

Project Description

**UPCD Tier 2 Project Number: S61268-669
(2007-2013)**

Water Management in Bolivia



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LIST OF ACRONYMS

ALHSUD	Latin American Association of Groundwater Hydrologists for Development
AUCC	Association of Universities and Colleges of Canada
Cap-Net	United Nations Environment Program; Network for Capacity Building in Integrated Water Resource Management
CIDA	Canadian International Development Agency
CIMAR	Centre for Research and Management of Renewable Resources
CIRA/UAEM	Inter-American Water Centre/Autonomous University of the State of Mexico
f/m	females/males
GoB	Government of Bolivia
GWA	Gender and Water Alliance
IC	University of Calgary International Centre
IDRC	International Development Research Centre (Canada)
JICA	Japanese International Development Agency
LAWet-Net	Latin American Network for Capacity Building in Integrated Water Resource Management
NGO	Non Governmental Organization
OLADE	Organización Latino Americana de Energía
PRODASUB	Groundwater Development Program (JICA)
PRSP	Bolivian Poverty Reduction Strategy Paper
SERGEOTECMIN	Bolivian National Geology and Mining Technology Service
UAGRM	Autónomos University Gabriel René Moreno (Santa Cruz, Bolivia)
IAH	International Association of Hydrogeologists
UC	University of Calgary
UAJMS	Autónomos University Juan Misael Saracho (Tarija, Bolivia)
UAP	Amazon University of Pando (Cobija, Bolivia)
UATF	Autónomos University Tomás Frias (Potosí, Bolivia)
UES	University of El Salvador
UCR	University of Costa Rica
UMSA	University Mayor of San Andrés (La Paz, Bolivia)
UMSS	University Mayor of San Simón (Cochabamba, Bolivia)
UNAH	National Autonomous University of Honduras
UNAM	National Autonomous University of Mexico
UNAN	National Autonomous University of Nicaragua
USAC	University of San Carlos, Guatemala
USFX	Universidad Mayor, Real y Pontificia de San Francisco Xavier de Chuquisaca
UTB	Technical University of Beni (Trinidad, Bolivia)
UTO	Technical University of Oruro (Oruro, Bolivia)
UW	University of Waterloo
VAGGF	Office of the Vice-Minister for Gender, General Affairs, and Family

I. PROJECT RATIONALE AND DEVELOPMENT PROBLEM ADDRESSED

With a Gross National Income of US \$890 (2003) per capita, Bolivia is ranked 114th of 177 countries according to the United Nations Human Development Index (2002). Currently, 60% of Bolivia's approximately 10 million inhabitants live in urban centers (>10,000 people) and the remaining 40% live in small towns, communities or rural farms in often very harsh climates. According to the latest data, only 66% of Bolivians have access to adequate sanitation and even fewer, 55%, have access to improved (potable) water sources. Only 32% of the poorest 20% of the Bolivian population have piped water supply, compared to 93% for the richest 20%. And in rural areas, only 27% of the bottom 20% has access to piped water. Water and sanitation is a major priority for the GoB. The water and sanitation sector has the second largest share of public investment after roads. The GoB is making significant progress in the sector but rural coverage rates remain far too low, service delivery is fragmented, coordination and information systems in the sector are poor by Bolivian standards. For the vast majority of municipalities, this is a new jurisdictional field in which they lack technical and management expertise. For these reasons, there is considerable room for improvement and positive returns to be realized from supporting capacity-building and the rationalization of the institutional arrangements in the sector.

A distinct annual dry season affects 40% of Bolivia's land area and leads to water shortages that can last for over six months each year. There are significant water resources in the eastern lowlands but only about 1% of their potential has been tapped. Only 10% of the total cultivated land area is currently being irrigated representing a significant under-utilization of available water resources. Water pollution is evident near large populations, mining areas, agricultural areas and industrial areas and stems primarily from inadequate municipal wastewater treatment and poorly regulated mining, manufacturing and agricultural industries. An estimated 41% of the surface area of the country is in the process of desertification due to a combination of climate change and unsustainable land-use practices (e.g. urbanization, agriculture, deforestation). Bolivia's PRSP acknowledges that the availability of safe drinking water is critical to children's health and can help to reduce infant mortality and illness rates and recommends a *National Water Resource Plan*.

Bolivia has attracted global attention due the problems associated with water privatization, which was implemented in 1997 (in La Paz/El Alto) and in 1999 (in Cochabamba), in response to pressure from the World Bank, Inter-American Development Bank and the International Monetary Fund. A *Water and Sanitation Law* was approved which granted concessions to private water companies such as water tariffs indexed to the U.S. dollar, a 40-year monopoly and the prohibition of alternative water services. The impact of these measures on lower-income Bolivians was tremendous and often violent protests erupted leading to what has been called the Bolivian "water war". These protests first erupted in Cochabamba and then later in La Paz/El Alto and have led to the gradual termination of water concession contracts, a process that is still ongoing today.

II. LINK BETWEEN THE PROJECT AND BOLIVIA'S NATIONAL DEVELOPMENT PRIORITIES

The new government of Evo Morales created a new Ministry of Water in February, 2006, which has three vice-ministries: a) Basic Services, b) Irrigation and c) Watersheds and Water Resources. The latter has three sub-units (watersheds/water resources, water quality and international waters) and three priority programs (Development of a National Water Resource Strategy, a National Watershed Plan and a National Desertification Plan). The new government has prioritized water as a human right and will focus on both the poorer rural indigenous communities as well as the more affluent urban communities.

Clearly privatized water concessions are not part of the new government’s agenda and water supply that is affordable to the poor of Bolivia is to be given high priority.

Groundwater is a very important water resource for Bolivia yet under-utilized, poorly mapped and poorly protected. Groundwater currently supplies (from wells and springs) potable water to about 70% of the country’s inhabitants, most of whom live in rural areas and small communities. 100% of the City of Santa Cruz, 80% of the city of El Alto and about 50% of the City of Cochabamba are supplied by groundwater. The following table was prepared based on information collected in preparation of the proposal and summarizes the groundwater dependence in Bolivia for potable water supply:

City	Population ¹	% dependent on GW ²	Population dependent on GW
Santa Cruz	1,397,700	100%	1,397,700
La Paz	835,200	10%	83,520
El Alto	827,200	80%	661,760
Cochabamba	586,800	50%	293,400
Sucre	247,300	40%	98,920
Oruro	216,600	50%	108,300
Tarija	170,900	40%	68,360
Potosi	149,200	30%	44,760
Trinidad	86,400	20%	17,280
Cobija	32,200	15%	4,830
Total Urban:	4,549,500	61%	2,778,830
Total Rural:	5,077,800	80% ³	4,062,240
TOTAL:	9,627,300	71%	6,841,070

¹Population statistics from the National Statistics Institute, Republic of Bolivia, 2006; ²groundwater dependence statistics from the Department of Hydrogeology, SERGEOTECMIN; ³Rural % dependent on groundwater is estimated based on experience in rural areas in other developing countries.

The Department of Chuquisaca (including the City of Sucre) has become increasingly dry in recent years and surface waters are unable to provide sufficient quantities of water supply. Thus Sucre is looking at other solutions including potential groundwater resources. Aquifers represent an integral part of the aquatic ecosystem for many areas of Bolivia and provide important year-round discharge into creeks, rivers, lakes and wetlands. It is expected that groundwater will become an increasingly important resource for Bolivians in the next decades. The only government hydrogeology department is located within SERGEOTECMIN which has recently defined the following priority hydrogeology projects:

- Capture of Groundwater in Mojo and Moraya
- Control and Protection of Aquifers in Cochabamba
- Development of Groundwater Resources
- Participative Collection of Hydrogeologic Information in the Altiplano
- Hydrogeologic Information System of Bolivia “SIHIBO”
- Groundwater Potential in the Central Altiplano through Geophysical Exploration and Hydrogeology.
- Classification of Water Bodies in the Department of Santa Cruz
- Classification of Water Bodies in the Mapiri-Tipuani Watershed

The GoB is currently working on a presidential decree that would require all water wells drilled in Bolivia be registered with the GoB. According to the draft decree, water well drillers are to be properly

trained and drilling information would be collected according to a standardized format and entered into a water well database. The decree is an excellent step for Bolivian water resource management; however, the GoB will require considerable hydrogeologic assistance (to design the database and train drillers) for such a decree to be effective.

Despite the very high importance of groundwater in Bolivia, there are currently no M.Sc.-level trained hydrogeologists in the country. It is accepted worldwide that M.Sc.-level training in hydrogeology is necessary to conduct the studies necessary for optimum groundwater utilization and protection. Groundwater is extremely difficult to study and interpret in comparison to surface water resources and requires knowledge of geology, chemistry, physics, biology and engineering. SERGEOTECMIN currently employs only two hydrogeologists (both male) and both of them have less than 6 months of formal hydrogeology training. Another 5-10 hydrogeologists (all male) work in the Bolivian private sector but they also have only short-term or on-the-job training. Bolivia's current hydrogeologic expertise lies mainly in the area of well drilling, construction and pumping, however, the complex needs of Bolivia (like all countries) require expertise in more complex areas such as aquifer yield evaluation, groundwater quality assessment/monitoring, groundwater contamination, groundwater recharge area identification/protection, evaluation of competing groundwater demands (e.g. private vs. public wells and irrigation vs. potable water wells) and the impact of climatic change on aquifers.

III. PROJECT DIRECTORS AND CONTACT INFORMATION

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IV. KEY PROJECT PARTICIPANTS AND THEIR RESPECTIVE ROLES

UC:

- Mr. David Bethune – Faculty of Science/International Centre (IC); hydrogeology/water resource management; UPCD project management, project co-director/technical advisor/course instructor/research supervisor.
- Mr. Brendan Mulligan – Faculty of Science, hydrogeology; instructor/research coordinator based in Sucre.
- Dr. Cathryn Ryan – Geology & Geophysics; hydrogeology, water quality impacts; senior technical advisor/instructor/research supervisor.
- Dr. Laurence Bentley – Geology & Geophysics; hydrogeology; technical advisor/course instructor/research supervisor.
- Mr. David Nuell – Geography, field methods/GIS in water resource management, course instructor.
- Dr. Ted Horbulyk – Economics; environmental economics, technical advisor/research supervisor.
- Dr. Maureen Wilson – Social Work; participatory development/gender; technical advisor/course instructor/research supervisor.
- Dr. Lorne Jaques – IC; UPCD projects, participatory development; senior project oversight, participatory development instructor.
- Dr. Eric Dillmann – IC; UPCD projects, community health, senior project oversight.

- Ms. Gloria Eslinger – IC; financial management, senior management and oversight/financial trainer.
- Ms. Anayancy Solis – IC; project procurement, financial training in Spanish.
- Ms. Brianna Ball, project administrative assistant.

USFX:

- Mr. Normando Guzmán Bedoya – Faculty of Technology; project co-director/surface water hydrology/ project co-director/technical advisor/course instructor/research supervisor.
- Mr. Héctor Tezanos Pinto – Faculty of Technology; surface water hydrology/course instructor/research supervisor.
- Dr. Zully Moreno de Landivar – Faculty of Education, gender and water issues/course instructor/research supervisor.

V. PROJECT IMPLEMENTATION METHODOLOGY AND KEY ACTIVITIES

The project activities are divided into the following six components (a.k.a. work breakdown structure):

- 1000 M.Sc. Programs at USFX
- 2000 Continuing Education
- 3000 Policy Strengthening
- 4000 Creation of Bolivian University Water Network
- 5000 Development Education
- 6000 Management and Administration
- 7000 Monitoring and Evaluation

The activities for each component are described below and the timing of their implementation is shown in the Activity Implementation Plan following.

DESCRIPTION OF ACTIVITIES
<p>1000 M.Sc. Program at USFX</p> <ul style="list-style-type: none"> • <i><u>Stakeholder Consultation:</u></i> USFX and UC conducted a substantial stakeholder consultation for the 1000, 2000 and 3000 activities as part of the full proposal preparation. Stakeholder consultation, however, is an ongoing process whereby USFX develops and maintains a relationship and communication with key stakeholders and consults either formally or informally with them during the project as necessary. • <i><u>Capacity Needs Assessment:</u></i> As part of the full proposal preparation, USFX conducted an internal appraisal of their current capacity and the required new capacity to properly deliver the project (i.e. M.Sc. programs, continuing education, policy strengthening and water network building). The appraisal involved a full review of existing faculty and support personnel, administrative facilities, curricula, research programs, teaching facilities, laboratory facilities, computer facilities, internet services, field equipment and vehicles. The Capacity Needs Assessment will be finalized in the first quarter of the project and the results presented to the Project Steering Committee and AUCC. • <i><u>Curricula Design/Strengthening:</u></i> The UFSX M.Sc. program will be strengthened in the areas of hydrogeology, water quality/contamination, gender issues in the water sector, community participation and the holistic application of integrated water resource management. All new curricula will be formally approved by USFX and incorporated into the M.Sc. program pensum. • <i><u>Recruitment and Training of USFX Professors:</u></i> This activity will focus on the training of professors in hydrogeology but will also include other related water resource management themes. Two female Bolivians will attend the UC M.Sc. Hydrogeology program and then return to USFX to be hired as full-time professors to help deliver the USFX M.Sc. program. USFX will thus create new permanent faculty positions for the Canadian trainees. The new female faculty will be very important mentors/role models to attract female students to the M.Sc.

program and subsequently support them as students. USFX professors will also have opportunities for training by attending the projects' Continuing Education short courses.

- Procurement of Books and Equipment for USFX M.Sc. program: USFX will procure academic books (e.g. hydrogeology textbooks), documents, computer software, laboratory equipment and field equipment (e.g. water samplers, field chemistry kits, rain gauges) as necessary for their M.Sc. programs. Laboratory equipment will be for the USFX water quality laboratory which, despite being one of the best laboratories in Bolivia, is in great need of updating. Procurement will take place mostly in Year 1 and 2 to ensure the equipment is in place for the M.Sc. program.
- Student Recruitment and Selection: This is a very key activity as students must be academically qualified and highly committed. USFX will begin student recruitment immediately in Year 1 and ensure students are selected well in advance of the beginning of the first M.Sc. program cycle (by Year 3). Some students may require a course or two of academic preparation for the M.Sc. program. Female applicants will be strongly encouraged to apply to the M.Sc. program by training female faculty (see above) who will be role models/mentors and specifically promoting the program to female graduates of science and engineering programs.
- USFX M.Sc. Program Delivery: USFX will begin to deliver a strengthened M.Sc. program in the first months of the project and will fund students from the second cycle of the USFX M.Sc. program (note the first cycle concludes in early 2007). USFX will deliver 2 full two-year M.Sc. program cycles during the project. Each cycle will fund about 12 students (50% female) thus a total of about 24 M.Sc. students will be funded over the project. Student fellowships will cover tuition, monthly living stipend, books, etc). Students will be required to dedicate themselves full-time to the program to ensure a high academic standard is achieved. UC will provide a Canadian hydrogeology instructor for the first four years of the project to assist USFX deliver its new strengthened/expanded M.Sc. program while its future professors are being trained in the UC M.Sc. (hydrogeology) program. (See Recruitment and Training of USFX Professors.)
- Community-Based Research Projects for USFX faculty and M.Sc. students: All USFX M.Sc. students will be required to do applied thesis projects, which are very important hands-on learning experiences for the students. The thesis will be community-based to ensure the students are working very closely with key stakeholders. Prior to the field-work phase of the projects (end of year 1 of M.Sc. program) the students will be given courses in technical field methods such as water sampling and field analysis (e.g. electrical conductivity, salinity, dissolved oxygen, pH, Eh), monitoring well construction, stream gauging, climatic data collection, as well as the social (gender-sensitivity and community development) research skills. Students will also receive seminars introducing them to the theory and methods of scientific (yet applied) research. Students will be taught how to be objective, collect good data and ensure their research is directly relevant to the needs of Bolivia. In addition, a small fund will be set-up at USFX to which professors may apply for financial support to conduct applied water research projects to promote the practice of faculty-led research at USFX.

2000 Continuing Education

- Curricula Design and USFX Approval: The continuing education short courses and workshops will be directed toward municipal-level water technicians and district/national government water sector professionals. The program will be designed and approved in Year 1 and delivery will begin in Year 2. The curricula will cover topics including integrated water resource management, water treatment systems, rural water supply and sanitation, municipal wellhead protection, irrigation methods and water well construction, water quality/contamination, gender and community development.
- Instructor Recruitment: Instructors will be recruited from USFX, UC, the new Bolivian University Water Network, the CARA Network or any other organization according the needs of each course. All instructor expenses will be covered; however, honorariums will not be paid to any instructors. USFX instructors will be gradually trained during the project to deliver the continuing education program independently on an ongoing basis after the project.
- Program Delivery: The Continuing Education program will begin with one course in Year 1 and at least 3 courses per year for Years 2-6 of the project. M.Sc. students will attend all continuing education courses as part of their M.Sc. program (i.e. for academic credit) while technicians/ professionals will receive a certificate for attendance. In addition to the M.Sc. students, about 20-30 professionals and technicians (female and male) each course will benefit from this program. Course themes will include (but not be limited to) themes such as gender-sensitivity in water projects (see below), community participation in water projects (see below), water well construction, water quality monitoring, low cost water treatment/sanitation, source water protection and watershed management.

- Gender-Sensitivity Training for USFX faculty and M.Sc. students: Gender-sensitivity training will be for all professors and students involved in the USFX M.Sc. program. Gender-sensitivity training will be conducted in collaboration with the Gender Water Alliance (GWA), which has already delivered Spanish-language gender/water courses in the region. GWA instructors will team up with USFX professors (i.e. training of trainers) to ensure USFX is able to deliver the courses on an ongoing basis within their M.Sc. and Continuing Education program.
- Community-Development Training for USFX faculty and M.Sc. students: All USFX M.Sc. students (and professors) will be trained in participatory field methodologies and required to conduct fieldwork in a rural or urban community or municipality, collect good field data, and work directly with key stakeholders applying a participatory approach.

3000 Policy Strengthening

- National Policy Fora: USFX and UC will deliver a national policy forum near the end of Year 1 of the project. The purpose of the forum will be to identify critical policy needs for water resource management in each country. All key stakeholders (public and private sector) will be invited to participate. The fora will produce clear action plans defining a clear supportive role for USFX and teaching/research priorities.
- Policy Research: Following the results of their national fora, USFX and UC faculty and students will conduct water policy related research (mostly through the M.Sc. theses in close collaboration with key national water agencies and municipalities (e.g. Cochabamba and Santa Cruz). One or two UC graduate students will be recruited to work with USFX on groundwater policy research (as part of their graduate research). Policy research will assist the GoB with its efforts to regulate and standardize water well drilling and pumping in Bolivia and with themes such as aquifer protection and water quality/level monitoring.
- Public Education and Awareness Building: Universities are in a special position as leaders and educators of the broader community and they commonly provide public education in the area of water resource management. USFX will develop its own unique public education strategies following its national policy fora. The education will target both Bolivian children and the general public and will include a Bolivian version (in all three major Bolivian languages: Spanish, Quechua and Aymara) of the Canadian high school teaching module described under “Canadian Public Engagement”. These two activities will be closely related.

4000 Creation of Bolivian University Water Network

- Contact with all potential member universities. In the first year of the project, all interested universities will be contacted and invited to participate in the network. Interested members will be invited to provide input into the basic elements and structure of the network. Information on each members activities in the water resource sector will also be sought and posted on the network website.
- Design and construction of website. The new network website will be based at USFX where a webmaster will be assigned. UC personnel will provide considerable assistance as they have good experience with the CARA website. Funds will be provided for a website license for the duration of the project.
- Delivery of collaborative activities. All member activities will be listed on the network website and collaborative activities will be planned pending mutual interest. Activities will include project-funded short courses, research projects and public education.

5000 Canadian Public Engagement see XI. CANADIAN PUBLIC ENGAGEMENT STRATEGY)

6000 Management and Administration (see IX. PROJECT MANAGEMENT AND DECISION MAKING)

7000 Monitoring and Evaluation

The project will be monitored internally according to the *Performance Measurement Framework* which will be developed during the Inception Mission. The Steering Committee will review the information and make project adjustments as necessary. This information will also be annually reported to AUCC. The project will be evaluated independently at the mid-way point.

VI. RISK ANALYSIS WITH MITIGATION STRATEGIES

Impact Level:

- a) Bolivian national, regional and municipal government priorities remain supportive of improving water resource management (medium risk).
- b) Economic and political conditions in Bolivia enable continued investment by government in water resource management (medium risk).

Outcome Level:

- a) Internal conflicts (within Bolivia) will not unduly impede travel or implementation of project (low risk). Mitigation: avoid conducting project activities in areas of conflict;
- b) Effective communication between UC and USFX maintained despite disparities in technology and distance (low risk). Mitigation: Maintain regular email communication and meet at least annually;
- c) Project personnel are motivated, hard-working and resourceful and will see the project to completion (low risk). Mitigation: ensure motivated, capable personnel assigned to project;
- d) Bolivian project trainees (faculty and M.Sc. students) are high caliber/committed to careers in their home countries (medium risk). Mitigation: ensure students are capable and committed;
- e) USFX is committed to gender equity and recruits qualified female students and professors (medium risk). Mitigation: train leaders and professors in gender equity to ensure institutionalization of gender equality;
- f) Two female Bolivians are successfully recruited for M.Sc. (hydrogeology) training at UC and subsequently hired by USFX. Mitigation: Conduct a national recruitment and encourage females to pursue careers as university science professors; and
- f) USFX attracts sufficient numbers of participants to short courses (low risk). Mitigation: promote short courses widely and ensure they are high quality and relevant.

VII. GENDER-EQUALITY STRATEGY

The project will be consistent with gender equity programming in Bolivia following the Office of the Vice-Minister for Gender, General Affairs, and Family (VAGGF). Bolivia's PRSP is committed to the following gender equality elements that are of relevance to the proposed Tier 2 project:

- To improve women's inclusion in society, they will be empowered in terms of access to education, health services, housing and basic sanitation.
- To promote technical training for women, there will be coordination among the Ministry of Education and the Ministry of Labor, the Municipal Governments and the Prefectures, and the Bolivian Confederation of Private Entrepreneurs.
- Promotion of programs for women's access to education and continued attendance, basic technical training and support for academic access and retention programs.

At USFX, there are currently few female professors and students in the fields of science and engineering. In the entire USFX, there are currently 255 female (28%) and 644 male professors. The Faculty of Technology (lead faculty) has 21 female (13%) and 143 male professors. In terms of students, USFX has a total of 11,941 female (47%) and 13,758 male students and the Faculty of Technology has 1,484 female (29%) and 3,627 male students. In the Civil Engineering program (from which most candidates for the M.Sc. program will be drawn), there are 142 female students (13%) and 922 male students. In the Department of Chuquisaca where the City of Sucre (and USFX) is located, there are only 144 female engineers (12%) and 1013 male engineers (88%) currently registered. Clearly, females must be

encouraged to study science and engineering and seek faculty positions and the USFX must increase its efforts to create an environment of gender equity.

Within the project, females will be encouraged to enter the USFX M.Sc. program by recruitment of females graduating from USFX and other university science and engineering under-graduate programs and females will be actively recruited for the new USFX faculty positions that will be created within this project. Two females will be trained in the UC M.Sc. (hydrogeology) program and, after graduation, will return to permanent faculty positions at USFX. The project will provide gender sensitivity training to all USFX faculty and M.Sc. students involved in the project (in partnership with the Gender and Water Alliance, promote female leaders, professors and students, and gradually develop an institutional sensitivity to gender equity that will project to all academic and community outreach activities.

VIII. ENVIRONMENTAL PROTECTION STRATEGY

The project is environmental by nature and *Environmental Impact Assessment* (EIA) will be a fundamental part of USFX's new M.Sc. programs and continuing education. The project will build upon Spanish-language EIA materials already prepared under the Central American Water Resource Management Network (CARA) project. CIDA's EIA policy and the Canadian Environmental Assessment Act (CEAA) will be fully respected regarding any project activities or approaches that could impact the environment.

IX. PROJECT MANAGEMENT AND DECISION-MAKING STRUCTURE

The project management structure will be democratic and inclusive. The structure is comprised of the following elements:

- The ***Project Steering Committee***, which will follow a consensus model of decision-making will coordinate and monitor the different activities. The Committee will be comprised of the two Project Directors, the UC instructor in Bolivia and professors and financial staff from each institution (when feasible). A meeting will be held each year either in person or through tele-conference. Each year, the Committee will conduct a project review including a revision of all performance measurement information gathered through the internal monitoring system. The Committee will make project modifications as necessary and produce an annual work plan.
- The ***Canadian Project Director*** (at UC) who will manage the day-to-day project activities, guided by the annual work plan. He will at all times be participatory in the process and assist USFX in the development of strong collaboration internally and with other regional networks and universities. Unless a specific member of the management team is assigned as a mediator for any possible conflict that may arise, the Canadian Director at UC will assume this role. The Canadian Director will be supervised and assisted by the UC project team (see below).
- The ***Bolivian Project Director*** (at USFX) who will manage the day-to-day project activities taking place in Bolivia. He will at all times be participatory and work closely with the USFX project team and with the UC project director.
- ***Project Teams*** (at UC and USFX) which will be made up of a team of faculty members at each institution. These teams will support and advise the project directors and meet as needed.

X. ROLES AND RESPONSIBILITIES OF PARTNER INSTITUTIONS AND KEY TEAM LEADERS AND MEMBERS

UC: The Canadian lead university, the University of Calgary, will be responsible to AUCC for: (1) the achievement of the program's outcomes and for the production of specified reports, according to the terms of the grant agreement; (2) the adoption and implementation of policies, procedures and controls to assure the efficient utilization of AUCC funds; and (3) the establishment and implementation of adequate evaluation and auditing procedures in order to determine the extent to which the desired outcomes of the program have been achieved and to assess the efficiency and effectiveness of execution of the program. The **International Centre**, UC, will provide administrative and financial management services to the project. The International Centre will provide *financial and administrative training* to USFX personnel at project start-up. At project mid-term a financial management review will be conducted to evaluate the effectiveness of systems and provide recommendations for improvement, and a formal financial close-out will take place at project end. The financial management of the project will be lead by **Ms. Gloria Eslinger** (Manager, Administration and Specialized Services at the International Centre) with support from others including Dr. Lorne Jaques, Dr. Eric Dillman and other International Centre staff.

Mr. David Bethune will be the Canadian Project Director at UC and will thus manage and oversee all project administrative and implementation activities. David is based in the **Faculty of Science** which is the lead faculty for the project (other involved faculties include Engineering, Social Science and Social Work). Mr. Bethune will lead the team of UC professors and staff listed in Section IV. A UC professor of particular importance is **Dr. Cathryn Ryan** who will provide project oversight and participate in various implementation activities as an instructor and student advisor. **Mr. Brendan Mulligan** will be a hydrogeology instructor, student advisor and project management assistant. Mr. Mulligan will be based in Sucre for the first four years of the project where he will work full-time in the following activities: a) teaching semester courses in aqueous geochemistry and groundwater contamination, b) delivering short courses covering various topics, c) supervising student thesis projects, d) initiating the new Bolivian water network and e) assisting the two project directors with project management and coordination. USFX currently lacks expertise in aqueous geochemistry and groundwater contamination and Mr. Mulligan will teach courses and supervise research in these areas until USFX professors are trained at a later stage of the project.

USFX: The Bolivian lead university, USFX, will be responsible for the execution of all project activities that take place in Bolivia. The only exception to this will be the groundwater policy research conducted by a UC graduate student which USFX will assist and facilitate. USFX will enter into an official agreement (MOU) with UC and will be responsible for the financial reporting and accounting for all funds sent by UC do be disbursed by USFX. USFX will host and assist all visiting Canadian professors, students and staff. USFX will provide a place to work for Brendan Mulligan while he is working at USFX and assist him as necessary with work and living arrangements. The **Faculty of Technology** at the USFX will provide infrastructure, administrative and logistic support and related services to the project. The financial management of the project will be led by **Mr. Eduardo Rivero** (Dean of the Faculty of Technology), with support from the Faculty of Technology's administrative staff.

The implementation of the project (including economic, administrative and academic aspects) will be executed through the Postgraduate Office of the **Civil Engineering Department**, Faculty of Technology, USFX.

Mr. Normando Guzman Bedoya will be the Bolivian Project Director at USFX. Mr. Guzman will work closely with David Bethune and Brendan Mulligan to ensure all project activities are implemented and coordinated and all required financial and narrative reports are provided to UC. Mr. Normando

Guzmán will be a hydrology instructor and student advisor for the six years of the project in the following activities: a) teaching semester courses in hydrology b) supervising student thesis projects, c) initiating the new Bolivian water network.

Mr. Normando Guzmán will work in coordination with a team of supervisors, with experience in water resource management, from the Civil Engineering Department, Faculty of Technology, USFX. The team includes: Alfredo Arancibia, responsible for thesis projects; Fernando Ossio y Julio Tórréz, specialists in hydraulics; and Juan Carlos Ortiz, a specialist in water quality. The entire team will work under the direction of Edgar Grandón, Director of the Civil Engineering Department, USFX, and Eduardo Rivero, Dean of the Faculty of Tecnology, USFX.

XI. CANADIAN PUBLIC ENGAGEMENT STRATEGY

The Bolivia Water Management project will produce a secondary school teaching module for the Calgary board of Education similar to the module created for the Tier 1 CARA project. The CARA project produced a secondary school teaching module and video on Central American water issues and their relation to development (www.caragua.org/HighSchoolCurriculaEnglish.htm). The module includes a one-hour video that was developed in collaboration with the Calgary Board of Education and began introduction to Calgary schools in 2005. In the proposed Tier 2 project, a similar teaching module (and film) will be created to cover water issues and development in the Bolivian context. This version may target Bolivian children or the general public and be translated into all three Bolivian languages: Spanish, Quechua and Aymara. UC will also continue to participate in on-campus and community events to educate Canadians about Bolivian water issues and UC's/Canada's role in assisting Bolivia.

XII. SUSTAINABILITY STRATEGY

The USFX M.Sc. and continuing education programs will be sustained because the demand for such programs within Bolivia will gradually increase over time. The increased demand results from a combination of these countries gradual socio-economic “development” leading to a more progressive water policy framework and the gradual building of public awareness resulting from USFX's project-level public education/awareness activities and, more importantly, the impact on public awareness the M.Sc. graduates (and continuing education students, to a lesser degree) will have in their professional work. For example, Canada, the U.S. and Europe are increasingly demanding M.Sc.-trained hydrogeologists and universities are responding with more and more academic programs. The M.Sc. and continuing education programs at USFX will be successful (sustainable) by providing sufficient academic/technical depth while being highly relevant to the development needs of each country. The core ongoing support to the programs will come from USFX in the form of professors and university infrastructure/resources. At the end of the project, USFX will have a team of trained professors, infrastructure, books, equipment, administrative support and two up-and-running education programs (M.Sc. and Continuing Education). After the project is completed, USFX will require two key areas of ongoing financial support: student scholarships and community-based research support. USFX will thus begin seeking outside financial support for these two necessities early in the project and by the end of the project will have developed a broad base of financial and other support from various national and international organizations.

**ANNEX A: RESPONSE TO COMMENTS FROM
THE SELECTION COMMITTEE AND REVIEWERS**

Note: The following response is based on a review by all partners conducted during the project inception mission (May/2007).

Project Methodology and Management Structure

Reviewer Comment 1: *The relevance of having a large number of Bolivians come to Canada rather than sending a smaller number of Canadians to Bolivia should be better justified.*

Response: The reviewer must somehow be mistaken as the project will only train two female Bolivian USFX professors at UC at the M.Sc. (hydrogeology) level. No other Bolivians will be trained in Canada. If two suitable candidates cannot be found that are able to study in English at the TOEFL level then M.Sc. level training in hydrogeology will be done at the CARA M.Sc. program at the University of Costa Rica.

Reviewer Comment 2: *The extent to which activities are culturally acceptable still requires clarification. The cultural sensitivity of the different communities targeted does not come across systematically throughout the proposal. Because remote regions are involved, this should be more thoroughly addressed.*

Response: The project includes training of USFX M.Sc. students (and professors) in two key areas related to the cultural sensitivity of remote regions in Bolivia: a) gender issues related to water (in collaboration with the Gender Water Alliance) and b) community development where students will learn about the culture of remote communities, their water issues and strategies for how they can work with these communities on water projects. The community development training will include a module on Quechua, an indigenous language widely spoken in rural Bolivia (particularly in Chuquisaca), to facilitate communication between the M.Sc. and continuing education students and rural community members. A field manual will be produced during the project with strategies and ideas for how to work with rural communities on water projects (similar to the manual produced by the CARA project in Central America). The one-hour video produced for public engagement will be translated in Spanish, Quechua and Aymara, Bolivia's three most prevalent languages.

Reviewer Comment 3: *The gender equity strategy could be further improved by:*

- *Reinforcing the risk assessment to effectively address gender-related issues with respect to women's participation in their different roles and to identify appropriate mitigation strategies.*
Response: This has been done.
- *Ensuring the water database tracks sex-disaggregated data.*
Response: This will be done.
- *Ensuring that the performance monitoring framework reflects a gender perspective and uses gender-sensitive indicators.*
Response: This has been done.
- *Incorporating quantitative and sex-disaggregated results targets wherever possible to compliment the qualitative gender-sensitive indicators.*
Response: This has been done.

Reviewer Comment 4: *Expenses related to travel appear high and should be better justified.*

Response: Clearly travel between Canada and Bolivia is expensive. Most of these funds will be spent to send Canadians to Bolivia as instructors and student advisors. The only travel funds for Bolivians coming to Canada are for the project director to attend the AUCC orientation session and for two Bolivians (USFX professors-in-training) to study in the UC M.Sc. program.

ANNEX B: PROJECT WORKPLAN

ANNEX C: PERFORMANCE MEASUREMENT FRAMEWORK

PERFORMANCE MEASUREMENT FRAMEWORK

Water Management in Bolivia

UPCD Tier 2 Project Number: S61268-669

August 2007

Results	Indicators	Data Sources	Collection Methods	Timing & Frequency	Responsible Parties
Outcomes					
Outcome 1: <i>Strengthening and expansion of an existing M.Sc. program</i> “International Water Resources” for professionals working in the water resource sector (government, university, NGO’s and private sector).	1a) Institutional support: Number of USFX professors/staff involved. Number of new faculty positions created. Infrastructure (e.g. offices, laboratories, computers, transportation) adequate. Administrative support adequate.	USFX planning and budgeting committees, senior levels of management, Project Director and other key faculty.	Interview key personnel.	Mid-term and final evaluations plus annually when information available. (same for all results)	UC Project Director in collaboration with USFX Project Director. (same for all results)
	1b) External support: Extent to which USFX secures alternative sources of funding (e.g. for student scholarships, community-based research or faculty training) for the long-term sustainability of the M.Sc. programs.	USFX Project Director	USFX Project Director reports to UC Project Director.		
	1c) Program recognition/reputation. Increasing number of M.Sc. program applicants (f/m and students (f/m) with time. Evaluation of the M.Sc. program by a recognized national academic body.	Public and private sector organizations (national and international).	Random selection of organizations for interview.		
	1d) Extent of integration of gender issues in program curriculum.	USFX MSc program curricula.	Curricula review		

Results	Indicators	Data Sources	Collection Methods	Timing & Frequency	Responsible Parties
<p>Outcome 2: A sustained continuing education program at USFX in hydrogeology and water resource management for professionals, technical personnel and community-level facilitators working in the water resource sector (government, university, NGO's and private sector) developed and operated by USFX by Year 2.</p>	2a) Institutional support from USFX: Number of USFX professors instructing in courses. Number of short courses delivered per year by USFX professors versus non-USFX instructors.	USFX Project Director.	USFX Project Director reports to UC Project Director.		
	2b) Program recognition/reputation within Bolivia. Perception of importance and effectiveness of continuing education program by participants. Increasing number of short course students (f/m) with time.	Public and private sector organizations (national and international).	Random selection of organizations for interview.		
	2c) Extent of integration of gender issues in program curriculum.	USFX short-course program curricula.	Curricula review		
<p>Outcome 3: Strengthened water policy in Bolivia emphasizing integrated water resource management and groundwater usage, management and protection.</p>	3a) Number and type of policy research projects or activities carried out and extent to which they have contributed to local or national water policy strengthening.	USFX Project Director.	USFX Project Director reports to UC Project Director.		
	3b) Number and type of improvements made to water policy as a result of the project.	USFX Project Director, National Water Agency..	Interviews with key personnel.		
	3c) Extent of integration of gender issues in national water policies and programs.	Bolivian gender expert review.	Gender expert reports to USFX Project Director who reports to UC Project Director.		

Results	Indicators	Data Sources	Collection Methods	Timing & Frequency	Responsible Parties
<p>Outcome 4: Creation of a Bolivian University Water Network consisting of all Bolivian universities (public and private) involved in teaching and research on water issues.</p>	<p>4a) Quality/utility and member usage of network website.</p> <p>4b) Number and type of collaborations involving two or more Bolivian universities.</p>	<p>USFX webmaster. USFX Project Director.</p>	<p>Webmaster records activity and reports to USFX Project Director who reports to UC Project Director.</p>		
Outputs					
<p>Output 1.1 USFX has designed, obtained internal approval and is implementing its strengthened M.Sc. programs by Year 2 of the project.</p> <p>Output 1.2 USFX has developed the human and physical resources to independently deliver its M.Sc. program by project-end.</p> <p>Output 1.3 USFX successfully recruits, trains and graduates high-caliber Bolivian M.Sc. students and completes three (two-year) M.Sc. program cycles during the project.</p> <p>Output 1.4 USFX students and faculty are trained in gender-sensitivity and community-development and conduct applied “community-based field projects” in collaboration with key stakeholders (in particular municipalities and government water agencies).</p>	<p>1.1 Number of new faculty trained and hired to permanent faculty positions at USFX.</p> <p>1.2 Number of students (f/m) in USFX M.Sc. program (applicants, accepted, graduated). At least 70% of M.Sc. students successfully complete all components of programs and graduate in final year of project (% increases over time).</p> <p>1.3.1 Number of students (f/m) and faculty (f/m) trained by subject.</p> <p>1.3.2 Students, professors and graduates demonstrate knowledge of gender-sensitivity and community development in their work.</p> <p>1.4.1 Increasing number of stakeholder organizations collaborated with over time (in particular municipalities and government water agencies) and positive feedback regarding collaboration.</p> <p>1.4.2 Extent of integration of gender issues in curriculum.</p>	<p>Project documents, USFX Project Director and professors. (same as above)</p> <p>(same as above)</p> <p>(same as above)</p> <p>National water agencies and municipalities.</p> <p>Bolivian gender expert review.</p>	<p>Document review and interviews with key personnel. (same as above)</p> <p>(same as above)</p> <p>(same as above)</p> <p>Interviews with key personnel.</p> <p>Gender expert reports to USFX Project Director who reports to UC Project Director.</p>		

Results	Indicators	Data Sources	Collection Methods	Timing & Frequency	Responsible Parties
<p>Output 2.1 USFX is prepared to offer continuing education programs through a series of on-going short courses, seminars, workshops and distance education courses directed toward municipal and national government technicians and professionals.</p> <p>Output 2.2 USFX has assembled teams of instructors to deliver programs.</p> <p>Output 2.3 By Year 2, USFX is delivering a minimum of three short courses/workshops/seminars per year training 20-50 students per course covering a variety of water resource and water supply related themes. At least 50% of the short courses will be delivered on-location in municipalities.</p>	<p>2.1.1 Number of short courses delivered. Number delivered in rural municipalities.</p> <p>2.1.2 Increasing number of applicants and students over time (f/m).</p> <p>2.1.3 Increasing independence of USFX for course delivery (less dependant on outside instructors) over time.</p> <p>2.1.4 Increase in number of stakeholder organizations sending students to short courses over time.</p> <p>2.2.1 Number of courses delivered and number of students (f/m) trained.</p> <p>2.2.2 Student feedback indicates courses are of high quality, instructors good and course themes relevant to student priorities and they have applied new knowledge/skills in their work.</p> <p>2.2.3 Extent of integration of gender issues in curriculum.</p>	<p>Project documents, USFX Project Director and professors. (same as above) (same as above)</p> <p>(same as above)</p> <p>(same as above)</p> <p>Short-course student feedback forms.</p> <p>Bolivian gender expert review.</p>	<p>Document review and interviews with key personnel. (same as above) (same as above)</p> <p>(same as above)</p> <p>(same as above)</p> <p>Review student course feedback forms</p> <p>Gender expert reports to USFX Project Director who reports to UC Project Director.</p>		

Results	Indicators	Data Sources	Collection Methods	Timing & Frequency	Responsible Parties
<p>Output 3.1 A national-level review of critical policy needs to protect and conserve groundwater resources in Bolivia.</p> <p>Output 3.2 Improved enforcement of national water laws and execution of policy directed toward rural communities and municipalities in Bolivia.</p> <p>Output 3.3 USFX professors/students have gained significant experience that has further strengthened the M.Sc. and continuing education programs with respect to water policy.</p>	<p>3.1 Degree of stakeholder satisfaction with their water-policy related collaboration with USFX (interview with key stakeholders).</p> <p>3.2 M.Sc. and Continuing Education programs content includes water policy content (curriculum review).</p>	<p>Random sampling of stakeholder orgs.</p> <p>Program curricula</p>	<p>Interviews with key personnel</p> <p>Curricula review.</p>		
<p>Output 4.1 A Bolivian University Water Network is initiated by all interested members and a website is created.</p> <p>Output 4.2 Member universities are aware of each others activities and collaborate/share resources when feasible.</p>	<p>4.1 Creation of network website in Year 1 and subsequent population with member information and utility. Number of website visits.</p> <p>4.2 Number and type of Bolivian university collaborations increases with time.</p>	<p>World Wide Web</p> <p>Project documents, USFX Project Director and professors.</p>	<p>View website, webmaster.</p> <p>Review documents, interview USFX personnel.</p>		

LOGICAL FRAMEWORK ANALYSIS - WATER MANAGEMENT IN BOLIVIA UPCD Project Number: S61268-669	
Goal: To increase the capacity of Bolivians to manage, protect and conserve their water resources with the overall objective of reducing ill health associated with lack of access to clean, sufficient quantities of water.	Purpose: To strengthen the capacity of the USFX in water resource management education, training, research and practice, in collaboration with communities, municipalities, government agencies, other universities, international organizations and networks.
Impact	Performance Indicators
Improved management of water resources in Bolivia through increased institutional and human resource capacity and stakeholder partnerships within a supportive policy framework.	<ol style="list-style-type: none"> 1. Extent to which water quality or quantity is improved (monitoring and testing results). 2. Number and type of mechanisms put in place in Bolivia to increase public access to water information. 3. Number and type of national, regional or municipal government policies created or improved in each country to support good management, protection and conservation of water resources.
Outcomes	Performance Indicators
<p>Outcome 1: <i>Strengthening and expansion of an existing M.Sc. program</i> “International Water Resources” for professionals working in the water resource sector (government, university, NGO’s and private sector). The M.Sc. program will benefit from Canadian financial and technical support for faculty training, field and laboratory equipment, books/journals, curricula strengthening, student scholarships and applied thesis research. USFX will deliver 2 full two-year M.Sc. program cycles during the project. Each cycle will fund about 12 students (50% female) thus a total of about 24 M.Sc. students will be funded over the project. The new M.Sc. program curricula and related research will benefit from greater expertise in hydrogeology, water quality/contamination, integrated watershed management, community involvement and gender equity. At least 50% of the supported USFX M.Sc. students will be female and two females will be trained in the UC M.Sc. hydrogeology program and then hired by USFX as professors to help deliver the USFX M.Sc. program (and also sustain the continuing education and policy activities).</p> <p>Outcome 2: <i>A sustained continuing education program</i> at USFX in hydrogeology and water resource management for professionals, technical personnel and community-level facilitators working in the water resource sector (government, university, NGO’s and private sector) developed and operated by USFX beginning in early 2008. The program will be delivered through 1 week short courses (at least 3 per year for 2008-2013) to be delivered throughout Bolivia in collaboration with Bolivian Water Network partners, national government agencies and municipalities (total of 24 short courses over the project).</p>	<ol style="list-style-type: none"> 1a) Institutional support: Number of USFX professors/staff involved. Number of new faculty positions created. Infrastructure (e.g. offices, laboratories, computers, transportation) adequate. Administrative support adequate. 1b) External support: Extent to which USFX secures alternative sources of funding (e.g. for student scholarships, community-based research or faculty training) for the long-term sustainability of the M.Sc. programs. 1c) Program recognition/reputation. Increasing number of M.Sc. program applicants (f/m and students (f/m) with time. Evaluation of the M.Sc. program by a recognized national academic body. 1d) Extent of integration of gender issues in program curriculum. <ol style="list-style-type: none"> 2a) Institutional support from USFX: Number of USFX professors instructing in courses. Number of short courses delivered per year by USFX professors versus non-USFX instructors. 2b) Program recognition/reputation within Bolivia. Perception of importance and effectiveness of continuing education program by participants. Increasing number of short course students (f/m) with time. 2c) Extent of integration of gender issues in program curriculum.

<p>Outcome 3: Strengthened water policy in Bolivia emphasizing integrated water resource management and groundwater usage, management and protection. Policy will be directed toward groundwater and will likely provide assistance to the GoB's efforts to regulate and standardize water well drilling practices and database all water well information. At least 4 relevant policy intervention examples by project end. Other policy themes may include: protection of aquifer recharge areas, protection of municipal wellheads, water quality monitoring, and water level monitoring.</p> <p>Outcome 4: Creation of a Bolivian University Water Network consisting of all Bolivian universities (public and private) involved in teaching and research on water issues. The Network will be initiated and initially led by USFX with Tier 2 project support and will informally link the universities together and facilitate their support to government agencies, municipalities and communities. A website will be created in 2007 which will list all member water activities, projects/programs and provide a forum for member communication, collaboration and resource sharing. Network leadership (and the website) will pass to other university members over time.</p>		<p>3a) Number and type of policy research projects or activities carried out and extent to which they have contributed to local or national water policy strengthening.</p> <p>3b) Number and type of improvements made to water policy as a result of the project.</p> <p>3c) Extent of integration of gender issues in national water policies and programs.</p> <p>4a) Quality/utility and member usage of network website.</p> <p>4b) Number and type of collaborations involving two or more Bolivian universities.</p>
Activities	Outputs	Performance Indicators
<p>1. Faculty and student recruitment and training (especially females), curriculum design and approval, purchase of books, journals & equipment, strengthening of water laboratory, M.Sc. program delivery, community-based applied "research" projects (USFX M.Sc. theses).</p> <p>2. Delivery of workshops and short courses on water themes such as</p>	<p><u>Output 1.1</u> USFX has designed, obtained internal approval and is implementing its strengthened M.Sc. programs by early 2008.</p> <p><u>Output 1.2</u> USFX has developed the human and physical resources to independently deliver its M.Sc. program by project-end.</p> <p><u>Output 1.3</u> USFX successfully recruits, trains and graduates high-caliber Bolivian M.Sc. students and completes three (two-year) M.Sc. program cycles during the project.</p> <p><u>Output 1.4</u> USFX students and faculty are trained in gender-sensitivity and community-development and conduct applied "community-based field projects" in collaboration with key stakeholders (in particular municipalities and government water agencies).</p> <p><u>Output 2.1</u> USFX is prepared to offer continuing education programs through a series of on-going short courses, seminars, workshops and distance</p>	<p>1.1 Number of new faculty trained and hired to permanent faculty positions at USFX.</p> <p>1.2 Number of students (f/m) in USFX M.Sc. program (applicants, accepted, graduated). At least 70% of M.Sc. students successfully complete all components of programs and graduate by 2013 (% increases over time).</p> <p>1.3.1 Number of students (f/m) and faculty (f/m) trained by subject.</p> <p>1.3.2 Students, professors and graduates demonstrate knowledge of gender-sensitivity and community development in their work.</p> <p>1.4.1 Increasing number of stakeholder organizations collaborated with over time (in particular municipalities and government water agencies) and positive feedback regarding collaboration.</p> <p>1.4.2 Extent of integration of gender issues in curriculum.</p> <p>2.1.1 Number of short courses delivered. Number delivered in rural municipalities.</p> <p>2.1.2 Increasing number of applicants and students over time (f/m).</p>

<p>gender-issues in water projects, community participation in water projects, well construction and registration, low-cost water treatment and community sanitation, source-water protection, watershed management, groundwater and surface water contamination, aquifer recharge area identification and protection.</p> <p>3. Public education and awareness-building, policy research and forum/conference delivery.</p> <p>4. Design and construction of website, contact with all potential member universities and transfer of their water activities to the website, delivery of collaborative activities (short courses, research projects).</p>	<p>education courses directed toward municipal and national government technicians and professionals.</p> <p><u>Output 2.2</u> USFX has assembled teams of instructors to deliver programs.</p> <p><u>Output 2.3</u> Beginning in early 2008, USFX is delivering a minimum of three short courses/workshops/seminars per year training 20-50 students per course covering a variety of water resource and water supply related themes. At least 50% of the short courses will be delivered on-location in municipalities.</p> <p><u>Output 3.1</u> A national-level review of critical policy needs to protect and conserve groundwater resources in Bolivia.</p> <p><u>Output 3.2</u> Improved enforcement of national water laws and execution of policy directed toward rural communities and municipalities in Bolivia.</p> <p><u>Output 3.3</u> USFX professors/students have gained significant experience that has further strengthened the M.Sc. and continuing education programs with respect to water policy.</p> <p><u>Output 4.1</u> A Bolivian University Water Network is initiated by all interested members and a website is created.</p> <p><u>Output 4.2</u> Member universities are aware of each others activities and collaborate/share resources when feasible.</p>	<p>2.1.3 Increasing independence of USFX for course delivery (less dependant on outside instructors) over time.</p> <p>2.1.4 Increase in number of stakeholder organizations sending students to short courses over time.</p> <p>2.2.1 Number of courses delivered and number of students (f/m) trained.</p> <p>2.2.2 Student feedback indicates courses are of high quality, instructors good and course themes relevant to student priorities and they have applied new knowledge/skills in their work.</p> <p>2.2.3 Extent of integration of gender issues in curriculum.</p> <p>3.1 Degree of stakeholder satisfaction with their water-policy related collaboration with USFX (interview with key stakeholders).</p> <p>3.2 M.Sc. and Continuing Education programs content includes water policy content (curriculum review).</p> <p>4.1 Creation of network website in 2007 and subsequent population with member information and utility. Number of website visits.</p> <p>4.2 Number and type of Bolivian university collaborations increases with time.</p>
<p>Reach: <u>Primary:</u> Bolivian water sector professionals (NGOs, government, private firms) and technical personnel (municipal/national government, NGO and private sector), USFX (institution, faculty and students). <u>Secondary:</u> Bolivian communities, municipalities and government agencies; UC students/professors, Canadians (Calgary area high school students in particular).</p>		

Assumptions*, Level of Risk and Mitigation Strategy:**

Impact Level:

- a) Assumption: Bolivian national, regional and municipal government priorities remain supportive of improving water resource management (medium risk).
Mitigation: Raise public and political awareness within project.
- b) Assumption: Economic and political conditions in Bolivia enable continued investment by government in water resource management (medium risk).
Mitigation: None at project level.

Outcome Level:

- a) Assumption: Internal conflicts (within Bolivia) will not unduly impede travel or implementation of project (low risk).
Mitigation: avoid conducting project activities in areas of conflict;
- b) Assumption: Effective communication between UC and USFX maintained despite disparities in technology and distance (low risk).
Mitigation: Maintain regular email communication and meet at least annually;
- c) Assumption: Project personnel are motivated, hard-working and resourceful and will see the project to completion (low risk).
Mitigation: Ensure motivated, capable personnel assigned to project;
- d) Assumption: Bolivian project trainees (faculty and M.Sc. students) are high caliber/committed to careers in their home countries (medium risk).
Mitigation: Ensure students are capable and committed;
- e) Assumption: USFX is committed to gender equity and recruits qualified female students and professors (medium risk).
Mitigation: Train leaders and professors in gender equity to ensure institutionalization of gender equality;
- f) Assumption: Two female Bolivians are successfully recruited for M.Sc. (hydrogeology) training at UC and subsequently hired by USFX.
Mitigation: Conduct a national recruitment and encourage females to pursue careers as university science professors; and
- f) Assumption: USFX attracts sufficient numbers of participants to short courses (low risk).
Mitigation: Promote short courses widely and ensure they are high quality and relevant.

* Assumptions are the conditions that need to be in place for the project to be successful

** Level of Risk is the likelihood an assumption will not materialize.