**Council for Research Development (RUF)**
**Research Secretariat**
**Policy and Planning Department**
**Danish Ministry of Foreign Affairs**
**Asiatisk Plads 2**
**DK-1448 Copenhagen K**
**Denmark**

***Annex 7***

# REPORT FORM

## for Framework and Capacity-Building Projects

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|---|
| **Grant Recipient:** Henrik Balslev, Århus Universitet, Biologisk Institut, Herbariet, Bygning 137, Universitetsparken 8000 Århus C<br><br>Ph. 89422743/ 89424707. E-mail: henrik.balslev@biology.au.dk |
| **Project Title:** Biodiversity and Economically Important Species in the Tropical Andes (BEISA) – A research collaboration between Bolivia, Ecuador and Denmark |
| **Project Period:** October 2003 – September 2006 |
| **Project No.:** 91136 **File No:** 104.DAN.8.L.206 |
| **Size of Grant Awarded (DKK):** 1.633.200 (in 2004) |

I hereby send the annual report in English on the above research project. I declare that I accept that RUF and the Danish Ministry of Foreign Affairs may use the report and the project's results free of charge.

Date:Jan. 24, 2005 Name: Henrik Balslev Signature:

Herbarium
Institute of Biological Sciences
University of Aarhus, Build. 540
Ole Worms Allé
DK-8000 Aarhus C, Denmark
tel. (+45)8942-4742
lars.kvist@biology.au.dk

Forskningssekretariatet
Departmentet for udviklingspolitik
Udenrigsministeriet
Asiatisk Plads 2
DK-1448 Kbh. K.
Att. Line Sørensen

Kære Line Sørensen:

Hermed fremsender jeg i min egenskab af koordinator for BEISA vores årsrapport for 2004. Samtidig gør jeg opmærksom på at medlemmerne af BEISA´s styringskomite såvel som BEISA koordinatorerne på vores tre partnerinstitutioner har kommenteret tidligere versioner af årsrapporten, og at deres kommentarer og bidrag er efterfølgende er integreret iI den endelige årsrapport.

Venlig hilsen

Lars Peter Kvist

**The report contains the following items**:

# BEISA annual report (2004)

## 1. Dansk resumé

BEISA (Biodiversitet og Økonomisk Vigtige Arter i tropisk Andes – et forskningssamarbejde mellem Bolivia, Ecuador og Danmark, www.beisa.dk) er et ENRECA-projekt der omfatter fire universiteter med en aktiv interesse for økonomisk vigtige planter fra den centrale Andes region. BEISA er ledet af professor Henrik Balslev, Afdeling for Systematisk Botanik ved Biologisk Institut på Århus Universitet, og lokale projekt partnere er i Bolivia San Andrés Universitet i La Paz, og i Ecuador det Katolske Universitet i Quito og det Nationale Universitet i Loja. BEISA styrker Bolivias og Ecuadors kapacitet indenfor biodiversitet forskning og uddannelse. Unge lovende forskere bliver uddannet til at udføre selvstændig forskning på internationalt niveau. De bliver også trænet i at søge eksisterende biodiversitet viden i Web baserede databaser, og i at udbrede kendskabet til deres landes naturressourcer vha. moderne IT. Deres erfaringer vil hjælpe deres hjemlande til at udnytte, anvende og forvalte naturligt forekommende planter med økonomisk potentiale til gavn for egne borgere, og muliggøre, at nationale institutioner kan deltage i regionale og internationale bestræbelser på at bevare og forvalte Andes landenes biodiversitet. Den første 3-års fase af BEISA begyndte den 1. oktober, 2003, og gennem 2004 var den vigtigste aktiviteter på de enkelte partner institutioner følgende: 1). På San Andrés universitetet i La Paz at udvikle et nyt biologi curriculum, der giver kandidater bedre forudsætninger for at fremme en forvaltning af Bolivias ressourcer, 2). i herbariet i Quito at registrere anvendelsen af de i Ecuador hjemmehørende planter i en national database over økonomisk værdifulde arter, 3). på universitetet i Loja at gennemføre et feltstudium af produkter som befolkningen i det sydlige Ecuador samler og anvender fra træer der vokser i tørskove og bjergskove, og 4). på universitet i Århus at træne fire bolivianske og en Ecuadoriansk student i biodiversitets forskning og informatik. Studenterne i Århus har desuden defineret og planlagt M.Sc. speciale projekter, hvor dataindsamling bliver gennemført i deres hjemland fra begyndelsen af 2005. De i 2004 planlagte BEISA aktiviteter er med få undtagelser begyndt og gennemført i overensstemmelse med projektets arbejdsplan, og mange af disse aktiviteter fortsætter og producerer resultater som vil blive behandlet og publiceret gennem 2005 og 2006.

## 1. Summary in English

BEISA (Biodiversity and Economically Important Species in the Tropical Andes – A research collaboration between Bolivia, Ecuador and Denmark, www.beisa.dk) is a research collaboration framework aiming to enhance and improve biodiversity research and education at four partner institutions: the Institute of Ecology at the San Andrés University in Bolivia, the Catholic University of Ecuador in Quito, the National University of Loja, and the Biological Institute of the University of Aarhus. Each of these institutions has research interests regarding useful plants of the central Andean region. BEISA upgrades teaching and research regarding the rich biodiversity found in Bolivia and Ecuador. Young promising researchers are trained to an international level enabling them to carry out research regarding their home countries' biodiversity, as well as search, apply and disseminate knowledge found in information facilities and at institutions in the developed countries. Their capacities will help their home countries to exploit, apply and manage biodiversity for the well-being of their citizens, and enable national institutions to participate in regional and international projects and efforts aimed to improve the conservation and management of the regions biodiversity. The first three-year-phase of BEISA commenced on October 1, 2003. Through 2004 the principal activity at each of the four partner institutions were the following: 1) at the San Andrés University in La Paz a new and more adequate biology curriculum has been designed, 2) in the herbarium in Quito the uses of native Ecuadorian plants have been recorded in a data-base, 3) at the University of Loja a field survey of non-timber forest products in dry and pre-montane forests in southern Ecuador has been undertaken, and 4) at the University of Aarhus four Bolivian and one Ecuadorian student have followed M.Sc. courses. The students in Aarhus have also defined and described their thesis projects, to be carried out in their home countries from early 2005. Overall, the activities scheduled for 2004 have been initiated and implemented according to the BEISA work plan with a few exceptions, and most of these activities continue and produce results that will be processed and published throughout 2005 and 2006.

Key works: Biodiversity, Native flora, Etnobotany, Useful plants, Extraction, Non-timber forest products (NTFP's), research capacity, curriculum development, and sustainable development.

## 2. Background

The BEISA project (Biodiversity and Economically Important Species in the Tropical Andes – A research collaboration between Bolivia, Ecuador and Denmark) started on October 1, 2003 and its first phase will continue until Sept. 30, 2006. This first phase is envisioned as the first of four consecutive 3-year long project phases. The first project activity was an Inception Workshop attended by key project participants from the four partner institutions in La Paz, Bolivia, December 8-12, 2003. The objectives were to adapt the project activities to the granted budget that was reduced compared to the budget in the project application. It was also the purpose of the Inception Workshop to plan the coordination and implementation of the project. Based on the discussions and conclusions during the Inception Workshop an *Amendment to the Project Document* was elaborated (dated March 4, 2004). It included a revised budget, a new log frame, a detailed working plan for the three years, and co-operation agreements between the Danish partner and each of the local partners defining procedures and obligations according to the DANIDA standards. The Amendment is the document that guides the implementation, and here (at page 6) the main activities over the three years are summarized as "student course work and planning of the research program in 2004, field research in 2005, and processing of results and publication in 2006". BEISA has three principal objectives: 1) to improve university education and biodiversity research, 2) to document and make biodiversity information available taking advantage of modern IT, and 3) to investigate economically important species and ensure that results will serve to protect, use and manage local flora and fauna. In the present first project phase seven outputs (results) will contribute to these objectives, and specific project activities commenced in early 2004 and gradually expanded through the year. The present first BEISA annual report discusses the activities supporting each output, and accordingly mostly describes the project implementation, and document how the activities have advanced according to the work plan. Included is also a revised work plan that will guide the continued implementation of BEISA. However, compared to the original work plan the changes are moderate, and the objectives, outputs, indicators and assumptions appearing in the project log frame are maintained. It is therefore not necessary to elaborate a new log frame.

As **Appendix A** appears a list of the abbreviations applied throughout the BEISA annual report for the projects key persons as well as for various projects and institutions.

**3. Achievement of objectives**

*Number of students who have initiated an M.Sc. and Ph.D.*

Four Bolivian students and one Ecuadorian student commenced their M.Sc. degree studies at the University of Aarhus in February 2004, and all five have completed and passed the scheduled courses.

*Number of students who have graduated with an M.Sc. and Ph.D.*

None. The enrolled students are scheduled to graduate in late 2005/ early 2006.

*List of publications* (reports, peer-reviewed journals, proceedings, presentations)

BEISA research only began in 2004 and the studies continue, implying that few results have been produced at this early stage. However, during the year BEISA key persons have given a number of presentations at symposia and seminars.

*Proceedings (abstracts)*

Aguirre, Z. 2004. Los bosques secos del sur del Ecuador. Pp. 35 en Libro de Resúmenes X Congreso Nacional de Botánica, Universidad Nacional de Trujillo, Trujillo.

Balslev, H. 2004. La nueva clasificación de las Angiospermas. Pp. 23 en Libro de Resúmenes X Congreso Nacional de Botánica, Universidad Nacional de Trujillo, Trujillo.

Kvist, L.P., L.E. Skog & Amaya-Márquez, M. 2004. Las Gesneriaceae de Perú. Pp. 26 en Libro de Resúmenes X Congreso Nacional de Botánica, Universidad Nacional de Trujillo, Trujillo.

Moraes R., M., H. Balslev, H. Navarrete, Z. Aguirre, L. P. Kvist & F. Borchsenius. 2004. El proyecto BEISA, una oportunidad para investigación y capacitación en los Andes tropicales. Pp. 271 en Libro de Resúmenes X Congreso Nacional de Botánica, Universidad Nacional de Trujillo, Trujillo.

Navarrete, H., L. de la Torre, H. Balslev, F. Borchsenius, M. Moraes R., Z. Aguirre & L. P. Kvist. 2004. Libre acceso a la información sobre plantas útiles ecuatorianas a través del internet. Pp. 265 en Libro de Resúmenes X Congreso Nacional de Botánica, Universidad Nacional de Trujillo, Trujillo.

*Oral Presentations*

Aguirre, Z. Los bosques secos del sur del Ecuador. Conferencia magistral en X Congreso Nacional de Botánica, Universidad Nacional de Trujillo, Trujillo. May 4, 2004.

Balslev, H. La nueva clasificación de las Angiospermas. Conferencia magistral en X Congreso Nacional de Botánica, Universidad Nacional de Trujillo, Trujillo. May 4, 2004.

Balslev, H. Biodiversity in Bolivia. Thematic day concerning Danish Natural Resources Research in Bolivia, Royal Danish Agricultural University. Oct. 20, 2004.

Balslev, H & T. Knudsen. Tradicional uses and extraction of *Aphandra natalia* fibres. Biodiversity and Ethnoecology. Thematic Day, University of Aarhus. March 30, 2004.

Balslev, H. Evolución y Diversidad de las Angiospermas. Guest lecture, Universidad Nacional Amazonense Peruano, Iquitos, Peru. May 29, 2004.

Kvist, L.P. Medicinal plants in Loreto, Peru. Thematic Day, University of Aarhus. March 30, 2004.

Kvist, L.P. Las Gesneriaceae de Perú. Conferencia magistral en X Congreso Nacional de Botánica, Universidad Nacional de Trujillo, Trujillo. May 6, 2004.

Moraes R., M. El proyecto BEISA: Una oportunidad para investigación y capacitación académica en los Andes tropicales" May, X Congreso Nacional de Botánica, Simposio de Etnobotánica y Botánica Económica, Trujillo. May 6, 2004.

Moraes R., M. El proyecto BEISA: Biodiversidad de especies económicamente importantes de los Andes tropicales, November 2004, Seminario Instituto de Ecología, La Paz.

Navarrete, H. Iniciativas para compartir la información que se encuentra en las colecciones de museos y herbario. XVII Jornadas de Biología, Guayaquil, November, 2004.

Navarrete, H. Diversidad y endemismo de la flora del Ecuador, con especial énfasis en las pteridofitas. XVII Jornadas de Biología, Guayaquil, November, 2004.

Sánchez, O. Especies utiles de los bosques secos. Reunión anual de los investigadores Alamanes (DFG). Universidad Técnica Particular de Loja, September, 2004.

Torre, L. de la. Ethnoecology of vines used for crafts in Mexico. Thematic Day, University of Aarhus. March 30, 2004.

*Posters*

Presented at *Thematic day concerning Danish Natural Resources Research in Bolivia*, Royal Danish Agricultural University. Oct. 20, 2004.

A study of the genus *Elaeagia* in the Rubiaceae family (Maldonado, C., H. Balslev, F. Borchsenius & M. Moraes).

Useful woody species in seasonal dry Andean forests" (Carretero, A., H. Balslev & M. Moraes).

Ecology of palms in the Bolivian Amazon (Sanjinés, A., H. Balslev & M. Moraes), November 2004, Aarhus University.

Uses of palms in northwestern Bolivia (Paniagua, N., H. Balslev & M. Moraes), November 2004, Aarhus University.

Useful plants information in common people´s hands: Ecuador project (Torre, L. de la, Navarrete, H., Balslev, H. & Borchsenius, F.)

*Budget expenditure: Denmark and partner countries (Annex 10)*

The expenditures realized by BEISA distributed at project partners and budgetary lines appear in Annex 10. On December 31, 2004 a total of DKK 126.000 remained, distributed at the four partner institutions, and these unused resources should be transferred to 2005. Most of this surplus is at UMSA in La Paz. Here DKK 40.000 granted for IT-upgrading will be applied in the beginning of 2005, and it has not yet been possible to apply DKK 25.000 aimed for equipment of the Bolivian Fauna Collection (see Activity 1.4.1 in 4. Fulfillment of outputs and main activities).

*Other capacity building*

In Denmark the BEISA project took the initiative to establish a "Bolivia-group" that will network Danish researchers/ research groups involved in or interested in natural resource research in Bolivia. A founding meeting for the *Bolivia group* was held on April 15, 2004, at the initiative of the BEISA director HB, in collaboration with Marten Sørensen from the Ecological Institute of the Royal Veterinary and Agricultural University in Copenhagen (RVAU). Subsequently, on October 20, 2004, a seminar coordinated by HB and Sven-Erik Jacobsen from the Agricultural Sciences institute of RVAU was held with logistic support from the office of the NETARD (Danish Network for Agricultural Research for Development). Information regarding the Bolivia-group appears at the home page of NETARD (www.netard.dk). It is expected that the Bolivia groups will further a

closer collaboration between Danish research activities in Bolivia, and particularly between the ENRECA-projects active in the country.

In Bolivia BEISA collaborates with the FOMABO- (Forest Management in Bolivia) ENRECA-project, headed by professor Finn Helles, at the Forest and Landscape institute of RVAU, in collaboration with the forest units at universities in Cochabamba (UMSS) and in Santa Cruz (UAGRM). The BEISA-UMSA coordinator MM visited FOMABO´s two partner institutions in order to formalize and specify the collaboration with the FOMABO´s coordinators. This resulted in a workshop on "Scientific & Popular Writing", directed by MM over two days in September mainly for staff and students from UMSS and UAGRM, reviewing draft versions of their publications. Subsequently, discussions about further cooperation regarding training and research have continued both in Bolivia and in Copenhagen, and a number of common endeavors are planned for 2005 (see Revised workplan, Appendix B).

*Description of the dissemination of results to users at all levels*

According to the "Amendment to the project document" the last year of the present 3-years project phase will mainly be devoted to analyze and disseminate results to users at all levels. A start has been to establish a BEISA home page (www.beisa.dk) which gives a general description of the project and which will be a fast and efficient outlet for its results. Over the coming months the home-page is envisioned to become a dynamic link both between the project participants, and users that want to access data and results produced by the BEISA projects. In addition, the four partner institutions are also actively improving their home pages in order to disseminate BEISA results, as well as other biodiversity data.

## 4. Fulfillment of outputs and main activities

Here we summarize the advances of all activities scheduled for 2004 in the work plan. Individual activities figure below the outputs (results) which refer to in the log-frame presented in the *Amendment to the Project Document*. Compared to the log frame, the descriptions of the activities have been abbreviated and do not include tasks planned for 2005 and 2006. BEISA key persons are referred to with the abbreviations appearing in Appendix A.

**Output 1.1**. Project partners and particularly UMSA, La Paz, have improved their capacity of teaching and research regarding sustainable use and management of native flora and fauna, improving and expanding courses and curricula, and actively soliciting funding from national and international institutions and organizations.

**Activities**: 1). Workshops to plan and coordinate the project partners' activities initially in Bolivia in Dec. 2003 and subsequently in Peru in May 2004.

**Fulfillment**: The initial workshop was held Dec. 8-12, 2003, with key representatives from the four partner institutions. Based on its results an "Amendment to the project document" (dated March 4, 2004, and discussed in 2. Background) was elaborated. Subsequently during the first week of the project director HB and the coordinators from UMSA, ULN and AAU attended a Peruvian National Botanical Congress in Trujillo. In addition to attend the congress and give various presentations (see list in 3. Achievement of objectives), these days were used to discuss the up-start of BEISA. Much attention was given to analyze the planned curriculum development particularly at UMSA, and the present curricula of the four partner institutions were distributed and evaluated. Subsequently, visits by the Danish-BEISA coordinator to Ecuador in August-September and to Bolivia in November also served to coordinate the activities of the partners, evaluate project advances and discuss and adjust the activities that will be implemented in 2005 (and appear in the attached Revised Working Plan, Appendix B). The general outline of a book regarding economically important plant of the tropical Andes was also defined.

**Activities**: 2). Appraise the qualifications needed by biology candidates from UMSA, and evaluate the current curriculum, and develop a new improved curriculum; 3). Improve existing courses, and develop new courses particularly concerning Economic Botany; Natural Products Chemistry; and, Management of Natural Resources.

**Fulfillment**: 2). MM coordinated in May 2004 the elaboration of a synthesis and evaluation regarding the present biology curriculum at UMSA. The conclusion was that the curriculum did not reflect the fact that most future candidates probably will find work in public administration and in private enterprises often as consultants, and that fairly few of them will get employed as researchers. This underlines the need to offer new courses regarding administration and management of projects and natural resources. This evaluation became the starting point of a planning process aimed to define a new structure and content of the UMSA-curriculum. This process has involved UMSA staff teaching modules for biology-students, and their discussions

has been enriched by comments and suggestions made by FB, HN and ZA and distributed by MM at UMSA. A draft-document for a new study plan was distributed in Sept. 2004, and additional internal as well as external comments were integrated into a final version distributed in Dec. 2004.

3). The new biology-curriculum will be implemented from the second semester of 2005, and teachers at UMSA has consequently started to upgrade existing modules and design new modules particularly such ones that deal with management/ professional performance (non-science courses). Regarding the improvement of existing courses professors at AAU and the Ecuadorian partner institutions have exchanged experiences and materials with professors teaching similar topics at UMSA, e.g. plant geography and systematic botany. The botany group at UMSA is also designing four new modules that will be taught first time during 2005 and 2006, viz. *Economic Botany I* (second semester 2005), *Economic Botany II* (second semester 2006), *Conservation and Management of Natural Areas* (first semester 2006), and *Ecological Foundations for Management and Sustainabilit*y (second semester 2006). The overall structure of these modules was finished in December, 2004, and particularly LK made suggestions regarding the structure and content of the Economic Botany courses. LK is also supporting the UMSA-botany group in elaborating reading materials aimed for the teaching of these two modules; and has written a draft of a manual that describes methodologies in Economic Botany.

An introduction to Natural Products Chemistry is envisioned as a component of the Economic botany I module. Jose Luis Castro and Patricia Mollinedo, Bolivian chemists from UMSA, who currently study for their Ph.D. at the Lund University in Sweden, discussed on Oct. 21, 2004, the teaching of the natural product component with professor Jerzy Jaroszewski and associate professor Søren Brøgger Christensen at the Danish Pharmaceutical University (DFUNI). Their conclusion was the Bolivian chemists will teach this component in La Paz November-December, 2005, supported by a member from the Natural Product group at DFUNI.

**Output 1.2.** Bolivian and Ecuadorian undergraduate students from the participating institutions have been trained to their first degree in biodiversity management and utilization at their home-universities.

**Activities**: 1) Train pre-graduate students for their first degree (biólogo, licenciatura, ing. forestal, agrónomo) at the local institutions in thesis research focused at economically important plants.

**Fulfillment**: The BEISA-coordinators at UNL, UMSA and PUCE all teach and train pre-graduate students, and some of their students have commenced local thesis-projects (licenciatura). At UNL four students conduct thesis-research and will get their Forest engineer degrees during 2005. Two of them have established permanent one-hectare sample plots in two different dry forests (Zapotillo and Macará), and the other two have established one plot in more humid, hilly and species-rich pre-montane forest (El Colorado). In all three places they investigate the floristic composition of the forests, and record the potential uses of the woody plants by interviewing local people in the plots. At both PUCE and UMSA one biology student has planned thesis-projects stipulated to commence January 2005, and additional local thesis students are expected to be identified and to be supervised during 2005. Finally, in Bolivia two agronomy students have planned fieldwork together with AC for degrees at the University of Chuquisaca (see activity 1.3.2).

In addition, one forestry student at ULN, and two biology students at UMSA are planning local Master Degree studies envisioned to begin in March 2005.

**Output 1.3.** Bolivian and Ecuadorian graduate students from the participating institutions have been trained to M.Sc. and Ph.D. level in Denmark.

**Activities**: 1) Select and prepare four Bolivian and one Ecuadorian graduate student for M.Sc. studies abroad. 2) Train the selected students in biodiversity research and management in Denmark, commencing with 10 month coursework (60 ECTS) during 2004, and planning the individual thesis projects (to be executed in 2005).

**Fulfillment**: 1) The selection and preparation of the students in late 2003 were discussed in the "Amendment to the Project Document" and they arrived to Aarhus at January 26, 2004. 2) Here they began course work right away. In the period until June they followed: *Plant biogeography and Macroecology* (15 ECTS); *Tropical Rainforest Ecology* (10 ECTS); and *Biodiversity Informatics* (5 ECTS). Subsequently, from September to December the students all followed "Systematic Botany" (15 ECTS). In addition, over the summer (July-August) all five commenced their individual *Biological Projects* (15 ECTS) with deadline for delivering their works in January 2005. Pending approval of the Biology projects, the Bolivian/ Ecuadorian M.Sc. students have consequently all completed the planned 60 ECTS of course-work. Three students prolonged their stays in Denmark until mid/late January 2005, rather than going home in December 2004, in order to finish their *Biological Projects*.

In Denmark the students have also planned the thesis work that they will carry out in their home-countries in 2005. Two of them started this process in May 2004 when they practiced field methodology together with HB in Loreto, Peru. Here AS recorded the occurrence of palms in transects though distinct forest formations, and NP studied native people's uses of palms, and both will in 2005 use the same methodology for their thesis work in Bolivia. AS will study the distribution and abundance patterns of palm communities and how these patterns relate to environmental factors in lowland rainforests of the Madidi National Park, Bolivia, and NP will investigate peoples knowledge regarding palms mainly by interviewing informants along the transects established by AS.

AC will study useful trees in the Chuquisaca province of Bolivia. He will do his thesis work in collaboration with two agronomy students from the University in Sucre, and the latter will make their first local degree as part of the project (licenciatura). They will establish transects passing through both forest regenerating after fallow and intact forests, and particularly AC will interview local inhabitants regarding the potential uses of the trees found in these transects. The participation of the local students is financed by the Environmental Sector Program of DANIDA. Information regarding local people's knowledge and perceptions concerning native trees may facilitate the promotion of agroforestry systems in the region.

CM's thesis focuses on the taxonomy and phylogeny of the genus *Elaeagia* in the Rubiaceae (coffee) family. This genus comprises trees, predominantly found in montane forests of Latin America, and she has as part of her project planned fieldwork in Bolivia, Peru and Ecuador during January and February 2005.

LT will compile, integrate, and organize the existing comprehensive but dispersed information concerning the uses of native plants in Ecuador. A national Ecuadorian data base with these data will be designed, made available to the general public through an Internet portal, and continuously updated. Data will also be analyzed and published in a *Catalogue of useful Ecuadorian plants*.

**Output 1.4.** The infrastructure and management of natural history reference collections in the collaborating institutions have improved, particularly the Bolivian Fauna collection (*Colección Boliviana de Fauna*) at UMSA, La Paz.

**Activities**: 1). Identify needs and install equipment to upgrade zoological biodiversity reference collection in the *Colección Boliviana de Fauna,* La Paz.

**Fulfillment**: This activity has been postponed because the roof of the building presently holding the fauna collection is in poor shape implying that rain may

damage newly established equipment. The problem is expected to be solved during 2005, so the fauna collection can receive the envisioned support. Otherwise it may be necessary to consider another use of DKK 40.000 allocated for this purpose in 2006 (see Revised budget, Appendix D).

**Output 2.1**. The IT-infrastructure of the participating institutions has been upgraded, and researchers and technicians have been trained, e.g. enabling IT-based reference collection management.

**Activities**: 1). Identify needs and install IT-infrastructure for management of biodiversity data including reference collections at participating institutions.

**Fulfillment**: In the case of PUCE new equipment were installed in 2003, and a Web-site and interfaces to show the data on the Web is being developed. The biodiversity data in their databases are continually expanded, including digital photos of specimens and the literature database. In the case of UMSA the IT-infrastructure needs have been analyzed, and the upgrading is expected to happen in February 2005.

**Activities**: 2). Train Master Students in use of IT to process and analyze biodiversity data.

**Fulfillment**: During the *Biodiversity Informatics* (see activity 1.3.2) course each student constructed a database and made the information available at the Web. They have also worked with databases as part their *Biology project*.

**Output 2.3**. Research results are published to a broad spectrum of end-users and both locally, nationally and internationally, taking advantage of modern IT for the elaboration and distribution of relevant results and information, e.g. user-friendly identification and documentation materials.

**Activities**: Few results were envisioned to be published in 2004 since BEISA just has started, and it is a long process to publish in peer-reviewed journals.

**Fulfillment**: Some preliminary results have been presented as contributions to symposia and seminars (see list of publications in 3. Achievement of objectives), and a BEISA home page has been established (see dissemination of results in 3 Achievements). A book regarding economically important plants in the Central Andes has been outlined and will contain ca. 30 chapters. The authors will be BEISA participants and outside experts in subjects not covered by the project participants' expertise. The authors will write their contributions until July 2005, whereupon MM and BO will edit the book, and expect to publish it in mid-2006.

**Output 3.1**. Researchers have collaborated with local people/ communities, identifying economically important plants in the tropical Andes, and investigating the uses, values and management of individual species or groups of plants, as well as the combined socio-economic importance of species providing non-timber forest products (NTFP) to local people.

**Activities**: 1). Inventory of economically important plant species in Ecuador.

**Fulfillment**: Three persons have during the second semester of 2004 actively entered Ecuadorian ethnobotanical information into a database in the QCA herbarium at PUCE in Quito. LT will from early 2005 analyze these data and prepare a complete inventory of Ecuadorian useful plants both for a book and a Web-site. In addition, a book with ethnobotanical data recorded from vouchers specimens found in the QCA herbarium is nearly finished (3800 collections representing 1500 species), and these data will also become available on the herbarium's Web-site.

**Activities**: 2). Local, national or regional studies focused at species of plants applied for selected purposes. 4). Study non-timber forest products (NTFP´s).

**Fulfillment**: 2). LK has nearly finished a study regarding anti-parasitic plants in Loreto, Peru, bordering the Amazon region of Ecuador with co-workers from DFUNI. In Bolivia a student thesis study of the medicinal plants used by the Chimane ethnic group in the Bolivian lowland is underway under the supervision of MM. In Ecuador HN edits a book about trees used by the Huaorani Amerindians in the Yasuní National Park. 4). Also in Ecuador ZA and OS researches non-timber forest products in both dry and pre-montane forests in the southern parts of the country. Fieldwork has been completed in the dry forests of Zapotilla and Macará. Nearly 100 semi-structured and 360 structured interviews were conducted, and the results have been computerized in the herbarium of Loja. Fieldwork continues in more humid pre-montane forests where similar numbers of semi-structured vs. structured interviews will be carried out, and anticipated to be complete in March 2005.

**Activities**: 5). Elaborate, evaluate and improve methodologies to investigate interactions between human communities and plant resources.

**Fulfillment**: LK has spend one month (August 18 – September 18, 2004) in Ecuador collaborating with ZA and OS in defining and elaborating methods for their ethnobotanical study in southern Ecuador. This was also an opportunity to train the

involved forestry students in collecting information regarding the uses of products from plants, and local people's perceptions regarding these resources. LK is writing a systematic survey of field methods applied for Economic Botany research.

Summary of advances: Overall the outputs/activities have advanced according to the plans scheduled in the work plan for 2004. IT upgrading at UMSA began later than planned but in due time to permit the IT-training and database installation scheduled from mid-2005. It has not been possible to buy equipment to improve the conditions of the Bolivian fauna collection.

**5. Risks and assumptions**

The potential risks mentioned in the original *Project Document* (from March 2003) have not materialized, and the assumptions appearing in the *Amendment to the Project Document* appear to remain valid.

**6. Lessons learnt and future perspectives**

The Bolivian students arrived to Denmark only six weeks after they had been selected, and, as a consequence, there was very little time for their preparation, e.g. to improve a limited knowledge of English. However, the fact that they did arrive as a group, and followed the same program during their first year in Denmark, has made it possible to give them the support necessary to cope with this difficult situation. Future foreign students, particularly if they arrive individually rather than as groups, will need more preparation in their home country.

**7. Revised log frame and budget**

A revised work plan is included as Appendix B, while it is estimated as un-necessary to revise the log frame, considering that the envisioned results and activities are the same as in the *Amendment to the Project Document*. In contrast, planning between the project partners in late 2004 has resulted in changes regarding the timing and the substance of the tasks supporting the individual activities. Regarding the timing, it is the plan that the Bolivian M.Sc. students will defend their thesis projects in Aarhus in December, 2005, rather than in mid-2006. It has been evaluated to be preferable that they complete their fieldwork in Bolivia in about six months rather than 12 months (activity 1.3.2). In

addition, additional tasks supporting activities as curriculum development (activity 1.1.3), dissemination of results (activity 2.3.1), etc. have been identified and specified.

Appendix C includes the budget for 2005 including quarter-expenditures, and the budget for 2006 appear as Appendix D. Compared to the budgets in the *Amendment to the project document* these revised versions include only very moderate changes, and the total BEISA budgets for the individual years have not changed. However, for two institutions some resources have switched between 2005 and 2006. In the case of UMSA the 2005-budget has increased and the 2006-budget has decreased correspondingly. The reason is that the Bolivian M.Sc. students will study in Aarhus in 2005 rather than originally planned in 2006. In the case of AAU a similar amount has been moved from 2005 to 2006, mainly reflecting that a workshop (see activity 1.1.1) that was planned November 2005 will be held in January 2006.

In the 2006 UMSA-budget appears DKK 40.000 for Equipment-Zoology Museum. Most of these resources (DKK 25.000) were disbursed in 2004 but it may not be possible to spend them before 2006 (see discussion of Activity 1.4.1). The amounts that already have been transferred have instead been allocated for the purchase of a car in early 2005, and the budget for the this expenditure has been reduced accordingly.

## 8. Research progress

Most of the research planned during the first phase of BEISA commences in 2005, and only PUCE and UNL, both in Ecuador, has initiated major research efforts during the present year. These efforts (3.1.4 and 3.1.1. described above) have advanced according to the plans, and results will be processed from early 2005.

**Appendix A**

Abbreviations used in the Annual Report for BEISA for institutions and project as well as BEISA key persons.

AAU (University of Aarhus)
AC (Alain Carretero, UMSA-Master-student)
AS (Adriana Sanjinéz, UMSA-Master-student)
BEISA (Biodiversity and Economically Important Species in the tropical Andes)
BO (Benjamin Oellgaard, AAU, Economic Botany BEISA book editor)
CM (Carla Maldonado, UMSA-Master-student)
DFUNI (Danish Pharmaceutical University, Copenhagen, Denmark)
FB (Finn Borchsenius, AAU, head of steering committee)
FOMABO (Forest Management in Bolivia, ENRECA-project based at RVAU)
HB (Henrik Balslev, AAU, project director)
HN (Hugo Navarreta, PUCE-BEISA project coordinator)
LK (Lars Peter Kvist, AAU-BEISA project coordinator)
LT (Lucia de la Torre, Master-student from PUCE)
MM (Monica Moraes, UMSA-BEISA-project coordinator)
NP (Narel Paniagua, UMSA-Master-student)
OS (Orlando Sanchez, UNL, fieldworker and local Master-student)
PUCE (Pontificia Universidad Católica del Ecuador, Quito, Ecuador)
QCA (the herbarium at PUCE in Quito, Ecuador)
RVAU (Royal Veterinary and Agricultural University, Copenhagen, Denmark)
UAGRM (Universidad Autónoma Gabriel René Moreno, Santa Cruz, Bolivia)
UMSA (Universidad Mayor de San Andrés, La Paz, Bolivia)
UMSS (Universidad Mayor de San Símon, La Paz, Bolivia)
UNL (Universidad Nacional de Loja, Loja, Ecuador)
ZA (Zhofre Aguirre, UNL-BEISA-project coordinator)

**Abbreviations (bold) for institutions and persons affiliated the individual institutions (with coordinator first).**

| | | |
|---|---|---|
| **Bo** | UMSA: Universidad mayor de San Andrés, La Paz, Bolivia | **MM** (M. Moraes) , **AC** (A. Carretero), **CM** (C. Caldonado), **NP** (N. Paniagua), **AS** (A. Sanjínes) |
| **E1** | PUCE: P. Universidad Católica de Ecuador, Quito, Ecuador | **HN** (H. Navarrete), **LT** (L. de la Torres) |
| **E2** | UNL: Universidad Nacional de Loja, Loja, Ecuador | **ZA** (Z. Aguirre), **OS** (O. Sanchez) |
| **Da** | AAU: University of Aarhus, Aarhus, Denmark | **LK** (L.P. Kvist), **HB** (H. Balslev), **FB** (F. Borchsenius), **BO** (B. Oellgaard). |

| Immediate objective / Result / Activity / Task | Year | 03. | 2004. | | | | 2005. | | | | 2006. | | | Responsible Institutions | Principal participating persons (not necessarily complete) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trimester | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | | |
| 1 1 1 Workshops to coordinate, plan and discuss activities and results | | | | | | | | | | | | | | | |
| 1 Plan, execute and report first workshop to coordinate project | | xxx | xx | | | | | | | | | | | Bo Da | MM LK |
| 2 Inter-institutional work group meets in Trujillo, Peru | | | | x | | | | | | | | | | Da | LK ZA MM HN HB |
| 3 Workshop in La Paz to discuss results, plan 2. project phase, etc. | | | | | | | | | | | x | | | Bo Da | MM LK HN ZA HB |
| 4 Continued planning and writing of proposal for 2. project phase | | | | | | | | | | | xx | | | Da | LK HB MM HN ZA |
| 1 1 2 Appraise existing curriculum and support curriculum development (particularly at UMSA) | | | | | | | | | | | | | | | |
| 1 Interinstitutional workgroup evaluates existing curriculum | | | xxx | | | | | | | | | | | Bo E1 E2 Da | MM HN ZA FB nn |
| 2 Workgroup help to define and design new curriculum | | | | x | xxx | xxx | | | | | | | | Bo E1 E2 Da | MM HN ZA FB nn |
| 3 Continued monitoring of curriculum development | | | | | | | xxx | xxx | xxx | xxx | xxx | xxx | xxx | Bo E1 E2 Da | MM HN ZA FB nn |
| 1 1 3 Improvement of/elaboration of specific courses | | | | | | | | | | | | | | | |
| 1 Support improvement of existing courses | | | | | xxx | xxx | xxx | xxx | xxx | xxx | | | | Bo E1 E2 Da | MM & nn (depending on subjects) |
| 2 Elaboration of Economic Botany courses | | | | | xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxx | | Bo E1 E2 Da | LK MM nn |
| 3 Integration of Economic Botany in existing UNL courses | | | | | | | | xxx | xxx | | | | | | ZA LK OS nn |
| 4 Elaboration/teaching of Economic Botany course in Quito | | | | | | | | xxx | xxx | xxx | xxx | xxx | | | HN LT LK nn |
| 5 Teaching: Economic botany I in La Paz | | | | | | | | xxx | xxx | | | | | Bo E1 E2 Da | Mostly lecturers from UMSA |
| 6 Natural Products chemistry (integrated with previous course) | | | | | | | | | xx | | | | | Bo Da | DFUNI, UMSA Chemical Institute |
| 7 Teaching: Economic Botany II in La Paz | | | | | | | | | | | | | xxx | Bo | Mostly lecturers from UMSA |
| 8 Elaboration of Natural Resource management courses | | | | | | | | xxx | xxx | xxx | xxx | | | Bo E1 E2 Da | MM, colaboration with FoMaBo |
| 9 Teaching: Conservation/management of natural areas in La Paz | | | | | | | | | | | xxx | xxx | | Bo | Mostly lecturers from UMSA |
| 10 Teaching: Ecological Bases of Management/sustainability, La Paz | | | | | | | | | | | | | xxx | Bo | Mostly lecturers from UMSA |

| Immediate objective / Result / Activity / Task | Year | 03. | 2004. | | | | 2005. | | | | 2006. | | | Responsible Institutions | Principal participating persons (not necessarily complete) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trimester | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | | |
| 1 1 4 Strengthen capacity to negotiate projects including funding from third parties | | | | | | | | | | | | | | | |
| 1 Analysis of existing institutional contacts and networks | | | | | | | xxx | | | | | | | Bo E1 E2 Da | In colaboration with FoMaBo |
| 2 Strenghen institutional capacities to solicit/negotiate funding | | | | | | | xxx | xxx | xxx | | xxx | xxx | xxx | Bo E1 E2 Da | Coordinators, partly with FoMaBo |
| 1 2 1 Train students for first degree (licenciatura) and for Master degrees in Bolivia and Ecuador | | | | | | | | | | | | | | | |
| 1 Train pregraduate forest engineer students in Loja, Ecuador | | | | xx | xxx | | xxx | xxx | xxx | xxx | xxx | xxx | | E2 | ZA OS nn |
| 2 Train pregraduate biology students in Bolivia/ Ecuador (Quito) | | | | | | | xxx | xxx | xxx | xxx | xxx | xxx | xxx | Bo E1 | MM HN HB |
| 3 Train M.Sc. students at universities in La Paz and Loja | | | | | | | x | xxx | xxxxxx | | xxxxxx | | xxx | Bo E2 | MM ZA |
| 4 Workshops in Bolivia: scientific writing and thesis supervision | | | | xx | | | xx | | | | | | | | MM, in colaboration with FoMaBo |
| 1 3 1 Select and prepare Bolivian and Ecuadorian students for studies abroad | | | | | | | | | | | | | | | |
| 1 Selection and preparation of 5 M.Sc. students | | xx | x | | | | | | | | | | | Bo Eq | MM HN HB |
| 1 3 2 Train graduate students in biodiversity research and management in Denmark | | | | | | | | | | | | | | | |
| 1 Coursework (60 ECTS) of 5 students at University of Aarhus | | | xx | xxx | xxx | xxx | x | | | | | | | Da Bo E1 | FB HB LK nn |
| 2 Detail planning of individual thesis research projects | | | | x | xx | x | x | | | | | | | Da Bo E1 | HB FB nn |
| 3 Bolivian Students write and defend M.Sc. Thesis in Aarhus | | | | | | | | xxxxxx | xxx | | | | | Da Bo | HB FB MM nn |
| 4 Ecuadorian Student write and defend M.Sc. Thesis in Aarhus | | | | | | | | | | | xx | xxx | xx | Da E1 | LT HB FB HN |
| 1 3 3 Supervise M.Sc. Students during thesis research in home countries | | | | | | | | | | | | | | | |
| 1 Four thesis research projects at UMSA, Bolivia | | | | | | | xxx | xxx | | | | | | Bo | MM nn |
| 2 One thesis research project at PUCE, Ecuador | | | | | | | xxx | xxx | xxx | xxx | x | | | E2 | HN nn |
| 1 4 1 Upgrade zoological reference collection in Colección Boliviano de Fauna, La Paz | | | | | | | | | | | | | | | |
| 1 Identify and priority infrastructure needs | | | | | | | | | | xx | | | | Bo | nn |
| 2 Acquire, install and maintain new as well as existing equipment | | | | | | | | | | | xxx | | | Bo | nn |

| Immediate objective / Result / Activity / Task | Year | 03. | 2004. | | | | 2005. | | | | 2006. | | | Responsible Institutions | Principal participating persons (not necessarily complete) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trimester | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | | |
| 2 1 1 Improvement of IT-equipment particularly in the Bolivian National Herbarium | | | | | | | | | | | | | | | |
| 1 Identify, priority and install IT-equipment | | | | | | xxx | xxx | | | | | | | Bo | nn |
| 2 1 2 Train staff, students and other relevant person in using IT to investigate biodiversity | | | | | | | | | | | | | | | |
| 1 Training of students integrated in their stays in Denmark | | | xx | xxx | xxx | xx | | | xxx | xx | | | | Da Bo E1 | FB nn |
| 2 Training at local institutions in Bolivia and Ecuador | | | | | | | xxx | | | | xxx | xxx | xxx | Bo Da | nn, Students back fom Denmark |
| 2 2 1 Promote the application of and the integration with international biodiversity IT-facilties | | | | | | | | | | | | | | | |
| 1 Training of relevant persons within partners institutions | | | | | | | | xxx | xxx | xxx | xxx | | | Bo E1 E2 Da | FB HN nn |
| 2 Promotion of biodiversity-facilities in others national institutions | | | | | | | | | | xxx | xxx | xxx | | Bo E1 E2 Da | MM HB nn |
| 2 3 1 Publication of scientific papers as well as popular contributions | | | | | | | | | | | | | | | |
| 1 Book with ethnobotanical data from herbario QCA | | xxx | xxx | xxx | xxx | xxx | | xxx | | | | | | E1 Da | nn HN |
| 2 A comprehensive "Catalogue of useful plants in Ecuador" | | | | | | | | | | xxx | xxx | xxx | xxx | E1 | LT HN nn |
| 3 Publications regarding extraction in southern Ecuador | | | | | | | | | xxx | xxx | xxx | xxx | xxx | E2 | ZA LK OS nn |
| 4 Plan book concerning economic botany in the Central Andes | | | | xxx | xxx | | | | | | | | | Bo Da | MM Oellg HB |
| 5 Write contributions to book regarding the Central Andes | | | | | | | xxx | xxx | | | | | | Da | Many contributors |
| 6 Edit and publish book regarding plants in Central Andes | | | | | | | | | xxx | xxx | xxx | xxx | | Da Bo | MM Oellg HB |
| 7 Contributions to symposium in Peru including proceedings | | | | xxx | xxx | | | | | | | | | Da E2 E1 Bo | LK ZA MM HB |
| 8 Contributions to symposium in Loja including proceedings | | | | | | xxx | xxx | xxx | xxx | xxx | | | | E2 E1 Bo Da | ZA HN MM LK HB |
| 9 Scientific publication by project researchers elsewhere | | | xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxx | Bo E1 E2 Da | Potentially all |
| 10 Popular presentation/distribution of activities and results | | | | | | xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxx | Bo E1 E2 Da | Students and others |
| 2 3 2 Develop user-friendly documentation of biodiversity via internet accessible data-bases, etc. | | | | | | | | | | | | | | | |
| 1 Economically important plants in Ecuador | | | | | | | xxx | xxx | xxx | xxx | xxx | xxx | xxx | E1 | LT HN FB nn |
| 2 Use and management of palms in Bolivia | | | | | | | | | xxx | xxx | xxx | xxx | xxx | Bo Da | NP FB MM HB |

| Immediate objective / Result / Activity / Task | Year | 03. | 2004. | | | | 2005. | | | | 2006. | | | Responsible Institutions | Principal participating persons (not necessarily complete) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trimester | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | | |
| 2 3 3 Target documentation concerning plant resources to rural end-users | | | | | | | | | | | | | | | |
| 1 Particularly too communities in Loja, Ecuador | | | | | | | | | xxx | | xxx | xxx | xxx | E2 | OS nn ZA |
| 2 Particularly to communities in Chuquisaca, Bolivia | | | | | | | | | | | xxx | xxx | | Bo | AC nn MM |
| 3 Particularly to communities in the Madidi Natl. Park of Bolivia | | | | | | | | | | | xxx | xxx | | Bo | AS NP CM MM nn |
| 3 1 1 Inventory of economically important plant taxa | | | | | | | | | | | | | | | |
| 1 Enter relevant information from Ecuador in database | | xxx | xxx | xxx | xxx | xxx | xxx | | | | | | | E1 | nn LT HN nn |
| 2 Analyze information in data base concerning Ecuadorian plants | | | | | | | xxx | xxx | xxx | xxx | xxx | | | E1 Da | LT HN |
| 3 Commence database with relevant information from Bolivia | | | | | | | | xxx | xxx | | xxx | xxx | xxx | Da E1 | MM LT nn |
| 3 1 2 Applications of plants for selected, specific purposes | | | | | | | | | | | | | | | |
| 1 Antiparasitic plants applied in western tropical South America | | | xx | | xx | | xxx | | | | | | | Da | LK DFUNI nn |
| 2 Plants used for medicine in Bolivian forests | | | | | | | xxx | xxx | xxx | xxx | xxx | xxx | | Da Bo | MM LK nn |
| 3 Extraction for construction and technical uses in Bolivian forests | | | | | | | | xxx | xxx | xxx | xxx | xxx | | Da Bo | MM NP LK nn |
| 3 1 3 Studies of selected economically important plant species | | | | | | | | | | | | | | | |
| 1 The genus *Elaeagia* (Rubiaceae) in Andean montane forests | | | | | xx | xx | xxx | xxx | xxx | xxx | | | | Bo Da | CM FB LK MM |
| 2 The uses of palms in the Madidi National Park of Bolivia | | | | | | | xxx | xxx | xxx | xxx | | | | Bo Da | NP HB MM nn |
| 3 Distribution and abundance of palms communities in Madidi | | | | | | | xxx | xxx | xxx | xxx | | | | Bo Da | AS MM HB nn |
| 3 1 4 Socioeconomic importance and management of NTFP species | | | | | | | | | | | | | | | |
| 1 NTFP in southern Ecuador and particularly in Dept. Loja | | | xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxxxxx | | | Bo | ZA OS nn |
| 2 Economically important trees in Dept. Chuquisaca, Bolivia | | | | | xx | xx | xxx | xxx | xxx | xxx | | | | E2 | AC HB MM nn |
| 3 1 5 Development of methodologies to investigate human interactions with plants | | | | | | | | | | | | | | | |
| 1 Elaborate methodologies appropriate for research components | | | | xxx | xxx | xxx | xxx | xxx | | | | | | Da Bo E2 E1 | LK ZA OS AC HB |
| 2 Evaluate/compare results attained using different methodologies | | | | | | | | | xxx | xxx | xxx | xxx | | Da Bo E2 E1 | LK ZA OS AC HB |