**

BC Hydro is a crown corporation with technical and management expertise that has already been utilized in the previous project. The corporation has also collaborated directly with CIDA on a project providing electrical conservation technology to Brazil. Daryl Fields is the company's Manager of Executive Operations, with pioneering experience in non-monetary evaluation of environmental and social hydroelectric impacts and the development of socially and environmentally responsible industry policy. Daryl provided some input to WFT's previous project, and will build on this experience to provide training and input on industrial policy development. BC Hydro also possesses considerable practical experience in fish-friendly dam operation and water-use plans, and will also contribute this expertise to the new project, both through technical visits to Brazil and by hosting Brazilian trainees.

# Imagecraft Studio, Victoria, B.C.

Imagecraft Studio is a Victoria design company that has produced all of WFT's public awareness materials since 1995, including an award-winning "Peixes de Piracema" folder during the previous WFT-Brasil project. The proprietor, Ken Campbell, has a degree in public relations, which he also currently instructs at the college level. Imagecraft will have an expanded role in the present project that includes participation in workshops on building awareness strategies as well as public awareness and educational tools for communities in Brazil.

#### Marine Institute - St. John's, Newfoundland

The Marine Institute, an autonomous part of Memorial University in St. John's Newfoundland, is a world leader in development of and training for value added fisheries products, fish processing, and marketing, with experience at both the artesanal and highly industrialized levels. They will host

Brazilian trainees in St. John's as well as conduct technical training missions to Brazil to help design processing facilities and develop training material for use by extensionists.

### Vancouver Aquarium, Vancouver, B.C.

The Vancouver Aquarium is Canada's premier aquatic science information and awareness institution and a frequent collaborator with WFT on research and awareness projects. The Aquarium has worldrenowned expertise in tropical aquarium technology and design, management of public aquaria, and conservation education - particularly in assessing effectiveness of conservation training in different cultures. They will present workshops on the establishment of aquaria of different levels of investment in Brazil, and help develop appropriate strategies for developing this type of public awareness. In addition, they will be key participants in the workshops on developing appropriate educational tools in Brazil and will use project inputs to promote Brazilian fisheries issues in their renovated Tropical Gallery.

#### WestWind SeaLab Supplies, Watership Foundation, and DFO -Communications

This triad of a private company, an NGO, and government participate in delivering fisheries training programs to local schools in Canada – in particularly, with WestWind, using in-class aquaria as very effective educational tools. Cathy Carolsfeld, manager at WestWind, has also lived in Brazil, and is very familiar with its language and culture. This group will be used as a consultative resource for developing fisheries-related educational material for Brazil.

#### **Communities:**

A number of communities and co-management organizations from the Canadian west coast and arctic will be called on to participate in showing co-management realities in Canada to Brazilian community visitors and to build inter-community linkages. These include: Nisga'a Tribal Council, Regional Aquatic Management Society (RAMS), and the Inuvialuit Co-management Council (Inuvik).

# **Appendix 3: Gender & Social analysis**

Conclusions of Report Prepared for World Fisheries Trust By Karen Craggs, Gender Equality Incorporated, November 19, 2001<sup>11</sup>

# **Conclusions & recommendations**

# A) Conclusions on implications of declining fisheries for division of labour, gender roles, and power relations

This report has examined the socio-economic conditions, and the division of labour, gender roles and power relations within the fishing community in Três Marias. It has demonstrated the diverse implications of declining fisheries for gender, youth and the family and evaluated the results of the Project Proposal in relation to gender, youth and family considerations. The conclusion links gender, youth and family considerations that the project could explore. The recommendations that follow are more specific, offering examples of appropriate activities.

#### 1) The Relationship with Brazilian Authorities

Fisheries legislation has had a significant impact on the fishing communities. Interviews with local fishermen and their wives indicated that many of them perceived the local legislation as a source of conflict for their livelihood. There is therefore a need to facilitate a community understanding of the Brazilian legislation in order to cultivate a more informed citizenship. There has to be a link between the interests of the local community and the legislation, if they are expected to respect it.

As pointed out by Maria Beatriz Boschi, a biologist representing IBAMA, political will is being translated in both legislation and government structures that aim to include fishermen's input into the legislation process in an effort to be more responsive towards their realities. However, the benefits of this consultative process remain long term objectives. The need to address the awareness gap between legislation makers and local communities is very pressing.

On a positive note, the objectives of the project proposal for Participatory Conservation and Management for Inland Fisheries in Brazil apply directly to the local legislation. Article 5 of the State Law for Fishing in Minas Gerais supports sustainable development characterized by ecological prudence, social equality and economic proficiency and supports the promotion of socio–economic and cultural development of fishermen and their families. Therefore, the project has already identified a legal base on which to build social equity and sustainability.

<sup>&</sup>lt;sup>11</sup> Full report available from WFT

There is considerable political will backing the aims of this project. This was demonstrated by the Mayor who has recently set up a council for women as a forum for giving women in the community a voice and an opportunity to have their concerns integrated eventually into legislation and practice. The gap between legislation, political infrastructure and the local community needs to be addressed if the goal of strengthening the links between civil society and the government is to be achieved.

### 2) The Family Structure

The examination of women's roles in fisheries reveals that although women are actively involved in this field, the division of labour reflects the local attitudes on gender roles. Fishing is traditionally perceived as a man's job whereas complimentary activities related to fishing such as making nets, cleaning fish, preparing to sell them are considered as petty and therefore woman chores. There are good indications, however that the difficulties related to life in the fisheries has actually catalyzed changes in division of labour thereby having a more positive impact on gender roles.

In other words, the more desperate a family's situation becomes due to bad fishing returns, the more willing the husband is to allow his wife to participate and help either by joining him on the river or by allowing her to find alternative employment. This is demonstrated by the different attitudes towards women and their work in low productivity areas, such as Pirapora, as compared to higher productivity areas such as Três Marias.

... The difficulties related to fishing seem to contribute towards the disintegration of 'traditional' oppressive gender roles. This is of particular significance to the project because it is opportunity to work with the momentum of the events occurring rather than having to impose something.

# 3) The Role of Religion

The role of religion and the family is significant as a source of strength and support for the fishing community. This has to be acknowledged through activities that do not impact the family structure negatively. Since the project must work within the social realities of the Brazilian context, activities need to be accessible and open to family participation as much as possible in order to facilitate inclusiveness and involvement of family members. In the long run, such an approach would curtail further resistance against women's empowerment and change in social relations. Considering the issues and concerns raised by community members and partners alike during this analysis, the most appropriate approach would be a balanced integration of gender equality measures with overall community participation.

#### 4) The Role of Education

There are indications of an overall consensus in Três Marias that fishing holds very little future for the youth and that education is their only hope for a better future. It would be very important to support educational advancement in this community for youth as well as considering what kind of education might be useful or relevant for their parents. Educational activities related to youth may include tours of the aquaculture centre and dams, development of a school program or seminar on life in the fisheries or the use of cartoons and "fun" educational material to introduce awareness about the project's goals and purpose.

Education for women and family would best be related to health, for instance, learning about basic survival skills, or diseases that are related to the lifestyle by the river that can be avoided through precautionary measures as basic sanitation and dietary information is lacking. This possibility would bring value added living to the community as basic sanitation and dietary information is lacking. The Secretary for the Ministry of Social Promotion indicated that such topics have already been developed into workshops and seminars that are available to the local communities. Therefore, perhaps one of the project activities could be focused on promotional awareness of these programmes and how they can address some of the difficulties faced by life in the fisheries.

# **B)** Conclusions on gender analysis of project proposal

# 1) Integration and Understanding of Gender Equality

Promotion of women's empowerment and active participation is essential in the context of the project and the community. It is not enough for women to rely on God's will and the husband's permission for conditions are to improve. Activities should reinforce the will and capacity of women to be more involved in decision-making processes within the project and also within the community at large. This can be achieved at project level through measures already outlined in the proposal, including the provision and promotion of training opportunities and access to internship positions for women.

It is also important to be aware of the fact that merely allocating a quota of women in the project activities does not facilitate meaningful integration of gender considerations in the long run. Activities that cultivate a sense of ownership, participation, dialogue, collaboration, and citizenship are the only means of achieving true social equality and sustainability.

To achieve this (even as an unplanned result of the project) will require identification of already existing local resources and infrastructure. These would include local associations, or women's groups, or NGOs that promote awareness or entrepreneurial training and networking with local authorities to tap into existing resources set aside for exactly this purpose. Canadian partners could facilitate this process of establishing connections amongst the different local partners and resources because Canadian involvement would generate a high level of interest, commitment and response from Brazilian organisations and partnerships.

# 2) Gender Equality Methodology

Gender equality is identified within the Project Proposal document as a cross cutting theme and the results of the project aim to 'improve sustainable returns of the fishery resource to the poor of the fishing communities in a gender and family sensitive manner.'<sup>12</sup>

There is significant opportunity and potential for integrating and addressing gender equality through project activities. This can be achieved through 1) Gender Mainstreaming of the project and its activities. 2) Promoting gender equality by creating components of the project that focus on women's specific needs.

<sup>&</sup>lt;sup>12</sup> Executive Summary, Brazil Inland Fisheries: Participatory Management & Conservation, WFT & UFSCar, 2001.

One way of ensuring that gender is mainstreamed into the project is by implementing a gender equality methodology throughout the project. A clear and effective gender methodology would also serve to meet the project long-term goal of developing components with transferable methodologies.

The gender methodology for this project should be based on the following 3 steps;

- Identification of roles, needs, and priorities of women,
- Considering the different potential impacts of project activities on women, and children,
- Integration of specific gender equality practices as determined by the needs and context of each community.

Identification of specific gender equality activities must be determined in consultation and partnership of the community. The Council for Women is a good example of a forum for raising concerns that need to be addressed within the community, in relation to the fisheries. Other methods of participation may include community meetings or representation of women and youth representatives at project meetings.

The results of this gender and social analysis provide a clearer understanding of the socio-economic situation of fisheries in Três Marias. The report provides an analysis of the implications of declining fisheries on gender, youth and the family. The gender and social analysis reveals that there is a genuine need to prioritise and integrate gender, family and youth concerns into the project and that doing so will benefit the whole community in the process. The analysis demonstrates that there is significant interest and support generated within the community and amongst local authorities, government agencies and partners.

A number of existing resources and infrastructure have been identified during the course of the analysis. Existing infrastructure should be used as a resource wherever possible throughout the project. Political will has been transformed into meaningful infrastructure such as the Council for Women in Municipal Government of Três Marias. These are all independent signs of progress within the community and they should be integrated into the project plans and activities. The challenge for both Brazilian and Canadian partners alike will be to enable the community to determine what their needs and priorities are and to facilitate the progress desired rather than using an imposed approach.

# C) Recommendations

This report provides recommendations drawn from the results of the gender and social analysis. The recommendations provide a framework for a gender strategy. The gender strategy that will serve to increase awareness of gender equality; incorporate women's needs, priorities and interests into the project; and the capacity of women, and youth to participate effectively in the project.

The recommendations also take into consideration the results already achieved and propose directions that could be integrated into the project. Since the project is still at planning stage, the scope and objective for this project, in terms of the gender, youth and family goals needs to be clearly defined in consultation with the community and all partners. While gender, youth and the family have been

identified as cross cutting in the project, it is absolutely imperative that the different realities and needs of women, and youth are taken into account and addressed individually as well as through integration into the project activities.

Please note that the following recommendations can be integrated at several levels within the project; Project Level, Community Level, Municipal Level, Regional Level and so on.

### GENDER

Focus on:	Public Awareness.
Recommendation:	Promote the awareness and recognition of women's roles in fisheries.
Possible Activities:	Produce and promote the dissemination of a paper on women's roles in fisheries, promote simple exercises such as looking at the breakdown of a man's or woman's 24 hour day to see what activites they carry out and examine the division of labour.
Focus on:	Capacity Building.
Recommendation:	Promote, support and engage women to organise and participate actively.
Possible Activities:	Incorporate, wherever relevant, the use of workshops and training seminars that build long term skills such as forming and managing associations, collectives, as well as addressing basic issues such as education in health and nutrition.
Focus on:	RBM Planning.
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Recommendation:	Develop a gender strategy based on RBM methodologies.
Possible Activities:	Collect gender disaggregated data, determine gender specific goals, develop gender sensitive indicators, monitoring and evaluation components.

### YOUTH & FAMILY

#### Focus on: Education,

**Recommendation:** Support & integrate educational opportunities for youth.

**Possible Activities:** Internships, quotas of enrolment.

Focus on:	Participation,
<b>Recommendation:</b>	Promote the active participation of women and youth in the project,
Possible Activities:	Identify youth & women representatives who attend all project meetings.
Focus on:	Human Rights & Violence,
Recommendation:	Establish and support mechanisms that protect fishermen and their families from violence as well as targetting reduction of violence through dialogue,
Possible Activities:	Dialogue between fishermen and local authorities, awareness promotion.

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### **PROJECT PROPOSAL**

Focus on:	Comprehension of Gender Equality,
Recommendation:	Create a consensus on gender equality and gender equality goals,
Possible Activities:	Gender Equality Workshop for all project participants.

Focus on:	Networking,
Recommendation:	Promote and strengthen multi-level and diverse networks that connect local resources & organisations, government agencies together,
Possible Activities:	Visit NGOs, Promote visits to Três Marias.

Focus on: Building on Infrastructure,

Recommendation:	Identify, support and include roles models and their initiatives in the project activities.
Possible Activities:	Promote awareness and participation of the Council for Women and locally organized workshops, e.g. on self esteem, entrepreneurial skills, health.

It should be noted that some of these recommendations have already been identified and integrated into the project proposal plan, but more specific activities need to be identified and developed within the context and objectives of the project.

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