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A report to the
State Forestry Administration of the People's Republic of China, Kunming, Yunnan Province, China &
Forest Conservation and Community Development Project (FCCDP), Ministry of Foreign Affairs of the Government of the Netherlands

Needs assessment for training in design, data format development, management & use of geographic information systems for forest biodiversity conservation with an emphasis on the Caiyanghe Nature Reserve pilot project, Yunnan Province, China

synopsis

This report is an assessment of the training needs for the development of six, somewhat linked, geographic information systems (GIS) for forest biodiversity conservation. The focus in this assessment is on the training of the personnel, who are largely already in place, for systems design, development, assessment, and effective end use for a range of decisions-makers and scientists. This assessment is one of the largest bilateral projects on forest biodiversity conservation ever undertaken. All of these geographic information systems are being developed in the 2000 to 2002 period for six nature reserves in Yunnan Province of southern China. The focus for much of 2000 is on training and initial operation of one pilot GIS: for Caiyanghe Nature Reserve.

This mountainous region, with tropical, subtropical and temperate forest, has some of the richest set of biological resources remaining in eastern Asia. The geographic information systems being developed are not intended just as inventory devices for compiling many years of field data. Rather, these geographic information systems are intended for use in the management and protection of the biological diversity and other forest resources for the cores, buffers, and important adjacent areas of six nature reserves – forest mosaics with rich and sometimes organisms and ecosystems of global significance.

The terms of this project, of which the geographic information systems are only a part, also link a wide range of field and secondary data production and compilation to decision-making at the level of nature reserve managers and country and provincial land use planners. The project is only slightly behind schedule. But 2000 is the critical period for training to lay the basis for development of data base formats, design of GIS architectures, completion of the base and forest cover maps , begin the use of the national format for tracking biodiversity (CBIMS), begin the development of applications to facilitate system use and use by decision-makers. In this context, rapid delivery of training to achieve these often difficult scientific, technical and management operations are needed.

It is because of this urgent need for training that the Forest Sciences Division of ITC was engaged to conduct this assessment. Related concerns for data formats for inventory, monitoring and assessment, as well as GIS design, and applications are also covered as part of the need for a range of decisions by mid-2000 on which to build a sound basis for at least two years of training.

The problems and opportunities described for this project in Yunnan Province are not particularly different than those of other projects based on biodiversity conservation-oriented geographic information systems. throughout the world. In fact, this project of the State Forestry Administration and the Netherlands Ministry of Foreign Affairs has already mobilized exceptional levels of organizational support as well as scientific and technical expertise. Local expectations are high. This advantageous situation becomes problematic only when there been unevenness in the progress of various aspects of this complex project while a range of scientific, technical and managerial decisions have been avoided. This report lists the questions that must be quickly answered in order to begin to undertake relatively intensive training beginning in a matter of weeks. The major differences, and programmatic gaps, identified have been around

divergent understandings of and priorities for GIS design, data formats, remote sensing methodologies, and the role of applications. All of these sets of questions can be resolved within Yunnan through transfer of scientific, technical and managerial expertise – but there is not much time. In addition, there are more training needs than most have appreciated. And some of these gaps could retard the development of the project even when most other decisions have been made and training has been complete.

This is the technical report to provide background, with more detailed information and recommendations, for the accompanying policy report, "A strategy for training in development, management & use of forest biodiversity conservation geographic information systems." That report is authored by Kunming-based consultant Mr. He Bin with the support of ITC through Gordon Brent Ingram, the Associate Professor of the Forest Sciences Division. Both reports were developed after considerable discussion with Kunming-based staff, both Chinese and Dutch, along with a discussion in the State Forestry Administration office in Beijing. Where differences are perceived between the two reports, the He & Ingram strategy should be used to clarify policy and proposals for services delivery for the remainder of this year. While this ITC report explores longer-term questions of conservation biology, methodologies, systems design and a wide range of technical details.

In terms of use of this document, the Executive Summary is most relevant as an expanded discussion of the points in the accompanying strategy document. In addition, there are a number of content discussions around training that lead to lists and timetables for the direction of the remaining three years of this five year project. Much of the remainder of this report is intended as a record for future missions and investigations into GIS training needs as for other discussions on operationalizing use of digital technologies, biodiversity data, and conservation decision-support. For explanations of the technical jargon in this report, see Appendix I.

Contents

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Executive summary of recommendations

The operational goals for this pilot GIS are remarkably simple, deceptively so. For 2000, they are the following:

1. the setting of territorial boundaries to be represented by the GIS that include all of the nature reserve core, all its buffer zones and key adjacent areas within a rational spatial unit as defined by natural and cultural factors;
2. creation of a base map through in-house digitizing and scanning;
3. creation of a forest cover, ecosystems and land use map (or rather set of map layers) as based on 1998 and 1999 (spectral) remote sensing data in conjunction with ground truthing and other field data collection involving global positioning systems;
4. some entry of species and habitat data as based on IMA formats (that have yet to be formalized);
5. the creation of at least one thematic map as related to current land use or related resources; and
6. training five or more people to be able to successfully achieve each of the operations listed above (in well under nine months).

It will be difficult to attain these goals within 2000 but this strategy attempt to show how such highly coordinated efforts would be possible. However, without an extensive training programme addressed to particular topics and groups, these goals will not be met, seriously jeopardizing the long-term benefits of the project.

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Introduction

The Forest Sciences Division of ITC was contracted to conduct this initial consultancy for the Forest Conservation and Community Development Project at a critical time: a third of the way, through this five year technical assistance programme. There are substantial needs for training in spatial and digital technologies with most personnel already in place. This report is from an exciting point for the design and operationalization of six state-of-the-art geographic information systems.

Over the last two years, there have been a number of training needs analyses, for different aspects of the Forest Conservation and Community Development Project. However, little time has been spent in the last year, in identifying the specific requirements for training Chinese staff, with little or no command of English, in a wide range of advanced digital technologies, practices, and modes of problem-solving and information exchange. ITC recommendations are needed in March of 2000 to not only set achievable objectives for and to propose a blueprint for all subsequent training in 2000. This initial training needs assessment also lays the basis for a training plan, proposed for towards the end of the year, for training in GIS, remote sensing,

necessary field methods, and development of decision support for the remainder of the project extending into 2003.

As for the mandate of this training needs assessment, the introduction of the March 2000 terms of reference (FCCDP Project Management Office 2000b) state that,
"How effective will the implementation of the [entire] FCCDP be needs to be assessed by the Forest Resources and Biodiversity Inventory, Monitoring and Analysis System (IMA)[pronounced in English as 'ee-mah']. In the IMA, first hand reliable data / information of the existing tropical forest resources and other issues arising from nature reserve management must be timely and effectively collected for the decision-maker (FCCD Project Management Office) and the nature reserve managers (Prefecture Wildlife Protection Offices and NR Management Offices etc.) managers (Prefecture Wildlife Protection Offices and NR Management Offices etc.). To achieve this goal, the establishment of a monitoring network – FCCDP GIS integrating Geographic Information System (GIS), Remote Sensing (RS) and Global Positioning System (GPS) (hereafter referred to as GIS in general) with conventional inventory and monitoring techniques is no doubt adequate and effective. In addition to the spatial data of the nature reserves to the IMA system will engage, tremendous attribute data of the nature reserve will also be involved, it is therefore necessary to set up the GIS and MIS (management information system) data bases to achieve effective management and to provide better service to FCCD PMO and the nature reserve managers in the fields of database management and GIS/MIS." [bracketed words are Ingram's]

This two week consultancy took place in Beijing and Kunming, China in early and mid-March. The terms of this particular consultancy, and the subsequent two week report completion and review period, were to complete the first training needs assessment directly concerned with linking the linking of data and decision-support aspects of this Sino-Dutch cooperation project on forest conservation. In particular, the attention in this assessment was on determining training needs for a range of operations linking production of data on forest biodiversity to the design, development and management of six geographic information systems all of which are months and years away from full operation.

The focus in this consultancy is in determining the short-term training needs, much for this year, that are required to begin to put into operation the first of these geographic information systems, for the pilot nature reserve. The Caiyanghe Nature Reserve is a mountain area of exceptionally intact tropical and subtropical forest with an intact core of natural forest surrounded by roughly the same area of degraded, 'experimental' buffer.

Training subjects covered in the terms of reference

The terms of this investigation also extended to the training needs for effective provision of data of sufficient quality (in terms of spatial precision and being current) to be used in decision-making. These highly spatial data bases are being developed for use by reserve managers and for land use planners and other decision-makers at county / prefecture and provincial levels. The intended level of application of these geographic information systems for forest biodiversity conservation is high. If these goals are met, these geographic information systems would be critical contributions to environmental management in China and would most likely function as prototypes for other forest biodiversity conservation efforts in the country. However, this level of application, from this particular project over the next three years, remain

in doubt. What is clear is that the worthwhile and ambitious goals require an additional level of training needs assessment: for systems designs and spatial decision-support functions. Consequently, the types of geographic information systems-related training that was considered in this report extend to the following operations and operations and personnel:

principles for forest biodiversity conservation necessary for design, development, maintenance and use (by land managers and scientists) of viable geographic information systems with those functions;

final phases of **design of data formats** (often referred to here as 'IMA) (Project Management Office 2000a) for subsequent entry into geographic information systems (and related conservation biology principles);

decision-making around formats for **compilation and entry of spatial data** (computerized mapping);

compilation, review and on-going **management of data quality**;

theory and methodology for use of remote sensing (spectral, satellite) data in geographic information systems;

use of global positioning hardware and software expressly in conjunction with remotely sensed and forest biodiversity data;

field methods for working in conjunction with remote sensing data (for subsequent entry into geographic information system);

use of remote sensing data processing software and development and transfer of subsequent maps (to geographic information systems);

design of the overall GIS architecture for forest biodiversity conservation (that fully represents the five sub-systems and respective functions envisioned in the project documents)

applications development for Chinese-language users to make the typically English-language software, such as Arcview, more useable;

applications development for data entry in the field (typically in conjunction with global positioning systems);

applications development for quality control and management of data;

applications development to adapt C-BIMS to the intended sub-systems and functions of these particular geographic information systems;

Data forms for inventorying, monitoring & analysis (IMA)

The core of the IMA concept in this project are five different inventory, monitoring and decision-support 'subsystems' (FCCDP Project Management Office 2000a). These, rather complex and overlapping, projects can be described briefly in terms of the following:

1. subsystem 1: fragile biological resources and ecosystems of immediate attention;
2. subsystem 2: fragile ecosystems in the buffers of the nature reserves;
3. subsystem 3: "key and indicator ecosystems and species";
4. subsystem 4: production capacities in areas adjacent to nature reserves; and
5. subsystem 5: land uses in adjacent zones.

But as a possible facility for conservation, such operations, even when developed through one computer system (which is not the case with this project), are not automatically integrated and pose questions for effective development and management. For example, only at the very end of the March 11 and 12, 2000 technical meeting (see Appendix XI) was it made clear by an official of the Kunming office of the State Forestry Administration that there was more interest on their part for subsystems 4 and 5. In contrast, personnel in the Sino-Dutch project office have indicated that these latter two subsystems were intended to be a comparatively small portion of the overall programme.

Such unresolved questions around project resources, optimal level of GIS complexity, and intended use, have tremendous implications for this entire project. The flash point for differences has emerged around the . architecture for the pilot GIS Some key decisions must be made in the coming months. Fortunately, the levels of scientific and technical exchange have been well-established for largely concensus-based decisions that most participants can live with. This report is attempt to envision that middle-road in operationalizing these systems for such a wide range of groups and to quickly develop the highest quality training available from Chinese and Netherlands institutions.

Decisions made on software

An overall plan for development of the geographic information systems of the six nature reserves was proposed (Yunnan Institute of Forest Inventory, Planning & Design 1999) but not implemented. This overall concept at least listed training needs for 'file management', 'PC system management, Arcview 3.1, and GPS operation (Yunnan Institute of Forest Inventory, Planning & Design 1999: 26). Instead, a concept for a pilot project geographic information system was developed (FCCDP. 1999a). But again, the terms of reference of this document neglected the bulk of the training needs for remote sensing, GIS design and management, data transfer, applications development, and subsequent decision support.

Project gap analysis & problem statement

In this initial assessment, the following are the kinds of capability and training gaps in the project that were immediately apparent in the first weeks of interviews and consultations.

The GIS and decision-support objectives of the pilot project are only partially defined
solution:
cost-effectiveness
impact
design process transferable to other nature reserves
design facilitates use
possibilities of decisions in the field
operationalization of decision-support

There are growing number of decisions on geographic information systems that require the input of various groups and to be properly recorder.
solution:
Advisory board
with
Long
Li of the FCCP office (for Mr. Wang)
Yu
He bin
planning input
Yunnan Academy of Forest Science
the endangered species lab
the reserve managers

As part of training, there is a need for Kunming GIS staff to extensively use the internet and web sites.
solution: individual email accounts

There is growing need for technical exchange between nature reserve managers.

Lack of ITC training capacities in Chinese
Late in 1999, ITC entered into contract negotiations for provision of services under the auspices of training around forest biodiversity conservation geographical information systems. Virtually all of ITC's training services are in the English language. However, in March of 2000, a series of decisions were made by the Sino-Dutch project that are to make the great majority of the software utilized and data bases architectures developed in the coming months and years to be in the Chinese language. At the same time, it has become apparent that less than a handful of the potential staff for these data bases, nor the prospective end-users, can speak English let alone be able to utilize any kind of training in English.

Inadequate assessment of training needs geographic information systems and conservation biology in the previous year
While the early phases of the Sino-Dutch project had extensive analysis of training needs as well as procedures to conduct assessments, there was little mention of the requirements for development, maintenance, management and practical use of the six geographic information systems that were funded. Even at the late day of the first GIS concept, by Larenstein GIS (1999), barely considered training linked to system design, management and utilization, beyond hardware acquisition. A subsequent proposal, originating from China (Beijing Astronautical Technology Development Company 1999) similarly emphasized operation of hardware and limited training in software.

There has been a large gap in training in global positioning technologies, remote sensing and subsequent map production in GIS
The need for this highly scientific training is highlighted in the Terms of References for the IMA (FCCDP Project Management Office 2000a: 4 [point 9]). However, before this investigation, little practical attention was paid to this objective. The lack of an extensive and rigorous training programme in these activities threatens the integrity of nearly every other operation in this project for its remaining three years.

There has been inadequate consulting and programme development in links between data production, GIS architecture, and decision support. The international consultants in 1999, as originally envisioned (FCCDP Project Management Office 2000a: 4, below bottom heading) gave insufficient attention to operationalizing the links between data production, GIS architecture, and decision support as illustrated in the consulting reports (FCCDP Project Management Office 1999a, Larenstein GIS 1999). Yet, this is intended linkage is a central theme in all of the seminal project documents and guides much of the current management of the project. The limited terms of reference of the June 1999 Larenstein report, in particular, is largely responsible for the current confusion. That report emphasized hardware acquisition, a few standard software packages, and initial training in hardware operation by venders without any appreciation of what the facility was intended to achieve nor the system design decisions that would be necessary for the well-defined indicators of effectiveness (rooted in effective biodiversity conservation).

There has been, so far, no effective review of other forest biodiversity conservation geographic information systems. There has been a lack of appreciation, in the previous consultant reports, for typical and state-of-the-art methods, system design processes, and applications. This has stymied a basic consensus on the need for typical software customizations from those for facilitating Chinese-language users to data quality management to decision support. This lack of attention, in 1999, to such components, that are crucial to virtually all current biodiversity conservation geographic information systems, have laid the basis for obstacles to a range of decisions – constraining even the first phase of operationalization of the pilot project GIS

The previous concept and proposed budget for training for the pilot GIS was inadequate and did not reflect the training needs of Chinese language-speaking personnel. The intended geographic information systems are complex and require far more personnel hours and training than

envisioned in the only other discussion of GIS training needs (FCCDP Project Management Office 2000c: 32 – 36).

The role of identification and management of corridors in this project is unresolved. The need for corridors between these relatively small protected areas has been a central theme in the Dutch-initiated project concepts (FCCDP 1997: [second of three project objectives], FCCDP Project Management Office 2000a: 2, Euroconsult. 1999a: 28 - 29). But corridors appear have not been fully considered for implementation phases of the GIS or have been effectively dropped from serious consideration by cooperating Chinese agencies. This question of the extent to which potential corridors might be covered in one or more of the six GIS has tremendous implications for a range of design decisions necessary for operationalization. Based on decisions around the design of the GIS, and boundary delineation in particular, that are needed in the month of March and April, the concern for corridors between the six protected areas will be either developed or dropped.
solution:
Given the centrality of this concern in the formation and establishment of this project, the role of decisions around the GIS, in land management vis-à-vis corridors, warrant discussion in at least one technical meeting, linked to boundary delineation for the pilot nature reserve.

There has yet to be a training needs assessment for staff at the level of the provincial, prefecture and county levels.
solution: interviews and assessment of needs by mid-2001

Recommendations for GIS architectures & applications

We can think of GIS architecture as that similar to the design of a houses (in this project, 6 houses) with gardens that partially touch on eachother. ‘Architecture’ is needed to fit everything needed into the houses and the gardens; to build some fences where necessary and to have some common space. And a stream my flow between or through some of the gardens.

If the GIS architecture is faulty, the ‘houses’ can collapse on people in the rainy season causing misery. how to satisfy the intended functions of the five subsystems for very different nature reserves in terms of size, shape, socio-economic and cultural contexts? And if a house is designed to be too small, or the rooms are partitioned awkwardly, there may not be room out of the rain for all of the records, books, heirlooms, scrolls, and other signifiers of (group) memory. What does this metaphor of a small neighbourhood or village infer about principles for design of the geographic information systems?

Firstly, the design of the data bases, their inter-relationships and applications should be flexible. Each nature reserve is different and involves a slightly different set of social and conservation projects. Thus **the** six geographic information systems should not be identical though it is necessary to employ the same data formats, applications and standards. Secondly, a number of decisions need to be made early on in the design process. For this pilot GIS, a number of decisions are necessary by May 1, 2000:

1. the software and the types and inter-relationships of the applications intended to implement each subsystem;
2. the partitioning and layering of the data particularly in terms of implementation of each subsystem;
3. the outer boundary of the territory represented by each geographic information system (that includes the nature reserve cores, buffers and important adjacent areas in rational natural and cultural units);
4. the relationship of the processed remote sensing data to the forest cover map(s);
5. the minimum levels of field data to be collected **before** initial processing of remote sensing data;
6. the relationship between the attributes and categories on the forest cover maps and already-established categories of forest ecosystems; and
7. the role of successional phases and cultural factors in the attributes and categories described on the forest cover maps (as based on the field work combined with field work).

Recommendations for training

The following capabilities for training were identified:

- a wide array of relevant software, architectures & applications;
- analysis of the use of geographic information systems for biodiversity conservation;
- stakeholder analysis and potential users;
- system design;
- system development;
- job descriptions of personnel currently or projected to be involved with or using these biodiversity conservation geographic information systems;
- analysis of current training levels; and
- selection of future staff.

Staffing for training

Within the world of remote sensing and GIS, the current strengths of ITC (and its Forest Sciences Division) is in delivery of training in these technologies that is interdisciplinary and problem-based. The groups that we best serve are mid-career professionals with first and often also post-graduate degrees. often already in managerial and scientific positions.
The Forest Sciences Division of ITC can offer 2 ongoing professionals based in the Netherlands, for several periods a year in China, for the life of the project. These individuals provide training and advising services in English. Since few personnel available for this project, in Yunnan Province ,speak English, the ITC personnel would be oriented to transfer of technical, scientific and instructional expertise; effectively to train the Chinese-language trainers. In order to transfer the necessary range and combination of expertise, 60 % to 70% of this training, to English-language speaking professionals, would best be in or in the vicinity of the nature reserves and adjacent areas (and would be intended to bring together professionals from different levels and sectors). Another 30 % to 40% of the training and advising would best be at the Kunming

facility bringing together that staff with those from the scientific institutes and the provincial land use planning offices.

Two Netherlands –based trainers and advisors from ITC are recommended over a single individual who works twice as much on the project. Unfortunately, this recommendation increases transportation costs for ITC-based training services. But there are a number of reasons for this recommendation. First, few individuals, if any, in the Netherlands or elsewhere, have all of the skills and background to train in these operations and advise on the methods and systems development that are necessary (as prerequisites to development of training programmes). Secondly, more advanced English-language training is only necessary at particular points in the project and at different times of the year. Thirdly, by returning to ITC on a regular basis, the trainers / advisors can most efficiently develop training, advising and broader transfer efforts especially where the testing of new digital technology is necessary. A fourth point is that the weather plays a major role in the scheduling of the field work. Heavy rains make field work in the periods of (Europe's) summer virtually impossible and some high elevation areas are difficult to effectively work in during the winter. A fifth, and less important point to the Sino-Dutch project, is that the FSD-ITC staff available for this project can typically stay no more than two months at a time as they are needed on other ITC work back in The Netherlands. Some of this work could involve providing training services and an international peer environment to Beijing and Kunming-based personnel.

At the present time, ITC can propose two Netherlands-based individuals, to work in a team with Chinese counterparts over the next three years.

i.

Associate professor, universitair hoofddocent, for training and advising on scientific and technical activities particularly:

conception, development of training materials, delivery of scientific and management-level training, and evaluation of training programme effectiveness (in collaboration with Kunming-based GIS consultants and under the direction of the Kunming-based Sino-Dutch project);
forest biodiversity conservation objectives, field assessment methods, and data formats (in conjunction with C-BIMS software development group in the State Forestry Administration, Beijing);
importation of field and other spatial data to the geographic information systems;
GIS design for conservation planning (mid-project implementation of software and digital data management aspects of subsystems 1, 2 & 3);
implementation of the intended decision-making facilities of subsystems 1, 2 & 3 at the level of the reserve managers and scientific institutes; and
development of decision support tools for nature reserve managers and provincial / prefecture land use planners.
individual at ITC whom is qualified & already
assigned to the project: Ingram

ii.

Assistant professor, universitair docent, for training and advising on technical activities related to:
field methods and software for remote sensing and global positioning;

forest biodiversity field assessment methods, and data formats;
mapping through use of remote sensing data linked to field work methods linked to the geographic information systems;
GIS design for planning sustainable forestry and other land use (architectures for subsystems 2, 4 & 5);
implementation of subsystems 2, 4 & 5 especially at the Kunming facility and with the provincial and county / prefecture land use planners; and
linking data from nature reserve managers to the Kunming facility.

The services of these individuals as staff of FSD-ITC could be made available to this project over the coming three years at the following levels:

2000: 3 to 5 months each in China with 10 to 20% additional preparation time at ITC (optimal periods in Yunnan: April & May, October through December);

2001: up to 5 months each in China with 10 to 20% additional preparation time at ITC (optimal periods in Yunnan: January & February, April & May, October through December);

2002: up to 5 months each in China with 10 to 20% additional preparation time at ITC (optimal periods in Yunnan: January & February, April & May, October through December); and

2003: up to 4 months each in China with 5 to 10% additional preparation time at ITC (optimal periods in Yunnan: January & February, April & May, October through December).

The proposed terms of the service delivery could be best carried through the following management understanding between FCCDP and the FSD of ITC:

for missions scheduling, a minimum of three months notice from the Kunming project office (with requests with shorter notice (and for shorter periods) possible in a few extraordinary instances);

FCCDP Kunming project flexibility in the majority of dates (within two weeks before or after dates of particular requests) in order to minimize disruption to other FSD-ITC education programmes and projects;

the two ITC personnel teaching and advising in a team for at least half of the time in order to pool expertise and to be most effective (especially with larger groups in the field and in the Kumning GIS facility);

based on our institutional emphasis on mid-career, problem-based learniong, personnel having input into the proposed locations of training sessions with the option of 60% of their training and advising time being at the nature reserves and respective prefectures / counties;

ITC personnel providing services in the same work week as is used at ITC with additional hours in a particular work week (possible at the irregular request of the project directors only) being redistributed within the period of the same mission to China; and

ITC personnel consulting to the project as staff of a Netherlands institution of higher learning where informal scholarly contact could be made outside of project work time (with the informing of the project Directors and as long as contact did not involve conflict-of-interest and competing funding proposals).

Appendix I
Chronology of mission activities

Ingram's involvement in this project began on the evening of Tuesday, February 29. Dr. Michael Weir, who had originally been schedule for the mission, had fallen ill suddenly. Within Ingram has had the most experience on field research for and development geographic information systems for forest biodiversity conservation but was not a staff member when the ITC contract with this project was originally proposed.

Thursday, March 2, 2000
Enschede to Den Haag: beginning rush visa application process

Friday, March 3, 2000
Den Haag: successfully obtain visa
Amsterdam: preparations for trip

Saturday, March 4, 2000
Amsterdam: meeting with ITC staff member proposed for subsequent missions for project preparation (due to short-notice of trip and the need to convey project documents); discussions about the project and development of a subsequent team from the ITC Forest Sciences Division depart Amsterdam for Beijing

Sunday, March 5, 2000
Beijing: late arrival because of ice storm in Schirpol; arrival at hotel
Beijing:
1. meet with Mr. Long and Mr. Li

Monday, March 6, 2000
Beijing:
1. meeting with GEF
2. Paul Schoonackers

Tuesday, March 7, 2000
depart Beijing for Kunming
Kunming:
1. meeting with project directors Mr. Wang, Mr. Bram Bustra, and FCCP staff

Wednesday, March 8, 2000
Kunming:
1. . meeting with project directors Mr. Wang, Mr. Bram Bustra, and FCCP staff and review of Beijing mission of Long and Li
2. review of project documents

Thursday, March 9, 2000
Kunming:
1. visit to new Dutch-funded GIS facility at State Forestry Authority, Kuming; meeting with Mr. Yu

Friday, March 10, 2000
Kunming:
1. visit to new Dutch-funded GIS facility at State Forestry Authority, Kuming; meeting with Mr. Yu

Saturday, March 11, 2000
Kunming:
Technical meeting on forest biodiversity conservation data base formats, GIS facility at State Forestry Authority (technical meeting described in Appendix VIII)

Sunday, March 12, 2000
Kunming:
Technical meeting on forest biodiversity conservation data base formats, GIS facility at State Forestry Authority (technical meeting described in Appendix VIII)

Monday, March 13, 2000
Kunming:
1. IMA
2. meetings with counterpart, Mr. He Bin
3. meeting with Mr. Bustra

Tuesday, March 14, 2000
Kunming:
1. IMA including tentative scheduling of field time at pilot nature reserve for ITC staff involved forest mapping
2. meetings with counterpart, Mr. He Bin

Wednesday, March 15, 2000
Kunming:
1. meeting with Mr. Yu

Thursday, March 16, 2000
Kunming:

Friday, March 17, 2000
Kunming:

Saturday, March 18, 2000
Kunming to Beijing (not possible to make the connection to Amsterdam without an overnight stop)

Sunday, March 19, 2000
depart Beijing for Amsterdam
Amsterdam to Enschede

Appendix II

List of persons contacted

Individuals are listed in alphabetical order by family names. For telephone and fax, China's prefix is 86. For dialing the city / region code from outside of China, the '0' is dropped.

Dr. William Bleisch
Science Director
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interpreter
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Appendix III

List of project documents consulted

Beijing Astronautical Technology Development Company. (November) 1999. Caiynaghe Nature Preserve GIS/MIS Computer Information System Construction Plan. on file FCCDP.

ARCADIS Euroconsult. 1999a. FCCDP Forest resources and biodiversity inventory, monitoring and analysis mission. Draft final report. May 1999, ARCADIS Euroconsult, Arnhem, The Netherlands).

ARCADIS Euroconsult. 1999a. FCCDP Forest resources and biodiversity inventory, monitoring and analysis mission. Volume II. June 1999, ARCADIS Euroconsult, Arnhem, The Netherlands).

FCCDP. 1997. Annex A2: Forest and biodiversity resources inventory, monitoring and analysis. February 1997 (Yunnan Department of Forestry, Ministry of Foreign Affairs, Directorate-General International Cooperation & People's Republic of China / Kingdom of the Netherlands).

FCCDP. 1999a. PIMAP: Preliminary integrated management plan of the provincial level Caiyanghe Nature Reserve, Yunnan Province, P. R. of China, June 1999.

FCCDP. 1999b. Plans of Operation: IMA / GIS Pilot Programme in Caiyanghe Nature Reserve, November 1999.

FCCDP Project Management Office. 2000a (February 7, 2000). Terms of Reference for Forest Resources and Biodiversity Inventory, Monitoring and Analysis (IMA) Consultancy.

FCCDP Project Management Office. 2000b. Terms of reference for GIS consultancy. March 7, 2000. (This was the version of the TOR developed by the project after the contract was developed. On March 7, the FCCDP requested that the ITC consultancy be carried out under these terms.)

Larenstein GIS. 1999. FCCDP Geographic Information Systems Final Report, June 1999 (Larenstein GIS, International Agricultural College, The Netherlands).

Yunnan Institute of Forest Inventory, Planning & Design. 1999. FCCDP Operational plan for IMA GIS component.

Appendix IV

English-language draft of training needs questionnaire

The following questionnaire was developed by Ingram and kindly adapted and translated into a Chinese-language form by Mr. He Bin with distribution intended for project staff and other prospective contributors and end-users of the six geographic information systems.

Gordon Brent Ingram, Ph.D.
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March 9, 2000

PLEASE RETURN BY 1600 HR, 16 March, 2000 TO
Mr. He Bin fax: (0871)4145717

Forest Conservation & Community Development Project Yunnan Province

Forest biodiversity conservation
geographic information systems
training questionnaire

This questionnaire is intended for project staff, nature reserve managers and other staff, scientists, land use planners and forest managers working on or having an interest in the geographic information systems being developed for the six nature reserves in the Forest Conservation & Community Development Project Yunnan Province (Caiyanghe, Nuozhadu, Wuliangshan, Tongbiguan, Xiaoheishan, Gaoligongshan)

date_____

name _____

employment position_____

office _____

street city_____

telephone & fax_____

email _____

gender _____ age_____

years of English language training _____
years of employment working in the English language_____

describe two or three of your areas of expertise and employment experience

1. _____
2. ._____
3. ._____

final university degree_____ location _____ year ____

years of post-secondary education _____

one or two major fields of study_____

if you have a masters degree, the title of the thesis_____

_____

year M.Sc. completed _____

number of university courses in the following:
wildlife management & biodiversity conservation_____
landscape ecology_____
biology_____
land use planning & forestry _____

list courses titles and the year the course was completed

_____

_____

_____

_____

_____

_____
please list relevant courses and workshops taken outside of university

_____ list on back of sheet
_____

years of employment _____
please indicate if any of your responsibilities involved the following:

(3 months or more employment only)
nature reserve field work_____ years

nature reserve management _____ years
government administration ____ years
university teaching & research _____ years
design of **spatial** computer systems _____years
management of **spatial** computer systems _____ years
data entry into **spatia**l computer systems _____years
management & input of other computer systems _____years
development of web sites _____ years
processing of remote sensing data _____years
integrating processed remote sensing data
with geographic information systems _____ years
work with habitat data _____ years
work in land use planning using habitat and forest cover data _____ years
work with conservation criteria and planning _____years
computerized decision-support that was **spatial** _____years

experience in forest diversity geographic information systems

Please describe your experience in the following mentioning length of time on this activity, the project and the institute, the year, and the name and telephone or email number of your supervisor

1. Remote sensing of forest areas

List software used

Did you ever supervise or teach this knowledge and these skills?

2. Integration of remote sensing data into geographic information systems

List software used

Did you ever supervise or teach this knowledge and these skills?

3. Field work with global positioning technology

Describe the terrain and climatic conditions

Indicate numbers of hours of fieldwork per week

Describe the hardware and software

Did you ever supervise or teach this knowledge and these skills?

4. Transfer of global positioning technology to spatial databases

Describe the hardware and software

Did you ever supervise or teach this knowledge and these skills?

focused on natural ecosystems

Describe ecosystems and locations

Describe any digital technologies employed

Did you ever supervise or teach this knowledge and these skills?

6. Fieldwork focused on vertebrates

Describe the species, habitats and locations

Describe any digital technologies employed

Did you ever supervise or teach this knowledge and these skills?

7. Fieldwork focused on plants

Describe the species, habitats and locations

Describe any digital technologies employed

Did you ever supervise or teach this knowledge and these skills?

8. Fieldwork focused on invertebrates and / or non-vascular plants

Describe the species, habitats and locations

Describe any digital technologies employed

Did you ever supervise or teach this knowledge and these skills?

Describe any experience mapping phases of forest succession and ‘ancient forest’ location of this field work

Describe any digital technologies employed

Did you ever supervise or teach this knowledge and these skills?

10. Assessment of data before entry into spatial data bases

Describe the data

Describe the software

Did you ever supervise or teach this knowledge and these skills?

11. Experience in digitizing

what institute?

What kind of data?

How many hours of digitizing did you do a day?

Did you ever supervise or teach this knowledge and these skills?

Did you ever supervise or teach this knowledge and these skills?

Describe any experience designing geographic information system ‘architecture’ as in organization of layers of spatial data

Describe the data

Describe the software

Did you ever supervise or teach this knowledge and these skills?

13. Describe any experience with ‘tiling’ as in linking spatial data on adjacent areas into coverage in a larger database

Describe the data

Describe the software

Did you ever supervise or teach this knowledge and these skills?

14. Describe any experience with decision support for land use planning and management

goal of decision support

areas or regions of concern

intended outcome of the decision-support

software used

Do you ever supervise or teach this knowledge and these skills?

15. Do you have any experience developing software applications?

If so:

Were the applications spatial?

What software did you work with?

Did you ever supervise or teach this knowledge and these skills?

* * *

Please make any further comments about any other expertise, technical skills and experience that you feel that you can offer to the geographic information systems and related field work and decision-support aspects of this project.

Are there any other forms of training in geographic information systems and related field work and decision-support that you feel that will be necessary for you to work in, manage or be a end-user with these computer systems?

Appendix V

Original agenda & minutes of March 2000 technical meeting

Kunming, March 11 & 12, 2000

Agenda proposal by
Dr. Gordon Brent Ingram, Associate Professor, ITC
with the guidance of
Mr. He Bin, Consultant to the Sino-Dutch Project & Division Director, Yunnan Institute of Environmental Science
Mr. Long Yongcheng, Associate Professor, Yunnan Forestry Department

Technical meeting on
forest biodiversity conservation
data base formats

The focus of this meeting is to discuss, for the first time, formal collaboration of the following groups around the development of the geographic information systems for the six nature reserves in the Sino-Dutch Project:
Sino-Dutch funded laboratory, Kunming
Mr. Zhu's group in the Ministry of Forests, Beijing
with assistance of the consultant from the FCCDP-PMO,
Mr. He Bin of a Kunming-based GIS consulting group
with assistance of the consultant from the FCCDP-PMO,
the Forest Sciences Division, ITC (International Institute for Aerospace Survey & Earth Sciences), The Netherlands (which has an independent history of training of Chinese personnel)
The representatives of other groups present are as sources of data and end user groups who will be increasingly consulted as this project progresses.

Proposed Agenda
Saturday, March 11
Session 1
1000 hr to 1200 hr
Software & data base decisions for the geographic information systems for the 6 nature reserves
Content:
This is the most crucial session of the technical meeting.

Review of the
software environments used by each group;
software programmes used (and developed) by each group;
biodiversity conservation GIS architectures and data formats used (and developed) by each group;
software applications used (and developed) by each group; and

capacities for development of software applications (and formats) in the coming year
Decisions to be made:
Software environments: Windows98 or Sy-Base or both (if both, which platforms are use for which versions);
Software: Arc|Info or powermap (Beijing-developed) or both (if both a basic decision on the nature of the a protocol and GIS architecture)
Applications development (for remote sensing, global positioning data, data entry, data management, and decision-support): in Beijing-developed powermap or Arc|Info's MO (one or the other)

Session 2
Saturday 1330 hr to 1700 hr
Review of data entry formats & their effective spatialization
Content:
review of producers of data & end users of the data;
review of the extent of quality and spatial precision of the data that is available in 2000;
review of C-BIMS (China Biodiversity Information Management System) formats and the need for any additional formats and protocols for this project with these 6 nature reserves;
review of additional data formats related to the relatively extensive goals for end-use at the level of nature reserve managers, county planning authorities, and scientific institutes
Decisions to be made:
whether or not the Sino-Dutch project fully supports the data base formats of C-BIMS (an affirmative decision was already tentatively made in Kunming on March 7, thus precipitating this meeting);
whether or not the Sino-Dutch project will develop additional data base formats (which can be compatible with C-BIMS);
the extent to which the decision-making support applications can be linked (or not particularly linked) to C-BIMS (this has more implications for whether these applications might be attractive to nation-wide users of C-BIMS)

Session 3
Saturday 1900 hr to 2200 hr
Review of working groups on data formats & geographic information systems in Kunming & Beijing (along with ITC programmes in the Netherlands & China)
Content of discussions:
Review of hardware, software, and personnel resources of these groups in terms of:
GIS architecture;
data base formats,
data base entry;
integration of remote sensing data;
software applications development; and
end-user support

Decisions made:
Modalities of collaborations on a middle-term basis, funding permitting, to advise, design, develop, manage, monitor, evaluate and redesign and redevelop aspects of the geographic information systems of the six nature reserves.

Sunday
Session 4 (with Zhu, He, Ingram, Long, Yu and other interested parties)
1000 hr to 1300 hr
Decision-support functions & other end-user functions
Content:
Review of contributing and user groups and user-subgroups:
nature reserve managers and the different offices and personnel (and training levels);
Government institutes:
Ministries, offices and specific levels of decision-making and personnel;
Academic organizations and institutes – particular levels of research, decision-making and personnel
Nongovernmental organizations (?)

Initial review of end-users needs for information input, analysis & decision-support as related to the GIS user groups:
nature reserve managers and the different offices and personnel (and training levels);
government institutes:
ministries, offices and specific levels of decision-making and personnel;
academic organizations and institutes – particular levels of research, decision-making and personnel
nongovernmental organizations (?)
As related to:
Production of data (from field work);
Planning of subsequent monitoring and assessment programmes;
Conservation planning including planning and management in the buffer and adjacent areas (including any corridors which would be year away from serious discussion);
Landscape, habitat, and species protection / management

Decisions needed:
Identification of 5 to 10 initial priorities for software applications for end user functions, for field work and nature reserve management, and an initial concept for collaboration and subsequent development of a work plan.
Constitution of this group as a technical advisory committee for the direction of the development of the geographic information systems for the six nature reserves in Kunming under the Sino-Dutch project.
Schedule of subsequent meetings of technical advisory group
Beginning the development of an end-user advisory group of nature reserve staff (with representatives of each reserve), county planning offices, academic institutes, and non-governmental organizations

List of participants

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