

## **INTERNATIONAL PARTNERSHIP FOR A JOINT EDUCATIONAL PROGRAMME IN A DEVELOPING COUNTRY IN SOUTH AMERICA, CASE OF BOLIVIA**

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### **Business Plan**

**KEY WORDS:** ITC, CLAS, UMSS, partnership, Implementing Masters, Bolivia, The Netherlands

### **ABSTRACT:**

Since 1996, the International Institute for Geo Information Science and Earth Observation (ITC) from The Netherlands and the Centro de Levantamientos Aeroespaciales y Aplicaciones de Sistemas de Información Geográfica para el Manejo Sostenible de los Recursos Naturales (CLAS) from Bolivia have been running joint masters courses in water resources, soils and natural resources.

With the assistance of the Dutch Government, in the first stage of the co-operation, three separate but parallel eleven-month Masters Programs have been established in Cochabamba, and these are largely modelled on those offered by ITC in Holland. The programs have been highly successful in training a large number of young Bolivians professionals for careers in various Earth Sciences disciplines. The “Soil Information For Land Use Planning” and “Watershed conservation and management” courses have now been running for nine years and the course “Irrigation & Drainage” for six years already. The first two of these Masters courses started in 1998 and the third one started in 2000 with the additional support of UNESCO-IHE, also from The Netherlands.

To date 165 PM students have graduated from the masters courses, the new professionals included people from Bolivia, Cuba, Perú, Argentina, Colombia and Mexico. Currently 21 students are enrolled in the “Soils” and “Water” courses.

The Masters diploma is awarded jointly by the Universidad Mayor de San Simón (UMSS) from Bolivia and by the ITC from The Netherlands. Eighty five percent of the professionals graduated from CLAS obtain jobs (consultancies and permanent positions) within a year of graduating, generally in the fields of land use planning and watershed management.

The masters courses are divided into a modular system (15 modules including fieldwork plus the personal study topic), 6 modules are common and the others are specific for each program. In the establishment of the programme, the lecturers included a wide range of experienced professionals from Bolivia, Perú, Colombia, México and The Netherlands. Currently since the UMSS incorporated the CLAS into its structure, the lecturers are Bolivians trained in Bolivia and in The Netherlands (ITC and IHE) with a Professional Master, Master of Science and PhD degree with multidisciplinary backgrounds.

CLAS is an international post graduate unit within the UMSS and it has been recognized as a Centre of Excellence by the Ministry of Sustainable development of the Republic of Bolivia due to the fundamental academic role that it plays within the country.

The Universidad Mayor de San Simón is one of the biggest universities in Bolivia and well recognized in South América. It has more than thirty international programs with developed countries such as France, Germany, Switzerland, Sweden, Denmark, The Netherlands, Belgium amongst others. It is in the process of achieving the accreditation of its education programs with the MERCOSUR (Mercado Común del Sur) that it is comparable with the European Union at its early stages.

The courses focus on the latest technologies such as Geographic Information Systems and Satellite Remote Sensing in the environmental sciences and the study topics include land use planning, land evaluation, land degradation, watersheds management, water quality, hydraulics design among others. These courses offered are unique in South America and hence the centre has been established acts as a regional one. Due to the importance of CLAS within the region, it is one of the first and only institutes in the world that has registered its three master courses (“Soil Information for the land use planning”, “Watershed conservation and management” and “Irrigation and Drainage”) from 2005 to 2007 with NUFFIC (The Dutch organisation responsible for providing fellowships to Dutch universities and International Training Institutes that run programmes for developing countries). CLAS obtained four fellowships from NUFFIC in 2005 and twelve fellowships in 2006. These fellowships are available to candidates from the NUFFIC list of 57 eligible countries, who have a background in environmental sciences, two-year professional working experience and who speak Spanish.

In a further stage of cooperation with ITC in The Netherlands plans are being formulated at CLAS and ITC to introduce a joint of Master of Science Program and a post graduate diploma courses in water resources, soils and natural resources as well as the existing masters courses. In the early stage, the Program will be executed partially at CLAS in Bolivia (as a part of the current professional master course) and it will be completed at ITC in The Netherlands. Eventually CLAS hopes to be able to independently run a full-master of science-course in Cochabamba. A pilot group of five people has been successfully completed an initial Joint CLAS-ITC MSc course in the Water resources survey and Natural resources management programs in 2003.

In order to reach these new goals, a number of new techniques involving e-learning tools are being explored. Steps are being taken to strengthen the research skills at CLAS and to further enhance its position as an important educational centre in Latin América. In this respect ITC and UMSS have signed an agreement on research co-operation, one of the central aims of which is joint PhD supervision.

A network of affiliated Institutes called GI-NET was created between ITC and all its educational partners that include India, Mexico, Nigeria, China, Bolivia and others. This network exists to promote the technologies of Geographic Information System (GIS) and Remote Sensing (RS) and to explore opportunities for collaboration in education and research.

## 1. INTRODUCTION

### 1.1 Background

In 1996 the International Institute for Geo-Information Science and Earth Observation (ITC, The Netherlands) started the CLAS Project (Centro de Levantamientos Aeroespaciales y Aplicaciones SIG para el Desarrollo Sostenible de los Recursos Naturales) with the Universidad Mayor de San Simón in Cochabamba, Bolivia. In this project two joint professional masters programmes Water Resources Environmental Management (WREM) and Natural Resources Management (NRM), were developed and subsequently entirely delivered in Bolivia in the Spanish language. A limited number of successful candidates of those masters programmes continued with an MSc degree at ITC with exemption for a specific number of modules according to the program they were following.

The ambition of CLAS to become a centre of excellence of internationally recognised quality within the UMSS and to contribute to the improvement of the educational system in Bolivia is both a logical development from CLAS as a centre into an institutional entity, and an important prerequisite for a sustainable CLAS. ITC's decentralised education programme has identified CLAS as a potential partner for implementing joint educational programmes. The development and maintenance of a strong partner relationship between CLAS and ITC is seen to be of mutual importance.

The capacity built at CLAS provides good opportunities to continue the collaboration and even expand it to an official Joint Educational Programme meeting some conditions and requirements.

At the moment CLAS offers a Masters degree in 'Geoinformation of the natural resources' with three specializations: a) Survey, evaluation and planning of the territory; b) Watersheds management and conservation and c) Irrigation and drainage.

A pilot joint MSc. course has already been established in 2003, where 5 students from CLAS completed successfully an abridged Master of Science degree at ITC.

In September 2003 a mission from ITC took place representing the **Water Resources and Environmental Management (WREM)** and **Natural Resources Management (NRM)** programmes to review the quality of the current courses taught at CLAS and to develop a draft curriculum plan for a decentralised ITC Master of Science programme at CLAS. The mission proposed two scenarios for upgrading the PM course to a MSc-course.

**Scenario 1: (Masters at CLAS + finish MSc ITC)**, Students complete the regular Masters programme at CLAS then finalise an abridged MSc at ITC.

**Scenario 2: MSc CLAS = MSc ITC**

The CLAS MSc course would run exactly parallel to the ITC courses. Parts of the course will be taught at CLAS and ITC. In this approach, different operation modes would be possible.

### 1.2 Rationale

A foreign university degree (outside of Latin América) is highly valued in Bolivia because it gives a competitive advantage. This is one of the reasons why many Bolivians and Latin-Americans aspire to study abroad. However, the main problem related to this desire is that overseas scholarships are scarce and almost none students can afford the costs of a full course overseas, as well as the fact that the language for this fellowships is in English. The course at CLAS is the only Masters course of its kind in Bolivia that gives the participants an international diploma (Bolivia & The Netherlands).

The best solution for these problems is a joint courses, where students study partly in Bolivia and partly in the Netherlands. This offers to the students the possibility of gaining knowledge about the latest technologies used recently and import them to their "environment" such as Bolivia or other countries within Latin América.

It is very important also to remark that there are high capacities already established in CLAS because of the almost 10-year-relationship. The interest of ITC is the establishment of a joint course in which its core training elements are implemented together with a reliable partner.

The CLAS centre has offered and still offers professional masters courses, and this joint programme offers the opportunity to continue a master of science degree abroad. Also a possibility to add an innovative course in emerging fields (Land use planning and Watershed management) to the centres *curricula*.

The need for such courses are because the increasing interest in the topic of the GIS technology across the world and including Latin América and particularly in Bolivia. Every year it has been apparent that the job opportunities grow for professionals with a specialization in the environmental fields using GIS technologies. Furthermore, the policy of the local government is based on the land use programmes were multidisciplinary teams are required in fields such as land planning and watershed management. With these programmes social problems related to the land use have been decreased within the municipalities. It is also a fact that 80% of the professionals formed at CLAS get a job the next year they finished the master programme. CLAS has already a reputation in the country about training professionals in GIS and RS and also about performing consultancy work in this field.

A long cooperation already exists between ITC and CLAS, and hence the present initiative of implementing a Joint Educational Programme is a natural progression of

that relationship. The present agreement aims to document and formalise the existing relationship and to guide its progression into the future.

This long-term goal exactly matches ITC's mandate of capacity building and institutional strengthening in higher education in developing countries. The time frame for reaching this ultimate goal is estimated at around six years. Yearly evaluations should determine the speed in which the curriculum is progressively taken over by CLAS. In an equal partnership between the two institutes, there should also be cooperation in research, (which should be improved), consulting and staff exchange. While ITC's input in teaching will diminish over time, it is anticipated that the activities in these other fields will increase. Since CLAS occupies a privileged position in the UMSS, the EUPG<sup>1</sup> will help CLAS to provide Bolivian PhD researchers members to upgrade their skills.

## 2. THE MARKET

### 2.1 Overview

There is clearly an increasing need for critical mass of human capacity as well as institutional and organizational capacities in Geoinformation, focusing on land use planning and water management in Bolivia and in the region (South America).

The course has two types of students as its target, i.e. young students who continue their education and mid-career professionals who want to upgrade their skills and knowledge. The first group consists of the BSc students wishing to obtain an MSc degree and develop a career in the field of geoinformation, either in the natural resources or water field. The career perspective for graduates is good. There are job opportunities both in the public sector (government and non-governmental) as well as in the private sector. The second group consists of the people who are already working in a professional organization. They are professionals with several years of working experience holding a BSc in subjects related to the environmental sciences. They are until now not a traditional target group of the Universities. Most schools and departments in the University do not have market for this target group, as they can easily fill the classrooms with regular BSc students, but these people need to upgrade their knowledge in the geo-information field because in the actual market everything has a position in space and in time, since our target is related to the environmental sciences it is compulsory to be updated in this subject.

The Netherlands Fellowship Programme (NFP) could be a potential sponsor for some mid-career professionals, perhaps the ALBAN foundation too, since the Universidad Mayor de San Simón is a recognized centre

<sup>1</sup> EUPG = Escuela Universitaria de Posgrado (University Centre of Postgraduate Studies) from UMSS

for a economical support, also some ITC fellowships will be explored.

The course has already started with a pilot joint master of science program the year 2003 with 5 students that have completed successfully the MSc programme in NRM and WREM at ITC. A second one has been already sent in the first semester of this year.

Nowadays CLAS is a centre with high potentiality in GIS and RS, since there are no other centres like it in the country or region; it also presents unique opportunities for the formation of professional masters and masters of science not only in Bolivia but also in South América.

As an institutional strategy it has been agreed to involve the departmental and municipal governments in the form of fellowships to upgrade their personnel either under the modality of modules or a master course (PM or MSc.)

Another academic strategy is to increase the national and regional market (so far the 75% of our graduated students get a job immediately after they finish the master course at CLAS, this can be seen in figure 1).

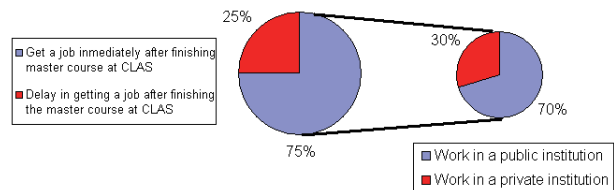


Figure 1. Placement in the job market of students formed at CLAS

For the promotion of the master courses, CLAS counts on the support of the EUPG and Vice-Rectorate of the UMSS.

Since the students on the proposed Joint MSc will do their thesis research on carefully selected topics of relevance to Bolivia, this will, over the years, result in a thriving research programme. The staff exchange is necessary to develop this research programme. Along the way, possibilities will be investigated for outside funding of the research as well.

To the year of 2007 CLAS will be giving Masters degree with the validation of ITC. Moreover, in the second semester of 2007 the Master of Science program is scheduled to start at CLAS and with completion at ITC. This approach will be followed until the centre obtains enough experience and upgraded lecturers that will be capable of lecturing a MSc course with the international recognition of the ITC. At the same time the Masters course will remain an option (collateral choice) for those professionals that still are interested in such degree. It is very important to remark that this kind of taught Masters will correspond to the regular formation of the MSc, in other words, the program will start the same but it will

culminate in an Individual Final Assignment (IFA) while the MSc students continue with their thesis. At this stage, the accreditation and degree of the Masters will be only given by the UMSS.

Regarding the prospective for the Joint MSc course, based on the data and assumptions that CLAS has about the origin of the students and also after making a future projection of the courses, figure 2 shows the estimated total percent of master of science alumni from 2008 to 2010 across Latin América.

Total percentage of MSc students per country (2008 - 2010)

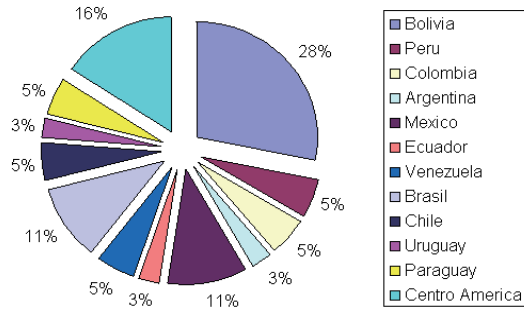


Figure 2. Projection in the future (2008 – 2010) of the CLAS MSc students in Latin América

### 3. IMPLEMENTATION OF THE MSC. COURSE

The implementation of the master of science course is foreseen in four phases as shown in the following table 1, 2 and 3.

	2005			2006			2007			2008		
	J	F	M	J	F	M	J	F	M	J	F	M
Phase 1												
CLAS/ITC PM	Own funded			MSc Completion ITC								
NFP funded				Own funded								
				ITC funded								
				CLAS/ITC PM			MSc Completion ITC					
				Own funded			Own funded					
				NFP funded			ITC funded					

Table 1. Phase 1 of MSc implementation

	2007			2008			2009		
	J	F	M	J	F	M	J	F	M
Phase 2									
Own funded	CLAS PM								
				1			13		
				First Joint MSc Course					
				Own funded			12		
							15		
				NFP funded			12		
							23		
							MSc at ITC		

Table 2. Phase 2 of MSc implementation

	2008			2009			2010			2011		
	J	F	M	J	F	M	J	F	M	J	F	M
Phase 3												
	Second Joint Course			CLAS PM								
				MSc at ITC								
							Third Joint Course			CLAS PM		
										MSc at ITC		

Table 3. Phase 3 of MSc implementation

All the masters courses given at CLAS are taught in Spanish but the material (such as handouts, bibliography, power point presentations, papers and others) are given in English. From 2006 to 2007 the degree will be awarded jointly by both ITC and UMSS. After 2007 the possibility that ITC can give certificates for the modules followed in CLAS is still under consideration.

The joint MSc courses that will be taught in CLAS (modules 1 – 13) will be taught in Spanish but the material (such as handouts, bibliography, power point presentations, papers and others) will be given in English including the research proposal and also the students have to present at the beginning of the new academic year some certificate or exam that proves their skills in English (from a known institution). Eventually the students will take the TOEFL test in order to continue the joint course in ITC (completion in English language).

From the second phase, the Masters course will be only a choice for those students that for many reasons (economical, time, personal, etc), cannot finish the MSc with the degree given by UMSS.

In the first years of the cooperation, it is envisaged that ITC will provide opportunities for a number of CLAS staff to be upgraded by attending ITC short courses, and to obtain the MSc degree for the remaining ones and also to explore the option that some members (probably one or two) could continue a PhD studies (sandwich) at ITC looking for some type of financial support.

The programme presented in the precedent tables, will be adjusted for the year 2007 in order to make the transition from the Masters courses lectured at CLAS to the Joint MSc programme.

#### 3.1 Legal status and degree

Since ITC is in a transition itself to be accredited by the European Union, it is now its reviewing precisely which courses it will put forward for accreditation. As decisions on this matter are not yet final, it may prove difficult for ITC to accredit the present joint Masters course with UMSS after 2007.

It is considered that courses resulting in a diploma may not prove attractive to students from South America, as there are diploma courses for even 3 months and the curriculum value is the same.

CLAS still wishes to promote the existing Masters course and hopes to stimulate many applications,. It has decided to continue the programme by itself, with a degree being issued solely by UMSS. But since the potential students prefer to have an international recognition of the course it will be more attractive if ITC will provide module certificates.

For the phase II, those students that finish the master of science in ITC will obtain the ITC degree only. But for the phase III there will be 2 options described next:

- For those students that have any particular reason (economical, time, will, etc.) there will be a collateral choice that consists in completing the Masters course at CLAS with the UMSS degree and the module certificates from ITC.
- For those students that complete the Master of Science course in ITC will obtain an ITC MSc degree.

#### **4. THE MANAGEMENT PROCESS**

##### **4.1 Admission**

Both ITC and CLAS have to approve admission of the candidates to the joint MSc course. Thus, applications will be screened by both ITC and CLAS. A first screening will be done by CLAS. Initially selected applications will be sent to ITC for final selection.

Admission criteria that will be applied are:

- BSc in a relevant field with a mark of 60 or higher. Relevant working experience is an advantage.
- An English proficiency test result of TOEFL according to the regulation extended in ITC.
- Applicants will write a short one-page paper on their motivation and the research they would like to do. Optionally, an interview may be held with the applicant. This interview will be conducted at CLAS by the joint course coordinator, possibly (in the first years) together with the ITC joint course coordinator.
- The candidate should be eligible for a visa to the Netherlands, i.e. his/her legislation status should be satisfactory. This should be determined and confirmed before the fifth module in Bolivia (in order to avoid a situation that the candidate starts the course and is subsequently not permitted to travel to the Netherlands).
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The students, who obtained the joint Diploma in 2007 or later, would be allowed to enter the MSc joint course in module 11 if they fulfil the academic criteria and under the commitment that the module on research skills is attended if not yet. This entrance option is valid within a period as described in the ITC assessment regulations.

##### **4.2 Assessment**

At the end of every module, participants' progress will be monitored through an examination and/or an individual assignment. To avoid any inconsistency in the marks on course records, CLAS will apply ITC's marking system in the joint courses.

CLAS is responsible for performing the assessment and quality of the marking of the modules taught at CLAS and ITC is responsible for those ones given there. The

assessment of the thesis is common responsibility with a veto right for ITC.

##### **4.3 Transfer**

Students who pass all modules at CLAS according to the ITC marking system will be candidate to come to ITC. Together with the CLAS Course Coordinator, the ITC Course Coordinator (or another ITC staff member) will be present towards the end of the CLAS lecture period, for transfer assessment. Those who are not selected or are selected but do not have the required resources for studying in the Netherlands, will receive a certificate.

Before moving to ITC, course participants will present a 1 to 3 page(s) research pre-proposal to the Course Coordinators. The purpose of this pre-proposal is to define the research interest and to obtain a broad idea of the topics.

##### **4.4 Selection of research topic**

The selection of research topics by the students is restricted by the expertise at the institute where the research is executed. A topic can only be chosen if supervision is available. The Course Coordinators will discuss proposed topics and list the appropriate ones.

##### **4.5 Admission to the thesis period**

Participants will be assigned a CLAS and an ITC supervisor that will help them to prepare a detailed research proposal during module 15. If the participant is at CLAS, the CLAS supervisor will discuss the topic and coordinate with the ITC supervisor and the opposite will happen if the participant is at ITC. The participant's research proposal will be formally assessed under the responsibility of the ITC programme Board, by a Thesis Admission Committee.

Students, who fail the thesis proposal defence at ITC, will not be admitted to the thesis period. Those will get a certificate.

##### **4.6 Supervision during thesis period**

Both supervisors, who will have equal responsibilities, will do the MSc supervision. However the supervisor of the Partner at whose premises the participant is will be the first contact person for the participant. All main feedback to the student should be done electronically, with a copy to the other supervisor.

During the MSc research period, participants will make a progress report every two weeks, which will be sent electronically to the ITC and CLAS supervisor(s) and course coordinators. Progress reports must include minutes of the meetings and communication of the MSc participant with his or her supervisors. The midterm presentations in phase 1 and 2 of the joint programme are

under the same circumstances as those for the ITC group of students. In phase 3 of the joint programme, the CLAS supervisor and Course Coordinator and at least one ITC representative will attend the midterm presentations. The MSc participant will receive a written report with recommendations from the Course Coordinator. The possibility to use Blackboard at CLAS will be explored. In that case, students and supervisors at CLAS can communicate with ITC via Blackboard conferencing.

#### 4.7 Thesis examination

Each thesis will be assessed by a Thesis Assessment Board, appointed by the ITC Programme Board. Regardless of the phase of the joint programme, each Thesis Assessment Board must consist of at least 4 members including one of the supervisors, an ITC professor or associate professor (chair), a CLAS lecturer and an external expert coming from the University (Universidad Mayor de San Simón). Since the degree is an ITC MSc degree, ITC members in the assessment board will have the veto right. The MSc exam and graduation ceremony will be held at CLAS or at ITC, depending on the phase. The MSc thesis defence and graduation ceremony, in phase 1 and phase 2 of the joint programme, will be at ITC and will be identical to that of the ITC group of students. ITC and CLAS could decide that in phase 2 the graduation will be at CLAS. In that case the last month of the research period, including the defence and graduation ceremony, is executed at CLAS. The MSc thesis defence and graduation ceremony, in phase 3 of the joint programme will be held at CLAS.

#### 4.8 Monitoring progress

It is the responsibility of the Joint Course Coordinators, Module Coordinators and Thesis Supervisors to closely monitor the progress of the students during the course. They have to report any doubt on the students' capability immediately to the ITC Programme Director and CLAS Executive Director. They will take a decision whether or not the student should continue.

### 5. QUALITY ASSURANCE OF TEACHING AND STAFF DEVELOPMENT

A longer-term staff development plan will be elaborated. Subject to available funding, more CLAS staff members will be invited to ITC for additional training. The ITC Course Coordinator will make at least one coordination visit per year. The ITC Programme Director will also make occasional monitoring visits. In addition, there will be web-based support.

#### 5.1 Course evaluation

For the modules at CLAS. The CLAS Course Committee will issue the module- and end-of-course evaluation forms, and will manage the results. For the modules at ITC the ITC Programme Director will do this. Content, quality of teaching and teaching materials will be

evaluated. In addition, yearly evaluation reports (based on results of module and end-of-course evaluations, progress of participants, retention and completion rates and preferably also graduate and employer evaluations) and also improvement plans per course will be made by the ITC and CLAS Course Coordinators jointly and submitted to the ITC Programme Director and the CLAS Course Committee.

#### 5.2 Quality assurance

The quality of the course has been and will be assured in a number of ways:

- Course structure and curriculum at CLAS very much alike such as the ones at ITC.
- Quality assurance process, each partner is responsible for the external quality assurance (accreditation / certification) in the own country. Consequently, the quality assurance measures for the joint courses have to meet the criteria of the accreditation / certification bodies in both Bolivia and The Netherlands.
- Adequate facilities and library services in CLAS and in ITC.
- Assessment regulations applied to the whole MSc course and to the common MSc/NRM or WREM modules of the course.

The course fee will be paid to ITC and will be administered by ITC. A part of the course fee will be transferred to CLAS, in accordance with the breakdown of the calculation of the course fee. Finally, running a new Joint MSc programme could be very attractive to many students not only in Bolivia but within the region (Latin América), whilst Masters still has good basis to continue running and will continue.

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