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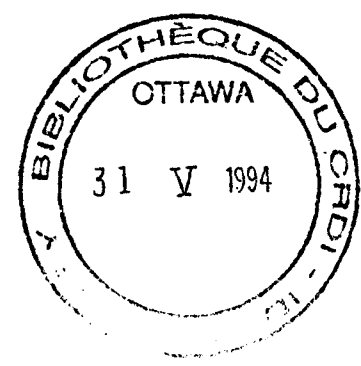
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REPORT ON
AN EVALUATION OF IDRC SUPPORT PROGRAMS
THE CHINESE ACADEMY OF FORESTRY

February, 1988

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EXECUTIVE SUMMARY

A four-member team, two from Canada and one each from China and Malaysia, travelled through China in November - December 1987 from Beijing to Guangzhou, to assess the institutional impact of IDRC support during the six-year period 1982-87, on the CAF in terms of (i) achievement of CAF objectives, (ii) upgrading and developing CAF's research resources in terms of physical plant, (iii) skills of its staff, (iv) transfer of technology and (v) the identification of opportunities for future support.

Visits to research facilities and staff interviews were held. In Beijing, visits were made to CAF Headquarters, MOF and SSTC followed by visits to field plots and interviews with state, provincial, prefectural and county officials involved with Paulownia intercropping in Henan and Anhui provinces. In Nanjing, a visit was made to the Research Institute of Chemical Processing and Utilization of Forest Products and a professor of Nanjing Forestry University interviewed. After reviewing Bamboo research at the Subtropical Forest Research Institute, Fuyang, Zhejiang Province, the team visited the Anji Bamboo Arboretum. Finally, a visit was made to the Research Institute of Tropical Forestry and the South China Botanical Gardens, Guangzhou.

This report includes a brief introduction to forestry in China, a profile of the Chinese Academy of Forestry and a summary of IDRC-supported programs in China to this date. The principal emphasis, however, is on the impact of IDRC support on CAF programs, manpower development and on forestry research and agroforestry practices in China. The potential international role of the CAF is explored, constraints and benefits identified.

The team concluded that IDRC funding, amounting to CAD 2.5 million since 1981, forms a significant contribution in the context of overall funding for forestry research in China. Due to China's wage structure and IDRC's unique style of operations, IDRC funds have been wisely and effectively used to enhance CAF research capacity and capability. Scientific productivity of the IDRC-funded projects appears to be excellent, as illustrated by the Paulownia and Bamboo projects. The enthusiasm, dedication and wide-ranging knowledge of the CAF staff were apparent and the creative and rigorous husbanding of scientific and technical resources by CAF and its affiliated institutes were impressive. The very strong development/practical

orientation of CAF research programs was coupled with a high respect and value for basic research. Research results have been promptly and widely adopted in the field as CAF researchers appeared to have first hand knowledge of the needs and problems of farmers, foresters and forest products industrialists in the regions where they worked. There appears an apparently high level of mutual familiarity and respect between CAF researchers and the forestry and public officials at all levels. As a result, the team observed many examples of the use of CAF-developed and IDRC-funded knowledge and technologies by farmers and foresters.

CAF officials commented favourably on the financial and administrative procedures and the reporting requirements of IDRC. IDRC staff and consultants who visited China were warmly praised for their dedication and commitment to their work, while being highly sensitive to the needs and peculiarities of the CAF system. IDRC has not only tried to support specific technical projects but also attempted to assist in the support services as well, such as administrative and financial management, and tried to strengthen the CAF where weaknesses were present.

While past IDRC support to China has been limited to CAF only, the team believes that this mechanism should continue. Although the direct recipient of IDRC support is CAF, in fact, through the formal and informal downstream networks and linkages, researchers at the Universities and provincial and county research centers, also receive IDRC support either in the form of funds, materials or in kind. We believe this system is effective and should be further strengthened.

The international contacts made possible through IDRC-funded projects have had far-reaching impacts on CAF researchers. Many had the opportunity to travel overseas for training and to attend various technical seminars and conferences. IDRC has also made possible visits by international scientists into China and these international exchanges have been very useful and highly appreciated by the Chinese researchers as well as scientists from outside China, especially from other developing countries.

While projects funded to date appear, in our judgement, to have been wisely chosen and successfully executed, we suggest that IDRC funds allocated to China in the future will continue to be wisely used, especially if other macro-projects can be identified, leading to research results of widespread applicability, not only to China but to other developing countries. R & D deemed necessary in support of national development projects, such as the Three Norths or

the Great Green Wall, might be envisaged. Finally we suggest ways and means in which China might be encouraged to play a greater role in international forestry, including agroforestry, pointing out current constraints and possible solutions, such as increased collaboration with appropriate research partners, facilitated by modest inputs from IDRC. We believe that China has a great potential in contributing its vast experience and expertise towards the development of forestry in other developing countries and IDRC can play a lead role in making this possible. At the same time, IDRC should "capitalise" on the China experience by informing the Canadian public on its tremendous contribution to forestry in China.

ii. LIST OF ABBREVIATIONS AND ACRONYMS

ACIAR	-	Australian Centre for International Agriculture Research
AFNS	-	Agriculture and Food Nutrition Sciences, IDRC
ARF	-	Assistant Research Fellow
ASRF	-	Associate Research Fellow
ASRO	-	IDRC Regional Office for Southeast and East Asia
BIC	-	Bamboo Information Centre
CAC	-	Chemical Analysis Centre
CAD	-	Canadian Dollar (1 CAD = 2.82 RMB)
CAF	-	Chinese Academy of Forestry
CAF HQ	-	The CAF Headquarters in Beijing around the office of the President, excluding the Research Institutes and Experimental Bureaus
CAS	-	Chinese Academy of Sciences
CFICT	-	Centre for Forest Inventory and Calculation Techniques
CSIRO	-	Commonwealth Scientific and Industrial Research Organisation
FAD	-	Fellowships and Awards Division, IDRC
FAO	-	Food and Agricultural Organisation of the United Nations
GTZ	-	German Agency for Technical Cooperation
ha	-	hectare(s)
IDRC	-	International Development Research Centre
IMRI	-	Industrial Membrane Research Institute
JER	-	Junior Experimental Researcher
KIB	-	Kunming Institute of Botany
MOF	-	Ministry of Forestry
NBO	-	National Bureau of Oceanography
NNSF	-	National Natural Sciences Foundation
NPC	-	National People's Congress
R & D	-	Research and Development
RF	-	Research Fellow
RICPUFP	-	Research Institute of Chemical Processing and Utilization of Forest Products
RIF	-	Research Institute of Forestry
RIFE	-	Research Institute of Forestry Economics
RIL	-	Research Institute of Lac
RISF	-	Research Institute of Subtropical Forestry
RISTIF	-	Research Institute of Scientific and Technical Information on Forestry
RITF	-	Research Institute of Tropical Forestry
RIWI	-	Research Institute of Wood Industry
RMB	-	Renmimbi Yuan
SIG	-	Second Institute of Oceanography
SSTC	-	State Science and Technology Commission
UNEP	-	United Nations Environmental Programme

I. INTRODUCTION

In an environment of competing demands for resources and global technological innovation, it is critical that research be evaluated in order to assure its relevance and value*. Evaluation involves collection and analysis of relevant information on the research process, research outcomes or strategic issues in order to make decisions with regard to particular projects or programs. It can include establishing whether research outputs are responsive to the needs of the intended beneficiaries of that research. Systematic evaluation is an extremely important tool in research management and, whenever possible, should be embodied within the research process itself. The collection of information at the start, or as an activity continues, has two benefits. First, it can provide timely feedback to improve an on-going activity; and second, it can yield evaluation findings with some degree of "pre- and post-" comparative analysis. It often happens, however, that an evaluation is decided on and carried out after the fact; that all the data is collected ex post facto. In cases where baseline or other important information cannot be obtained, the findings will be limited in scope and may not achieve their maximum validity.

Techniques and methods for evaluating development projects and programs are well established and documented (i.e. the log-frame analysis model is currently widely used among donor agencies).

The evaluation of research however, is less well documented. Of course, there are mechanisms for testing and verifying the scientific validity of research (primarily through conferences, publications and other peer review mechanisms). However, the techniques for looking at broader evaluation issues such as program rationale, beneficiary relevance, management, utilization of outcomes, cost effectiveness and institutional development are much less developed.

This latter issue is of particular concern given the strong institutional focus of this study. The substantial literature on the concept of institution-building documents may attempt to develop a formula for creating and strengthening institutions to administer development

* It should be noted that we are talking here about the ex post evaluation of on-going or completed activities and not the ex ante assessment of activities in order to decide whether or not they should be funded or implemented.

programs. Most of this literature is not directly applicable to IDRC-funded activities. It does not deal directly with research institutions; it is heavily oriented to the slightly different concept of "institutionalization"; and it largely ignores the institutional effects of activities which are only peripherally aimed at institution-building. The funding of individual research projects, the mainstay of IDRC's approach has, we feel, a high potential for affecting a recipient institution's capacity. The evaluation team, therefore felt that it was operating in a relatively new area of evaluation and consequently developed and refined its approach as the work progressed.

In summary, our mission was not to evaluate individual scientific research projects, but to evaluate the collective effects of these projects on the Chinese Academy of Forestry. This was both an ex post evaluation and a monitoring study as some projects were completed, some still ongoing and several more in the planning stages. The absence of "before" or baseline information makes this report rely heavily on subjective information obtained through interviews: and our conclusions are somewhat more interpretative with regard to the effects of IDRC funding. Should an evaluation study be undertaken at a later date, some of the information from this exercise would be useful as a baseline for comparison with information collected further downstream.

IDRC supports research in order to produce research results which contribute to development and in order to build the capacities of institutions to produce such results. However, an appropriate research environment must also be present, to enable an institution to harness the research skills of individuals. Thus, as IDRC contributes funds for scientists to carry out research projects, it is equally important that the institutional capacity and research environment be sufficient to ensure the productivity of the scientist and the utilization of his or her output. This was one of the basic tenets of guiding the mission's thinking in this exercise.

The task before the team was to evaluate the support of IDRC to the Chinese Academy of Forestry (CAF). Since 1981, IDRC, through AFNS, FAD and its Communications Division, has supported 11 projects in China, with a total funding in excess of CAD2.5 million, with a recipient contribution of around CAD1.5 million. CAF is the biggest single recipient of IDRC support in China. The objectives of the evaluation therefore, were to assess the impact of IDRC support on CAF in the following areas:-

1. in achieving its objectives,
2. in upgrading and developing its resources, including physical plant facilities,
3. in upgrading the skills of its staff,
4. in transferring research findings to users both in China and abroad.

The evaluation mission's approach was to develop an institutional profile of CAF as a basis for understanding the effects of IDRC support on CAF research capacity, and to assess the potential for CAF to play an international role in forestry research.

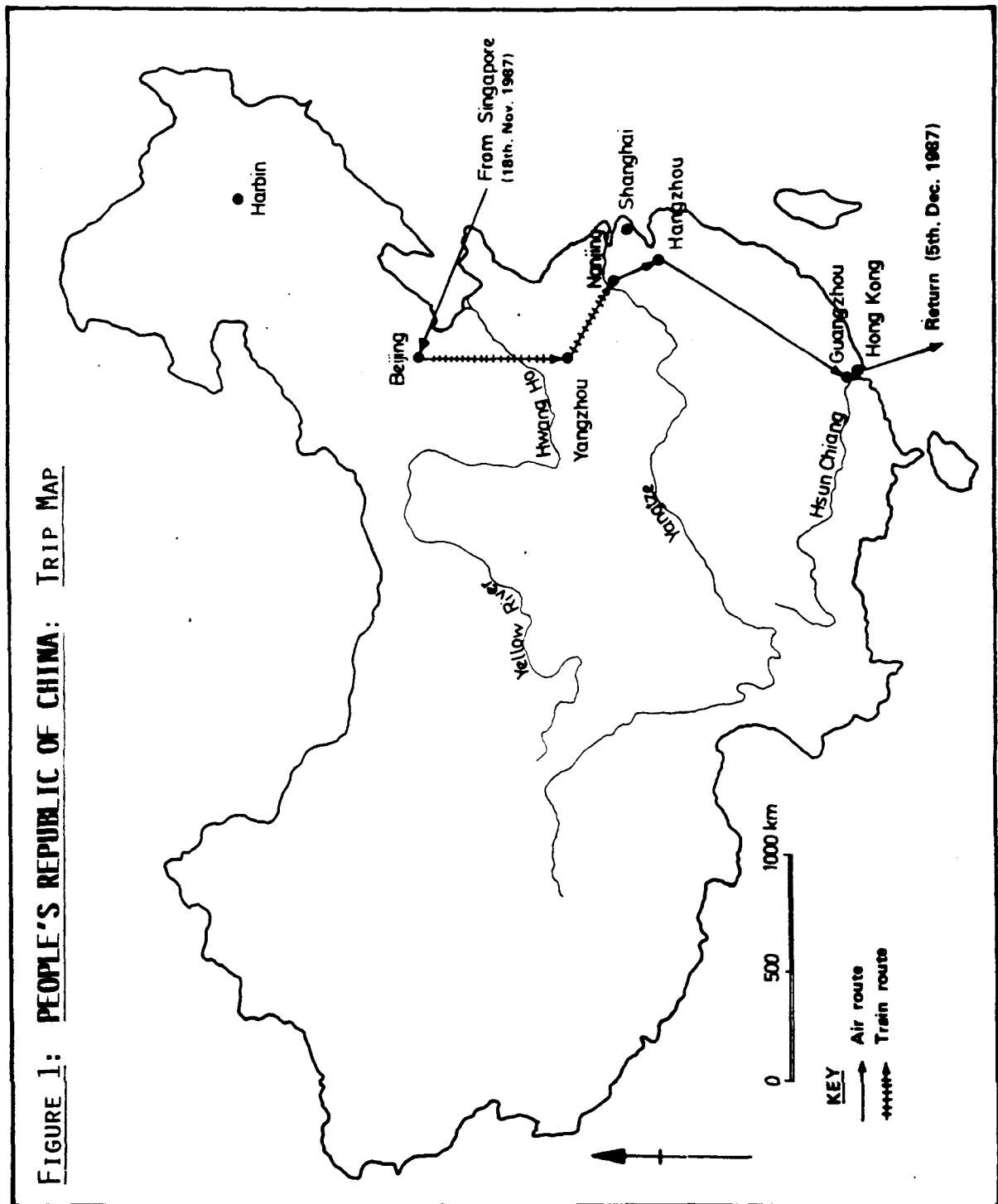
A copy of the Terms of Reference of the evaluation team is given in Appendix 1. Appendix 2 gives further elaboration of the Terms of Reference.

The mission was led by Professor J. W. Ker with members comprising Dr. Salleh Mohd. Nor, Mr. T. Smutylo and Mr. Wei Zhiqi. The personal data of mission members are given in Appendix 3.

In order to make evaluation more meaningful, it is important to have the involvement of the users and the host country. Mr. Smutylo of the Office of Planning and Evaluation, IDRC, Ottawa, provided the link to the donor agency, and advised on IDRC policy and evaluation procedures. Mr. Wei Zhiqi, of the SSTC, provided the team with links to the local institutions, especially to the SSTC, which is the signatory for IDRC projects in China.

Prof. Ker, Dr. Salleh and Mr. Smutylo met at ASRO in Singapore on the 16th November, 1987, for a briefing by Dr. C. Sastry and other staff members of ASRO and to develop procedures for the evaluation. The team developed a set of questions as a checklist to be answered and for information/data to be collected. Appendix 4 shows a copy of the checklist. It was also decided that the evaluation would be based on meetings and interviews with persons in China but no questionnaires per se would be used. ASRO provided the team with documentation of projects being undertaken in forestry in China. The team left for Beijing, China, on the 18th November, 1987, where it was joined by Mr. Wei. The itinerary and list of persons met by the team are given in Appendix 5 and Appendix 6 respectively. A map showing the route of the team in China is shown in a map in Figure 1. Mr. Smutylo, however, due to prior commitments, left the mission on the 29th November 1987 and only Prof. Ker reported back to ASRO after the mission.

While the main client of this evaluation is the ASRO office of IDRC, the report should also be useful for the office of Planning and Evaluation of IDRC, the CAF as well as the State Science and Technology Commission (SSTC) of China.



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2. FORESTRY IN CHINA - AN INTRODUCTION

China is a vast country with a land area of 9.6 million square kilometers. The varied geographical and climatic conditions over the country have resulted in a rich variety of forest types, ranging from the tropical rain forest and tropical monsoon forests of the south, through the sub-tropical humid evergreen broad-leaved forests, the temperate zone of deciduous and conifer forests, to the temperate and finally frigid conifer forests of the north. There are extensive montane conifer forests as well as semi-arid forests bordering deserts. The natural vegetation consists of over 7000 species of woody plants, of which over 2800 are trees.

However, many of the rich forests were destroyed during the early history of the country and by 1949, only 82 million ha or 8.6% of total land area was forested, most of it scattered over sparsely inhabited inland and northern areas. In 1978, the Central Committee of the ruling Chinese Communist Party adopted a series of important policies aimed at developing forestry. A Forest Law was enacted which was finally adopted in 1985. In 1981, decisions were made on forestry development and protection and March 12 declared as the National Tree Planting Day. A National Afforestation Drive was launched in 1984. The government considered it a basic policy to afforest the country and develop forestry. Family or collective tree farms were encouraged and between 1978 and 1984, over 70 million ha of land were allocated or contracted out to farmers to afforest. During the afforestation drive, 175,000 collective forestry farms were set up with an area of 17 million ha and over 4000 state forestry farms with over 46 million ha. Between 1949 and 1981 over 27 million ha of shelterbelts were planted with an annual average of over 800,000 ha. In 1983 alone, about 5.8 million ha of land were planted with trees. As a result of this concerted effort, the forest cover increased to 115 million ha in 1984 covering 12% of the land area, an increase of 33 million ha over 35 years. This forest cover is estimated to contain over 9 billion cubic meters of timber. Simultaneous with the afforestation program, the wood-based industries also developed with increasing production and a variety of products. Lumber production is over 14 million cubic meters annually, plywood nearly 0.5 million cubic meters and particleboard and fibreboard have increased to nearly a million cubic meters a year.

- *Sources: 1. A Brief Account of China's Forestry,
Ministry of Forestry, 1984
2. China's Forestry and its Role in Social
Development - undated

Another area of development in China is in the field of non-wood forestry resources. China boasts of over 3.4 million ha of bamboo, comprising half of the world's bamboo genera and 400 species. Bamboo is used in a variety of ways and is an important component in the Chinese way of life. A range of chemical products, such as the oil, tung oil, lacquer and medicinal herbs are also now produced from the forest.

Nevertheless, there are major problems and challenges to be addressed. With a population exceeding 1.07 billion distributed in an uneven way, problems of industrial and fuelwood supply, rational land use, soil erosion and shifting sands, are still serious and urgent. While the government has embarked on an active manpower and institutional development in forestry, there is much yet to be done.

Recognising the magnitude of the problems of forestry that have yet to be solved and the close links of forestry to agriculture and other land uses, the government has launched a number of programs and strategies. These include:

- i. The Three North program to reforest the vast barren and semi-arid areas of the North, North East and North West. The objective is to change the barren hills from a "yellow dragon" to a "green dragon". This program allots hill land to farmers to reforest and manage for private use. Collective farm forestry is also encouraged. Allotments can also be inherited. Collective and state-owned farms are encouraged to improve production and management. Agencies with interest in land are encouraged to embark on afforestation for which special afforestation funds have been set up. For example, a Green China Fund has been established to which interested parties are encouraged to contribute.
- ii. In the North West and northern parts of China, there are 137 million hectare of desert and sandy wasteland, with the result that 17 million ha of farms and pastureland are subjected to severe sandstorms during certain times of the year. To protect these farmlands, a giant shelterbelt program was started to cover 12 provinces and an estimated length of 7000 km. Up to 1984, over 4 million ha of trees have been established in this program. This extensive network of trees, shrubs and grass will have significant impact on China's agricultural production, the environment and its supply of forest products in the future.

- iii. A massive plan has been started to afforest the plains of China which cover about 93 million ha or 10% of the total area of the country. These plains also contain 40 million ha of agricultural land and a population of 340 million. These comparatively fertile lands make intensive agriculture possible with the unfortunate result of the disappearance of forests and increased population densities. Shortages of fuelwood and fibre products have resulted. A program to afforest the plains through introduction of shelterbelts, agroforestry and the "four-sided forestry" was therefore launched. "Four-sided forestry" involves planting trees along roads, waterways, farms and houses.
- iv. A Voluntary Mass Afforestation Campaign was launched to encourage every citizen above the age of 11 years to plant three to five trees every year. This resulted from a resolution of a session of the NPC. This mass afforestation program, envisages the establishment of trees and forests not only in the country but also in the cities. Various organisations have been mobilised to support the program, including the army.
- v. State-owned forestry enterprises have been nationalised to make them more effective in managing and utilising forest resources. New forest industries have been developed to assure better utilisation of the resource.
- vi. China has not forgotten the conservation of her many unique flora and rare fauna. It has embarked upon a program to strengthen nature reserves with the main objective of conserving unique flora and fauna. In 1983, a China Wildlife Conservation Association was set up. It has also taken specific measures to protect and conserve China's most unique fauna, the panda.
- vii. In order to provide the legislative support for these programs, the Government has strengthened legislation to protect and develop forestry in the country. The first forestry law in China was promulgated in 1979 and, in 1980, stipulations were made in the country's criminal law for punishment regarding illegal and indiscriminate felling of trees. All provinces, municipalities and autonomous regions, drew up their own forest laws. In 1984, the Forest Law of the People's Republic of China was officially promulgated.
- viii. The final strategy of the Government is to strengthen foreign economic cooperation and technological exchanges, in harmony with its open-door policy. This cooperation is now being extended to forestry and in

1983, China established the China Corporation for International Cooperation in Forestry and Forest Industries.

With these ambitious and wide-ranging strategies and programs, China has launched into massive reforestation. The fruits of these efforts are already visible and bearing benefits for the people and the environment. However, with a per capita GNP of around US\$300, the country is relatively poor and much yet needs to be done.

In the field of forestry education, there are currently three Forestry Universities, seven Colleges of Forestry and 18 Agricultural Universities with Forestry Departments. These institutions have over 4000 members on the faculty of whom nearly 500 are professors. The total enrolment is around 14000 undergraduates and 250 graduate students annually, with about 3000 graduating each year. The research institutes of the CAF are also empowered to award graduate degrees up to the Ph.D. level. The CAF, established in 1958, consists of 8 research institutes and 3 experimental bureaus and has a total staff strength of over 5000, of whom 1200 are researchers. The institutional support extends to the provinces, prefectures and counties, where forestry bureaus, departments and experimental stations are often present to implement programs and contribute to the intricate network required to transmit the results of forest technology to the ultimate user.

The Chinese Academy of Forestry has, along with state colleges and universities, national responsibility for research and teaching in the forestry field. CAF, and its affiliated research institutes, carry out 40% of the state (SSTC) funded research, and 25% of the Ministry of Forestry funded research in China.

Applied research is done primarily at the provincial level. There are 29 provinces and municipalities, each with its own research institute. Extension work is done primarily at the county level. There are 2000 counties, each with its own forestry research station or institute. Some of these institutes are little more than tree nurseries; however, some are quite strong and conduct their own research programs. Of all the afforestation work being done in China, approximately 60% is done at the provincial and county levels; 40% is through CAF at the national level.

The Chinese Academy of Forestry coordinates all forestry research dealing with problems that go beyond the local or county level; that is research with regional or national

implications. It is responsible for coordinating and balancing the specialized research programs of its seven research institutes. Funding to individual institutes from external sources must be channelled through CAF. It is also responsible for monitoring the technical and administrative management of research projects based on standards set down by the State Science and Technology Commission (SSTC). CAF makes recommendations to the Ministry of Forestry concerning the adoption of new technologies and concerning awards to research teams for their scientific achievements.

3. PROFILE OF THE CHINESE ACADEMY OF FORESTRY

3.1 General Introduction

The Chinese Academy of Forestry (CAF) was established in 1958 upon the basis of two pre-existing institutions. These were the Central Research Institute of Forestry and the Central Research Institute of Forest Industry. The CAF thus formed became the comprehensive research arm of the Ministry of Forestry. Based upon the regional problems of forestry and the needs for research support, the government established the following research institutes under the CAF in the respective years and locations:

- (i) The Research Institute of Forestry (RIF), 1951, at Beijing.
- (ii) The Research Institute of Wood Industry (RIWI), 1957, at Beijing.
- (iii) The Research Institute of Chemical Processing and Utilisation of Forest Products (RICPUFP), 1960, at Nanjing.
- (iv) The Research Institute of Forest Economics (RIFE), 1960, at Beijing.
- (v) The Research Institute of Tropical Forestry (RITF), 1962, at Guangzhou, Guangdong Province.
- (vi) The Research Institute of Subtropical Forestry (RISF), 1964, at Fuyang, Zhejiang Province
- (vii) The Research Institute of Scientific and Technical Information on Forestry (RISTIF), 1964, at Beijing.
- & (viii) The Research Institute of Lac (RIL), 1962, at Jingdong, Yunnan Province.

It should be noted that, while the RIF and the RIWI were established before the CAF and were the two original institutions that formed the basis for the CAF, the RIL was established on the basis of the original research station of the Chinese Academy of Sciences. While all these institutes are administratively under and responsible to the CAF, they have their own missions and objectives. Besides the eight (8) research institutes, the CAF also manages three experimental bureaus as follows:-

- i. Deng-Kou Experimental Bureau in Inner Mongolia Autonomous Region
- ii. Da-Gang Shan Experimental Bureau in Jiangxi Province
- and iii. Da-Qing Shan Experimental Bureau in Guangxi Zhuang Autonomous Region

The number of staff in the whole of CAF is 5200 of whom 1600 are scientific and professional staff. Three hundred and fifty of them are senior scientists and 600 are middle level scientists. The number of staff and scientists at the research institutes is given in Table 3.1, while that at CAF Headquarters and the experimental bureaus and experimental farms are given below:

1. CAF Headquarters

Total Staff - 200 Managers - 100

2. Da-Gang Shan Experimental Bureau in Jiangxi Province - closer linkages with RISF, RIF

Total Staff - 1,030 Technicians - 40

3. Jiou Longshan Experimental Farm of RIF

Total Staff - 156 Technicians - 8

- | | | |
|------------------------------------|---|-------------|
| 4. Dengkou Experimental Bureau |) | Total Staff |
| |) | 2,060 |
| 5. Daqing Shan Experimental Bureau |) | |

At CAF Headquarters in Beijing, which also houses the RIF, RIWI and RISTIF within the Headquarters complex, there is also the Centre for Forest Inventory and Calculation Techniques (CFICT) and the Chemical Analysis Center (CAC).

3.2 Mission and Objectives

3.2.1 The CAF

The Mission of CAF is to identify critical technical issues of strategic importance in the fields of forest production and forestry science and technology, which need to be addressed at the

TABLE 3.1: SUMMARY OF STATISTICAL PROFILE OF RESEARCH INSTITUTES

	NAME	YEAR ESTABLISHED	LOCATION	DIRECTOR	TOTAL STAFF	TOTAL SCIENTIST	ANNUAL BUDGET	NUMBER OF IDRC PROJECTS	TOTAL IDRC CONTRIBUTION	TOTAL LOCAL SUPPORT	TOTAL CAF + IDRC SUPPORT	FIELDS OF IDRC SUPPORT
1	RIF	1951	BELJING	WANG SHIJI	360	255	(Million RMB) ('000 CAD) 3.0(1063)	2	('000 CAD) 726	526	(000 CAD) 1352	1. PAULOWNIA I 2. PAULOWNIA II
2	RIWI	1957	BELJING	HE NAI-ZHANG	263	190	2.0 (709)	1	185.8	17.7	203.5	WOOD UTILIZATION
3	RICPUPP	1960	NANJING	WANG DING-XUAN	380	180	2.6 (922)	2	468.8	174.6	643.4	1. WOOD ADHESIVE 2. WOOD GASIFICAN
4	RIFE	1960	BELJING	JIN XIZHU	59	39	*0.2C (70.9)	-				
5	RITF	1962	GUAN GZHOU	BAI JIA-YU	200	100	1.5 (532)	2	379.5	274.4	653.9	1. RATTAN 2. FUELWOOD
6	RIL	1962	JINGDONG	HE KAIHUI	113	64	*0.39 (138)	-				
7	RISTIF	1964	BELJING	LIU YONG LONG	165	122	*0.57 (202)	1	154.3	118.6	272.9	BAMBOO INFORMATION CENTRE
8	RISF	1964	FUYANG	YANG PEI-SHOU	214	120	1.47 (521)	2	512	228	740	1. BAMBOO I 2. BAMBOO II
	TOTAL				1,754	1,070	11.73 (4,157.9)	10	2,426.4	1338.3	3865.7	

RATE (NOVEMBER 1987) 1 CAD = 2.82 RMB * OVERHEAD BUDGET ONLY

national level. Its mandate also covers the responsibility to study and review national policies and technologies for forest development, to participate in the formulation and planning of forest development programs and assess the use of science and technology in forestry. The CAF is also empowered to set up and revise standards of forest products and to provide consultancy services for the development of forest production and forest technology.

3.2.2 The Institutes

All the research institutes have similar missions and objectives, which in general are to identify critical problems of forest production, forest utilisation and of disciplines related to their areas of responsibility, to find solutions to these problems through R & D and to provide consultancy and advisory services to their respective clienteles. Some of the institutes also have a regional focus.

The RIF addresses problems of forest production and silviculture with emphasis on the northern and north western regions of the country.

The RISF focuses on problems of central China, particularly the central and lower reaches of the Yangtze River plains. It also has a mandate to carry out selection and breeding of high-yielding economic tree species.

The RITF is responsible for R & D in the southern regions of China, within the sub-tropical and tropical belts. Explicit in its mandate is to research ecological processes and the introduction of fast-growing species, including rattan.

The RIWI is mandated to focus on the issues, problems and development of the wood-based industries in the country and to find ways to maximise the utilisation of timber resources.

The RICPUFP, on the other hand, is responsible for the development and promotion of technology for the maximum utilisation of by-products of the wood industry and non-wood resources of forestry.

The RIFE focuses on socioeconomic aspects of forestry, and development and management strategies in the modernisation of Chinese forestry, as well as social and economic issues related to various technical fields of forestry and forestry research.

The main objective of RIL is to research the whole spectrum of lac production, including the breeding and propagation of high-yielding insects for lac production. It does not become involved deeply in utilisation research, which is mainly done by RICPUFP.

RISTIF has the mandate to collect, collate and distribute both domestic and overseas scientific information on forestry and forest products, and to provide services not only to the other institutes of the CAF but in support of the development of forestry in the country.

The experimental bureaus were established mainly as pilot programs or demonstration sites for testing and developing specific techniques or species under a particular condition characteristic of the region. The bureau in Inner Mongolia, for example, demonstrates various plantation species in the development of the arid and sand-dune areas of that desert region. The CFICT is mandated to carry out R & D in computer analysis of satellite imagery, the development of data bases, computer simulation and mathematical modelling. The CAC on the other hand, performs all organic and inorganic analysis of samples.

The missions and objectives of the institutes and bureaus are compatible with those of the CAF and can be taken as subsets of the overall macro-objectives of the CAF.

3.3 Organisation

3.3.1 The CAF Headquarters

It is unfortunate that the team was not able to acquire an organisation chart or an organogram of the CAF as a whole. It is a large and complex organisation and an organogram, no matter how simplified, would have provided a clearer picture of the organisation and thus lead to a better understanding of the workings within it. Since there was no documented chart, the team decided to

draw a simplified macro-organogram of the CAF, based upon our discussions with members of the CAF. We thank the individuals who have guided us in this effort, but any error of omission or commissions is entirely ours, for which we apologise. However, we considered this a necessary base for the preparation of the CAF profile.

The organisation chart of CAF, as perceived by the team, is given in Fig. 2.

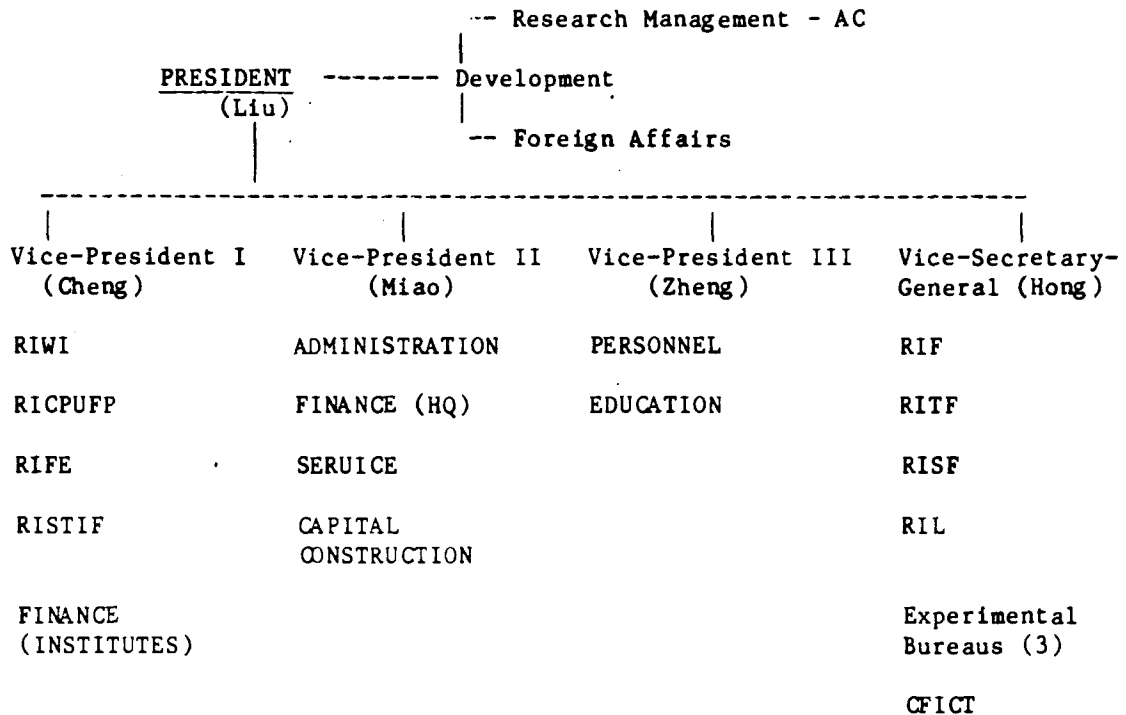
At Headquarters the CAF is headed by a President, assisted by three Vice-Presidents and a Vice-Secretary-General who has a rank equivalent to a Vice-President. The reasons why the fourth office is called a Vice-Secretary-General were not made clear to us. Responsibility for the 8 institutes, 3 experimental bureaus, 10 divisions and 2 centers are distributed among the four vice-presidents and the president. Each institute and division is headed by a director. Each division can have a number of deputy directors, generally two or three, each with a specific area of responsibility. The functions of most of the divisions are self-explanatory and need little clarification. However, some are unique to the CAF organisation.

The Education Division is responsible for planning and organising graduate studies at the CAF institutes. This is a unique feature of the institutes within the CAF in that they are authorised to grant graduate degrees up to a Ph.D. The Education Division manages this program to ensure that quality of training is maintained. This division also handles all staff training, both within the country and overseas.

The Foreign Affairs Division is responsible for liaison with foreign countries, international cooperation, the acquisition of visas for international travel by the staff and reception of foreign guests. The Division staff are also often called upon for interpretation duties during visits of foreign guests.

The Services Division is responsible for the utilities, maintenance of buildings, workshops and provision of welfare services to the community of staff and families who live within the CAF complex. The CAF provides housing at subsidised

Figure 2: ORGANISATION CHART OF CAF



Note:

1. This chart is based entirely upon the perception of the team after meetings and discussions with CAF members. Any error in design, omission or commission, is entirely ours.
2. Names in brackets under President and Vice-Presidents are current position holders.

rates for its staff. Responsibility for the management of this facility falls upon this Division.

The Development Division is responsible for extension of results to production units and works closely with clientele of the CAF and the institutes within the CAF.

The Research Management Division is responsible for planning research and links with various sources of research funding. For some reason which the team could not really understand, the Chemical Analysis Center (CAC) is also located within this Division. One would usually expect the CAC to be located in the Services Division.

Three Divisions, viz., Research Management, Development and Foreign Affairs, act in a staff function to the President, while the other institutes and divisions are in a line function through the vice-presidents.

It would appear, from Figure 2, that Vice-President I is responsible for all the research institutes related to wood industries, wood utilisation and economic and scientific information. On the other hand, all the institutes involved in research in resource development, including forest inventory and the experimental bureaus, come under the Vice-Secretary-General (equivalent to Vice-President IV). With the exception of the Financial Division, which is divided between Vice-Presidents I and II, all other Divisions are allocated to either Vice-Presidents II or III, with Vice-President III responsible for Personnel and Education. With regard to finance, Vice-President I is responsible for finances of the institutes while Vice-President III is responsible for finances at CAF Headquarters. The Vice-Presidents are ranked in order of seniority with Vice-President I being the most senior and the Vice-Secretary-General the least senior.

3.2.2 The Institutes

As the team did not visit all the institutes, it is not possible to describe the organisational profile of every institute. Moreover, as in the case of CAF, the team could not obtain a

documented organisation chart from any of the research institutes. The team therefore resorted to drawing up a chart based upon discussions with members of the institutes and piecing together the often disconnected facts. However, we were informed that, in general, the organisations of all the institutes are very similar in structure to each other.

Each institute has a director who is responsible to one of the vice-presidents of the CAF. However, in practice, we understand that the director often also reports directly to the President. Each director has at least two and often more, deputy directors who are responsible for managing various departments within the institute.

As an illustration of the organisation at the institute level, we selected a large institute in Beijing, i.e. the Research Institute of Forestry (RIF), and a relatively small one, i.e. the Research Institute of Tropical Forestry (RITF) in Guangzhou. Figure 3 and Figure 4 show the organisation charts of the RIF and RITF respectively, as perceived by the team.

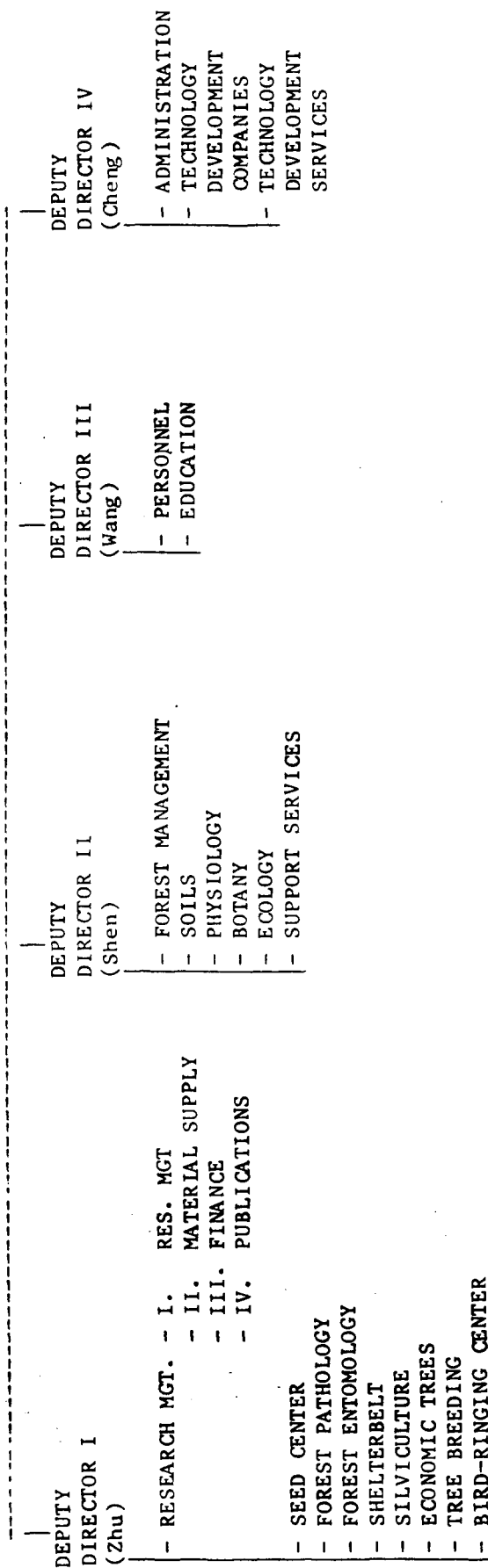
The statistical profile of the institutes within CAF is summarised in Table 3.1.

3.3.2.1 The Research Institute of Forestry (RIF)

The RIF is one of the larger institutes within the CAF system, with a total staff strength of 360, of whom 255 are scientists. It has the largest annual budget of 3 million RMB (CAD 1.1 million). The director is assisted by four deputy directors, each responsible for a number of departments. One deputy is responsible for Personnel and Education, one for Administration and Technology Development and two share responsibility for Research. Deputy Director I, who is the most senior, appears to have the largest number of departments. Besides being in charge of 8 research departments, he is also responsible for the research management department. This department is not only responsible for research management per se, but also handles materials supply, finance and publications.

FIGURE 3: ORGANISATION CHART OF RIF

DIRECTOR - FOREIGN AFFAIRS
(Wang)



Note : Names in brackets are current office holders.

Deputy Director II is responsible for five research departments and support services. Unfortunately there does not appear to be a logical rationale in the division of responsibilities for the 13 research divisions. However, it would appear that Deputy Director I is responsible for the more applied fields, as reflected by the Seed Center, Shelterbelt, Economic Trees, Silviculture, and Bird-Ringing Center, while Deputy Director II looks after the more basic fields such as Physiology, Botany and Ecology. However, there are other departments such as Pathology, Entomology and Tree Breeding under Deputy Director I and Forest Management, Soils and Support Services under Deputy Director II. The division of responsibilities between Deputy Directors III and IV is rational. The functions of all the departments are self-explanatory except for the two technology development departments under Deputy Director IV. The Technology Development Companies Department acts as a consultancy unit responding to requests from enterprises, for which they receive payment. This department generally uses known technologies and does not depend upon the scientists for its work. The Technology Development Services Department, on the other hand, functions as the extension arm of the institute, extending technologies to farmers and the public at a very nominal charge. This department also organises training courses for the public.

3.3.2.2 The Research Institute of Tropical Forestry (RITF)

The RITF is a relatively small institute located at Guangzhou. It was originally set up in 1962 on Hainan Island but moved to its present location in 1982. It has a staff of 200 with 100 in the technical and scientific categories. Of the 100 scientists, 19 are senior, 32 middle and 49 junior in rank. RITF has an annual budget of 1.5 million RMB (CAD0.53 million). The director has only two deputies, one in charge of administration, personnel, finance and capital construction, and the other for research and information, including 6 research departments (Afforestation, Genetics, Forest Resources, Ecology and Protection) and the Information Department. Research Management and Foreign Affairs are staff departments to the Director.

Titles of departments are self-explanatory. The organisation as perceived by the team is given in Figure 4.

3.4 Management of CAF

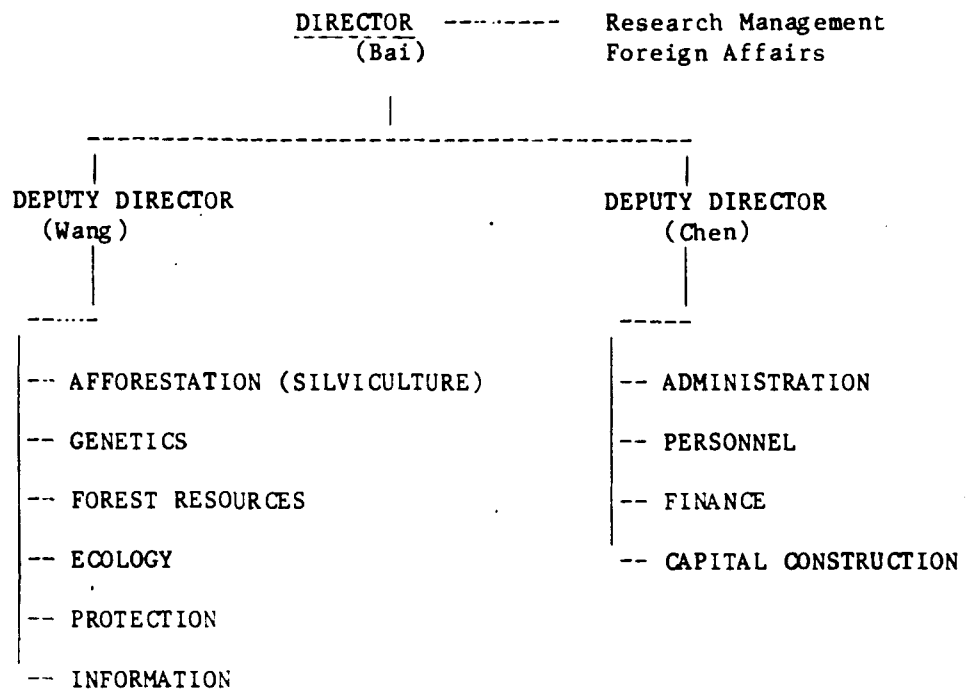
3.4.1 General

Being a relatively large organisation, distributed over a large area, and confounded by limited communication facilities, the management of the CAF offers tremendous challenges. While the political system in the country requires greater central control, the nature of research and the earlier-mentioned factors of size, distribution and limited communication facilities, require management to be decentralised in many aspects. The latter has led to the institutes having considerable autonomy in daily management and administration.

The CAF is one of the many agencies under the Ministry of Forestry (MOF). The president and the vice-presidents of the CAF are all appointed by the Minister. The candidates could come from within or outside the CAF, as well as from outside the MOF. The current president, Mr. Liu Yuhe, before his appointment as president in September 1986, was the President of the North-West Forestry College under the MOF. The appointment of the president and the vice-president is for a period of five years with the possibility of renewal. The president is the chief executive officer of the CAF, responsible to the Minister of Forestry for the overall proper and effective management of the CAF.

The president has wide-ranging powers, including the appointment of directors of institutes and divisions at headquarters. The deputy directors of institutes are also appointed by the president upon the recommendation of the respective directors. The directors however, have the authority to appoint senior and middle ranking managers at their institutes, and only need to inform the president's office. The directors are also authorised to appoint new staff at all levels including researchers, but the number and category of staff at each institute is determined by CAF headquarters, while the MOF determines the strength of the CAF Headquarters staff.

Figure 4: ORGANISATION CHART FOR RITF



Note : Names in brackets are current office holders

An interesting feature of the CAF staff composition is the very high ratio of scientists in the organisation. Table 3.1 shows that, taking all the research institutes as a whole, the percentage of scientists to the total staff is 61%. This figure ranges from 47% in RICPUFP to 74% in RISTIF. However, this figure does not include staff at the experimental stations.

3.4.2 Service Scheme for Researchers

Graduates, with a minimum of an undergraduate degree of the right discipline and possessing the right qualities deemed appropriate by the institutes, can be appointed as researchers. After one year of probation and satisfactory performance, they are appointed as Junior Experimental Researchers (JER). They then have to work for a minimum of four years and prove their research ability before being considered as Assistant Research Fellows (ARF). A further period of a minimum of five years and proven performance are required before promotion to the next rank of Associate Research Fellow (ASRF). After another five years and a good track record in research, they can then be considered for promotion to the highest rank of Research Fellow (RF). The JER is usually referred to as a junior rank researcher, the ARF as a middle rank while the ASRF and RF are considered as high rank researchers. Due to the fact that the CAF and the institutes within it are authorised to award post-graduate degrees of M.Sc. and Ph.D., the researchers are also eligible to carry titles of Assistant Professor, Associate Professor or Professor for ARF, ASRF and RF, respectively. While promotion within this system recognises length of service, other factors are also taken into account. Moral aspects, dedication to national development, academic and scientific performance and specialised knowledge are the general criteria applied. Researchers who win awards for their projects are the most likely to be promoted and to be assigned "good" projects in the future. Promotion and the possibility of winning internal and external awards are the chief motivating factors for scientists in the CAF system.

3.4.3 The Reward System

The management of a research institution is a complex and difficult task. While scientists are said to be generally motivated by challenges in the pursuit of knowledge and by peer recognition, nevertheless, monetary rewards can have a motivating effect on performance. The CAF has a system of rewards which, we are told, is practised in many research organisations in China. The CAF and all its research institutes have their own Reward Fund from which rewards are offered for high performance.

At the termination of a research project, the technical report is reviewed by an Evaluation Committee appointed by the Institute. An in-house Academic Committee of the Institute assesses the report of the Evaluation Committee and based on the resulting recommendations, an award from the institute's own internal award fund may be given to the project team for their outstanding achievement. However, not all institutes give internal awards. Institutes may recommend outstanding projects for awards at the CAF level. The CAF has an in-house Academic Committee which evaluates annually the nominations for awards from the institutes. External referees are used, when necessary, to provide needed expertise.

Progressively higher awards are granted at the Ministry and National levels through similar review mechanisms. The national awards are managed by the SSTC but with the advice of the ministry concerned. At the MOF level, the awards are managed by the Extension Division of the Department of Science and Technology. At both levels a panel of 8 to 9 national experts is used. Decision is by secret ballot. Thus a particularly good project team could receive awards at the institute, CAF, MOF and national levels.

At each level, there are also various grades of awards: First Class, Second Class and Third Class. Under exceptional circumstances, a Special Award at the state level could also be presented. Awards at each level are limited to a certain number per year. Special events are held to recognise researchers and to present the awards. Awards usually take the form of financial rewards and certificates. The magnitude of the financial

reward varies from year to year and is determined by the Evaluation Committee or the Director of the Institute. As an example of the magnitude of these awards, a Special National Award for 1983 was 100,000 RMB (CAD 35,460), a very significant and prestigious amount, by any standard. A third-class reward at the MOF in 1987 was 1500 RMB (CAD 532), a second class award was 3000 RMB (CAD 1064), while a first class award was 5000 RMB (CAD 1773). All members of the winning research teams share both the recognition and the financial benefits of the awards.

Awards for research at the provincial, prefectural or county levels can be granted by the respective regional organisations, enabling scientists and technicians in institutions at all levels to achieve recognition.

To date, the CAF has won a number of second class awards at the national level for various research achievements. The CAF has also received three first class awards and more than ten second class awards from the MOF.

The team was informed that the reward system, which was started in 1978, has had a great impact upon research performance. Winning a reward also gives greater opportunities to get new projects, increases promotion chances and results in an increase in personal income. It also provides an opportunity for peer recognition. In general, the reward system has been found to have a positive impact of motivating scientists to make greater contributions to the development of their sciences and to society.

3.5 Research Programs

3.5.1 Setting Priorities

The National Government launched the Seventh Five-Year Plan (1986-1990) which, among others, has laid the foundation for a strategy for the modernisation of China. This relies in part on the harnessing of Science and Technology in developing the economy, particularly in rural areas. In consonance with the objectives of the Seventh Five-Year Plan, the National Government

invited a pool of experts in various disciplines to evaluate the research needs to meet the objectives of the Plan. This group of experts presented proposals to the National Government which then provides funding for institutions to carry out research in the fields identified. These programs are referred to as State Programs. CAF receives a number of these programs. In implementation, State Programs are subdivided into levels and categories for ease of management.

A second category of research programs originate from the SSTC and the MOF. In 1985, SSTC launched a program to bring R & D into the mainstream of economic activity and to increase the technical skills of the rural population. Under this program, R & D institutions are encouraged to provide technological services to the rural population. SSTC then funds such research at R & D institutions. The MOF also prepares its own research program based upon its mission and objectives and in line with national policies. Draft programs are prepared by the Division of Science Management and reviewed by a Committee on Science and Technology. The program is then submitted to the Minister of Forestry for his approval. Once approved, the program is transmitted to the research institutes for implementation. Where expertise is limited in some disciplines, research required by such disciplines could be contracted out to institutions outside the CAF, or even outside the MOF. Similarly, the CAF also receives funds from other ministries for projects in which the CAF has expertise. Collaborative research programs between institutions within the MOF and between other ministries are also possible. Funding for Ministry programs come from the MOF which in turn receive it from the Ministry of Finance.

The third category of research programs is initiated by CAF itself, based upon its mission, objectives and stated priorities, in harmony with those of the MOF. Most of the CAF research programs are basic or fundamental in nature and are funded through a Science and Technology Fund in the CAF.

The fourth category of research includes the institute Research Programs, which are generally initiated by requests made by production units and

clientele of the institute for specific studies or investigation. These demand-pull research usually involves problem-oriented research. The researcher prepares a proposal which is submitted to the Academic Committee for review. The Director usually chairs this Committee which has members from within and outside the Institute. Outside members usually come from academic institutions. If funding for the project is required, support can be obtained from the institute's own Science and Technology Fund (S & T Fund) or it could be presented to the CAF for funding. The choice of funding source usually depends upon the magnitude of the amount required and the type of research. The Director authorises all funding from the S & T Fund.

Institutes can also receive contract research projects (called Trust Research Projects) from other organisations. These would be funded by the client but institutes are required, as a matter of policy, to ensure that such activities are not detrimental to the Institute's ability to carry out State, MOF or CAF programs.

Another source of funding for research is the National Natural Sciences Foundation (NNSF), which is an independent organisation. Only fundamental or basic research is funded by this foundation. Institutes can also receive funding and research projects from various international organisations but these must be approved by the CAF and the MOF, and must be channelled through the MOF or the SSTC. All research programs and projects undertaken by an institute must be submitted to the CAF for information.

Thus, an institute can receive research proposals and funding from a number of sources. For example, the RIF has a total of 105 projects in the Seventh Five Year Plan, as follows:

- 46 National projects (from SSTC)
- 19 Ministry (from MOF)
- 14 Other Ministries
- 6 CAF
- 11 RIF
- 3 International
- 4 NNSF
- 2 Developmental (SSTC)

The RISF has 60 projects: 30 are state or ministry projects, 16 through local governments, 11 are self-initiated, and 3 are international projects.

3.5.2 Research (Program) Management

3.5.2.1. Planning and Monitoring

The CAF recognises the importance of proper management of research programs to ensure effective implementation. However, the team was not shown any documentation of the actual procedures of research management. At the level of CAF, the Division of Research Management is in principle responsible for coordinating the execution of all research programs and projects in the CAF. This division is also responsible for planning, monitoring and evaluating research. At the institute level, the department or unit of research management is responsible for similar tasks. In some institutes, senior scientists are mobilised to assist the Department of Research Management in monitoring and supervising projects.

Researchers are required to submit progress reports every half year to the Department of Research Management, which collates and summarises them for onward transmission to the CAF. Regular meetings are held at the institute and CAF levels to discuss issues related to research planning and execution. The SSTC has set standards for technical and administrative management of research projects and the CAF uses these to monitor and manage projects under its responsibility.

3.5.2.2 Research Evaluation

After the termination of a project, the CAF carries out a thorough evaluation. A research project initiated by the institute will be evaluated at the institute, while an MOF program/project is evaluated at the MOF. National programs are evaluated by the SSTC but the SSTC can delegate this authority to the MOF or some other organisations. In general, the sponsor of the research organises the evaluation of the project. A terminal research report is required for every project upon completion.

The appropriate agency forms a Project Evaluation Committee comprised of experts in relevant fields from within and outside the research institution. Committee members are drawn not only from the scientific and academic communities but also from relevant industries, societies or producer group representatives. The number of members in the team varies depending upon the level of the project (institute, MOF, CAF or State). For example, for a State project, it could be as many as 30, while for a Ministry project there could be 20 members. In both cases, at least one third should be senior scientists. The project report is distributed to all members and usually an evaluation meeting is called at which the research leader is called to present his work, to answer queries and to discuss and explain the results of the research. If results of the project have been applied by users, a statement to that effect from the user should be presented. Field trips by the Evaluation Team to experimental sites may also be held. After a comprehensive examination, the project will only be assessed as successful if it receives the approval of at least two-thirds of the members of the Evaluation Team.

We were told that, in general, the evaluation committee is supposed to: identify the economic and social benefits, determine whether the project objectives were fulfilled, suggest further research or pilot testing and vote on whether the project was satisfactorily completed. Once approved by a two-third majority vote, the way is cleared, depending on the recommendations of the committee and of the director of the research institute, for application for awards, release of the technology, planning of further research, setting up a pilot production project, information dissemination etc.

For example, in the evaluation committee's conclusion and recommendations which were appended to the final report of the Spent Sulfite Liquor for Particle Board Adhesive Project, the committee reported on whether the objectives had been reached, and the methodology correctly applied. It made recommendations with regard to the potential for economic application, the likely "social impacts," and what further research and industrial trials were necessary.

The Evaluation Committee report and recommendations are used by the management for decisions on awards, promotions and to decide what further actions are required.

3.6 Resources

3.6.1 Facilities and Equipment

The team had little opportunity to look at the resources of the CAF at the institutes visited. As no list of facilities or equipment were available, there was no way in which we could evaluate the range and quality of equipment present. This was of little consequence as collectively the team does not consider itself competent to objectively assess the appropriateness, quality or condition of major items of sophisticated modern scientific equipment.

The short visits to the laboratories at the CAF included a tour to the RIWI, the RIF facilities and the remote sensing and computer facilities at the CFICT. The RIWI had fairly complete facilities for the production of panel products, particularly particleboard, including moulded particleboard. Facilities were also available for the production of fibreboard and the team was informed that RIWI is also capable of producing medium-density fibreboard (MDF). RIWI also possesses a comprehensive range of kiln-drying equipment, complete with computer control and recording. The wood preservation laboratory appeared quite complete, including facilities for termite culture. There was an up-to-date modern testing facility and the RIWI has been designated as the National Wood-based panel testing center. Most of the equipment were locally made, some fabricated in the CAF workshop but others were from West Germany and Japan.

A quick visit to some facilities at the RIF showed rather crowded facilities and while the equipment appeared to be in working order, there were few new pieces of equipment. A central testing laboratory included a 1980 liquid chromatograph, the most sophisticated piece of equipment that the team saw in RIF. The team was informed of a new four-storey building expected to be ready in 1988 which will help in easing the present rather crowded facilities.

The team paid a short visit to the remote sensing and computer facilities of the CFICT and was impressed by the array of IBM micro-computers, the main frame and facilities for digital analysis of landsat imagery. Although the lady in-charge said that this equipment was out-of-date and short in capacity, the team considered that for the forest inventory project in which they were involved, the equipment is adequate.

The team also had a quick tour of the facilities of the RICPUFP in Nanjing. This institute appeared to be the best equipped of those visited. The equipment appeared well-maintained and up-to-date with some very sophisticated analytical equipment, such as gas and mass spectrometer and an infra-red spectrophotometer. The team was also impressed by the types of pilot plants for a number of chemically-derived products from wood. As with the RIWI, the frequency of use appeared rather low but this is to be expected for a research institution.

The other two institutes visited, the RISF and the RITF, are more field-oriented. The team visited the plant protection laboratories of the RISF and noted that basic equipment appeared adequate, being supplemented by IDRC funds.

The facilities in general appeared adequate although maintenance of buildings and laboratories appeared rather poor. It is worth noting that new multi-storey facilities are currently under construction for the RIF, RICPUFP and RITF. All these are expected to be ready next year and should ease the rather limited laboratory space now available.

The team did not have the opportunity to assess the state of transportation facilities for research work in any of the institutes. However, we were informed that vehicles are in limited supply and that researchers depend upon international projects to supply them with such vehicles. Recognising the vastness of the country and the resulting communication problems, the team agrees that this is a factor that should be given due consideration. Otherwise, CAF and its institutes appear to be generally well-equipped and with adequate facilities.

Overall, the equipment appeared to be well maintained, in good condition and largely in use. Although most of it were over five years old, there was ample evidence of the respect, pride and value placed on the items in the laboratories we visited. Maintenance as well as copying or modifying or re-designing of equipment was being successfully carried out in-house. Where necessary and possible, service contracts with agents of suppliers were in place; although most service by overseas companies was reported to leave much to be desired. We were told of several instances in which IDRC's regional office was able to assist in motivating foreign companies to provide parts or service.

3.6.2 Finance

The team was only able to obtain broad estimates of budgets at the CAF and the institute level. Time did not allow us the opportunity for discussions with the financial staff with respect to detailed financial management. However, while recent funding has been more restricted, we were advised that CAF had been subjected to less traumatic budget cuts than some other agencies.

In general, the CAF receives operating and overhead funds from the SSTC, mainly for salaries. CAF receives about 11 million RMB (CAD 3.9 million) annually for this budget component. Ten percent of this budget can also be used for R & D. Capital funds are provided by the MOF. CAF received about 7.65 million RMB (CAD 2.7 million) for capital development in 1987. This figure used to be as high as 11 million RMB (CAD 3.9 million) per year a few years ago. This fund also includes money for purchases of major equipment. With respect to overhead budgets, they used to increase by about 5.5% per annum after 1985, but this increase has stopped. Of the 11 million RMB for overhead budget, 20% is for Administration; the rest for research staff salaries.

As to the third category of funds i.e. research funds, the CAF receives it from a variety of sources. As discussed in the chapter on programs, CAF receives research projects from the SSTC, MOF, State Economic Commission and a variety of other sources, including international sources and

through the sales of products and services. The CAF receives a total of 70 million RMB (CAD 24.8 million) for research from all sources, including 10 million RMB (CAD 3.5 million) from State Programs. On the average, the annual R & D budget of CAF from within-country sources is 11.7 million RMB (CAD 4.1 million).

The CAF also receives some funds from overseas, notably from IDRC Canada, FAO, UNEP, the Federal Republic of Germany through GTZ and Australia through ACIAR (Australian Center for International Agricultural Research). The average annual sum is about 2 million RMB (CAD 709,000) with IDRC contributing about 40% of this sum.

The institutes receive funds from the same sources but through CAF. However, the institutes have additional sources from provincial, prefectural and county governments or agencies.

To illustrate the various sources of funds that an institute can receive, Table 3.2 gives the budget figures for the Research Institute of Forestry (RIF) for 1987.

3.7 Linkages with Other Institutions

3.7.1 Within China

While the CAF has direct formal linkages with relatively few institutions, the CAF institutes have close relationships with many institutions at different levels within the community. At the national level, the CAF has formed links with the SSTC, the State Economic Commission and other ministries through the MOF. The CAF also has informal links in the education field with universities and colleges.

Of greater interest to the team was the close and personal rapport between the institute's staff and the local officials at the provincial, prefectural and county levels. To illustrate the organisation of forestry institutions in the provinces, a chart is given in Figure 5. This also gives links with the CAF, CAF institutes, the universities and MOF with the forestry bureaus and extension stations at the prefecture, county and xian levels. The team had personal experience of

TABLE 3.2: Budget of the Research Institute of Forestry (RIF)
(as an example)

Source	Number of Projects	Budget	Million (RMB) 1986-1990	Million (RMB) (1987)	1000 (CAD) Average per year
SSTC		Overhead Salaries Allowances Equipment Research Education Foreign Affairs General Office Maintenance of Equipment Personnel Division Miscellaneous Subtotal		0.5 0.13 0.035 0.085 0.015 0.060 0.020 0.025 0.015 0.145 1.03	177.3 46.1 12.4 30.1 5.3 21.2 7.1 8.8 5.3 51.4 365.0
National Projects (SSTC)	31	Projects - For RIF Research - Distributed to other Agencies	5.13 9.62	1.026 1.924	363.829 682.260
(SSTC)	15	Collaborate With Other Agencies - For RIF Research - Distributed to other Agencies	0.41 0.38	0.082 0.076	29.078 26.950
MOF	19	For RIF Research Distributed to other Agencies	0.51 0.43	0.102 0.086	36.170 30.496
CAF	6	For RIF Research	0.21	0.042	14.893
NNSF	4	For RIF Research	0.06	0.012	4.255
Other Ministries	14	For RIF Research	0.3	0.06	21.276
		Subtotal	17.05	3.41	1209.200
		Total		4.44	1574.200

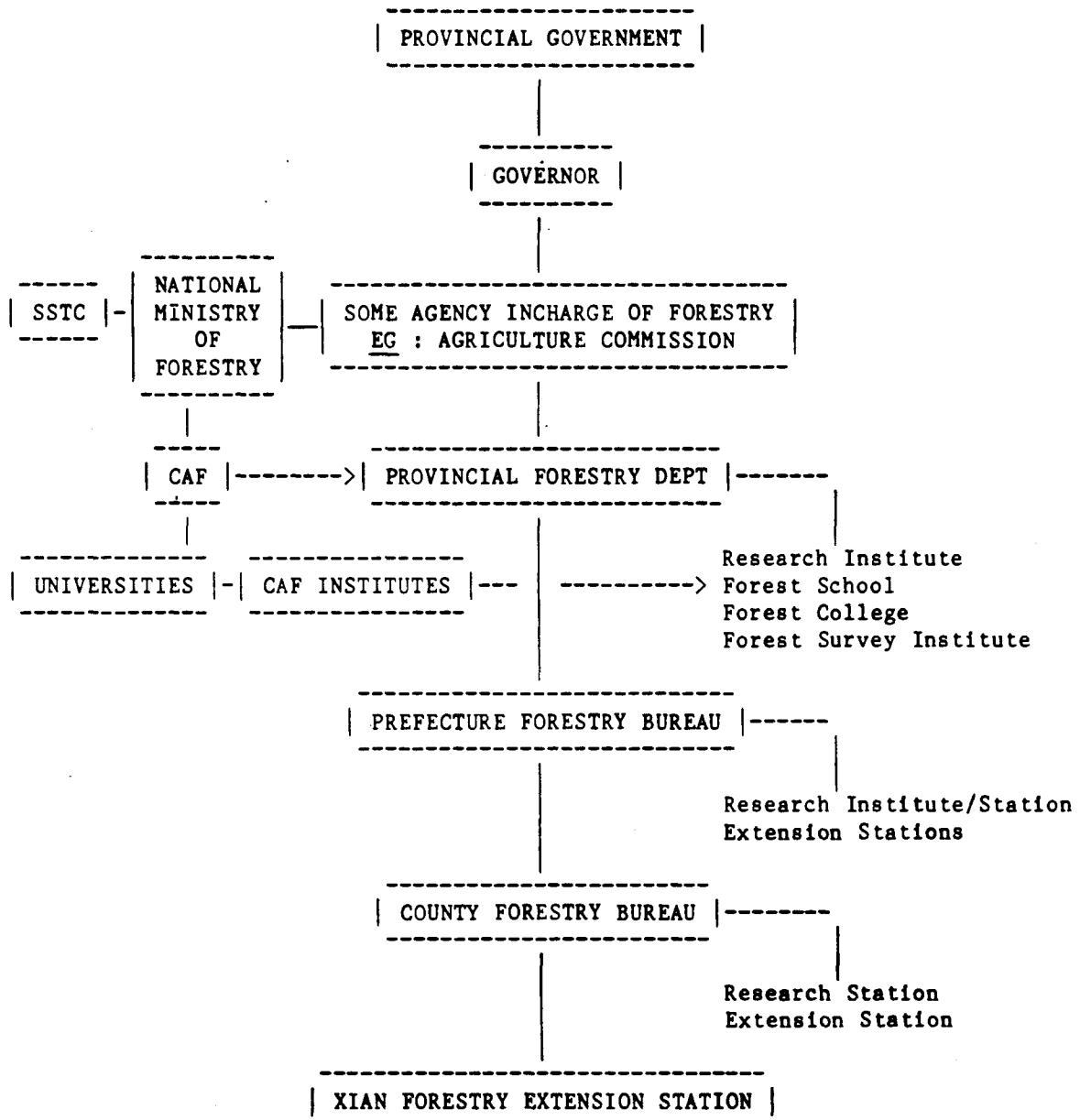
the close relationship between the institute staff and the provincial staff, not only at the scientific and professional level but also at the political leadership level. During our visits to Shandong, Henan and Anhui Provinces, the whole spectrum of county, prefectural and provincial staff and political leadership were on hand to greet us and to explain to us their programs and links to the CAF research institute and to IDRC-funded projects. This close rapport and keen interest shown by farmers and on-the-ground organisations and the open willingness to work with researchers augur well for CAF and reflect the good image of CAF staff. Such close cooperation between the scientist and the man-on-the-ground is all too rare in forestry.

During the briefing at the RITF at Guangzhou, representatives from the Department of Forestry, South China Agricultural University, the South China Botanical Gardens and South China Institute of Botany, the Provincial Forestry Department and two county departments, all shared their experiences in collaboration in an informal way with the RITF staff. Although no formal linkage exists, we had the feeling that the existing informal linkages might be stronger than that possible with any formal linkage. One had the sense of a strong, functional "forestry coalition" existing between them.

In Nanjing at the RICPUFP, the team was informed of the many links with the industry in setting up industrial and joint projects. There appears to be keen interest by industries to keep in close contact with RICPUFP staff, even if they have to pay for services. This, again, is a good sign.

These close linkages with the clientele is a positive step towards effective research extension and transfer of technology to potential users. Regular meetings are held and the institutes hold courses for users on a regular basis in various disciplines. In addition, free distribution of relevant and appropriate publications make these linkages more meaningful and effective. This close relationship also allows CAF institute staff easy access to land for research both on its own or on farmers' lands, thereby expanding the opportunities for field-testing and technology transfer to the farmer.

Figure 5: ORGANISATION AT PROVINCIAL LEVEL
(AND LINKS WITH CAF AND MOF)



3.7.2 International

To date, the linkages with other international institutions are relatively weak. However, with the stated national policy of being more open and encouraging international cooperation, the CAF can be expected to strengthen its international linkages.

Besides links with IDRC, the CAF has a fairly strong program with CSIRO of Australia, funded by ACIAR, on provenance trials of Australian species in China. This collaboration covers mainly equipment, training, consultants and supply of a vehicle.

Other relatively small project support come through FAO, UNEP and West Germany. The strongest international ties of CAF appears to be with IDRC which is discussed in Chapter 4.

China's "open door" policy was repeatedly referred to by CAF staff. Many of the scientists we talked to seemed to feel that China was on the threshold of an era of burgeoning international recognition. In some fields of forestry research, they see China as an unknown world leader and expect that as their advanced work becomes known internationally, opportunities for linkages with institutions in other countries will expand.

4. IDRC-SUPPORTED PROGRAMS IN CHINA

4.1 IDRC in China

IDRC's first project in the Peoples' Republic of China, initiated in 1981, was a forestry project related to bamboo. Between 1981 and 1987, IDRC supported a total of 72 projects in China, with grants exceeding CAD10 million. Of these, 11 were in the field of forestry with a total financial support exceeding CAD2.5 million, about 25% of total China funding by IDRC. Other IDRC support is in the fields of agriculture, medicine, marine science and fisheries, energy, urban studies and socio-economic studies. Many projects extend over periods of two to three years but some are only of one year duration. No project is for more than three years. If necessary, extensions of projects are developed as second phases of the original. Nevertheless, based on records at ASRO office of IDRC and the published listing of IDRC projects, it would appear that only a few projects have been completed.

Besides projects per se, there have been 35 trainees sent from China to Canada for short to medium-term training. Such training is linked to specific projects and is mainly in the field of medicine. While most IDRC support to China is managed by ASRO, about 40% is managed by IDRC Headquarters in Ottawa. However, all the forestry projects are managed by ASRO.

4.2 IDRC Support in Forestry

In 1981, IDRC started its support programs to China with two projects in forestry in the fields of bamboo and adhesives. Whether this is of special significance is a matter of conjecture but it reflects the interest of China and (perhaps) IDRC in forestry in China and the initiative of the ASRO staff. It also is a manifestation of the concern and the willingness of the Government of China to open its door to international support and cooperation in forestry, as stated in its policy. To date, IDRC has supported a total of 11 projects in forestry totalling about CAD2.5 million. The subject areas and amounts granted are summarised as Table 4.1 while further details are given in Appendices 7(a) to 7(i).

TABLE 4.1: IDRC Forestry Projects in China, 1981 - 1987

Code No.	Title	Grant Amount (CAD)	Remarks
1. 81-0130	Bamboo	241,400	Phase 1
2. 81-0199	Wood Adhesives	222,000	Terminated
3. 82-0121	Paulownia	356,000	Phase I
4. 84-0273	Rattan	226,600	
5. 85-0023	Bamboo II	246,500	Phase II
6. 85-0251	Fuelwood	152,900	
7. 86-0098	Wood Utilisation	185,800	
8. 86-0164	Paulownia II	370,000	Phase II
9. 86-0169	Farm Forestry Training	103,000	Completed
10. 86-0246	Wood Gasification	248,800	
11. 87-0127	Bamboo Information Center	154,300	

Summaries of the projects are given in brief in Appendix 8. With the exception of the Adhesives project and the Farm Forestry Training Program, all other projects are still active with the Bamboo and Paulownia projects extending into the second phase.

An analysis by Sastry (1987), shows that, within the countries served by the ASRO office in 1983-87, China received 30% of total number of projects and 48% of the total funds contributed. The breakdown by country, based upon Sastry (1987), is in Table 4.2. However, it should be noted that these figures are exclusive of the support given to the Rattan Information Centre in Malaysia, the Mangrove Information Centre in the Philippines, and the Research Management course in Singapore in 1984. Sastry (1987) also mentions four "pipeline" projects in China for 1988/89, as given in Table 4.3.

An important feature of IDRC support to China is that it has all been directed at a single institution, the Chinese Academy of Forestry (CAF). The CAF thus ranks as the biggest single recipient of forestry support in any one country. This support, however, is then distributed to a number of research institutes within the CAF.

However, among the "pipeline" projects for 1988/89, it is reported that the Bamboo cellulose membrane project is with the second Institute of Oceanography (SIG) of the Chinese National Bureau of Oceanography (NBO) with the Industrial Membrane Research Institute (IMRI) of the University of Ottawa, while the Jojoba project will involve the Kunming Institute of Botany (KIB) of the Chinese Academy of Sciences (CAS).

While the purpose of this mission was not to review individual projects, they are nevertheless mentioned as a backdrop to the IDRC involvement in forestry research in China.

Table 4.2. Forestry Program Support for Various ASRO Countries 1983-87 *

Country	Total No. of Projects Commenced	Budget (CAD)	Contribution Per Capita (CAD)
China	8 (29.6%)	2,006,600 (48.0%)	0.002
Indonesia	5 (18.5%)	343,870 (8.6%)	0.002
Malaysia	4 (14.8%)	363,690 (8.8%)	0.023
Philippines	4 (14.8%)	729,500 (17.8%)	0.012
Thailand	6 (22.3%)	694,250 (16.8%)	0.013

* Source: Sastry (1987)

Table 4.3. Pipeline Projects in China (1988/89) *

Title	Estimated Budget (CAD)
1. Bamboo Cellulose Membrane	70,000
2. Jojoba (Arid Zone Reforestation)	100,000
3. Rattan Phase II (Network Project)	150,000
4. Poplar Utilization	200,000

* Source: Sastry (1987)

5. IMPACT OF IDRC SUPPORT

For the past 30 years, with the exception of the years of the Cultural Revolution (1967-75), CAF has had its own research programs, carried out by its various forest research institutes.

IDRC has made major "inputs" into the CAF research system. The "inputs" include funds, technical training, external contacts, equipment, procurement assistance and administrative guidance. These could be elaborated as follows:-

1. Provision of financial assistance to existing programs in a country where money for research is limited. IDRC funds are used to pay salaries of researchers, technicians and labourers, and the cost of materials, transportation and related expenses needed to carry out research. As the unit cost of labour and materials is relatively low in China, one Canadian dollar goes a long way.
2. Payments for purchase of equipment not generally available locally or otherwise unavailable to the researcher due to import controls or foreign exchange regulations. This contribution of IDRC is important as it enables researchers to obtain up-to-date equipment from overseas, not necessarily from Canada.
3. IDRC funds are significant, amounting to over 10% of total CAF annual funding, and totalling more than CAD 14 million since 1981.
4. IDRC has assisted in technical and administrative training of CAF staff under the premise that proper administration and financial management are equally important in the smooth functioning of a research organisation.
5. IDRC also assisted in purchasing equipment and spare parts as well as acquiring servicing expertise for equipment already purchased. With its wide network of technical contacts, IDRC was able to assist CAF scientists who often found difficulties in locating reliable suppliers.
6. Foreign exchange is a major problem in China and IDRC provided the mechanism to assist CAF and individual scientists in foreign exchange arrangements. One example is in assisting CAF scientists travel abroad where IDRC could pay their travel allowances, thus overcoming the country's foreign exchange regulations.

7. IDRC has now held a couple of major international meetings with CAF and in so doing exposed CAF scientists to the organisation and management of such meetings. Through such meetings, IDRC has been able to bring experts and scientists into China to meet and discuss with the Chinese counterparts.
8. The establishment of various networks with participation by CAF scientists provides unique opportunities for CAF scientists to keep in contact with peers in other network countries.

The "effects" of the above "inputs" are many and varied such as better management, exchanges with other institutions, staff promotions etc. It must be emphasised however, that due to the ex poste nature of the evaluation exercise, the consequences are that (a) the way the "inputs" are viewed by the recipients become important indicators, and (b) the "effects" are largely based on the subjective reports of our informants.

Among the "effects" of IDRC support are:-

1. IDRC support has a synergistic effect on local funding as there is general recognition that, if a foreign organisation supports a local program, the state and local governments should also contribute.
2. The commitment of IDRC has tended to result in the commitment of additional resources to a project, especially manpower. This is important if an IDRC project is to succeed.
3. There is a tendency to "show the best" to foreigners. Therefore, the CAF and its related institutions have given special attention and a high profile to IDRC projects.
4. IDRC support has enabled experts from overseas to come and discuss issues and problems and to advise the CAF researchers. This is a very important aspect in Chinese research, especially after prolonged isolation from the world of science and technology. The consultants sent to CAF-IDRC programs have generally been well chosen and well received. Moreover, unlike some other aid agencies, IDRC selects and sends experts with the most appropriate expertise, not necessarily Canadians.

5.1 Impact of IDRC Support on CAF Programs

More specifically, the impact of IDRC support on CAF programs is best illustrated by the Paulownia project (in Minquan County, Henan Province), in which IDRC funding amounts to more than 50% of total funding. This "key" or top-priority project fits within China's overall scheme of 76 national priorities, of which research on fast-growing species is one of the three related to forestry. In this and other IDRC-supported projects, Canadian aid serves to reinforce rather than to redirect the research program of CAF and acts as a catalyst in focussing resources, both domestic and foreign, on pre-determined problems of national concern. With the help of IDRC, Paulownia research became widely known and supported in several provinces and counties. IDRC did not influence the researchers towards Paulownia research but, rather reinforced their interests and encouraged its expansion to a greater land area with a larger number of field trials. Centre support raised its status and attracted broader participation from various forestry and community organisations. Moreover, IDRC support does not appear to have changed Chinese research priorities nor to have inhibited the initiation of new research projects.

5.2 Impact of IDRC support on Manpower Development

Scientists responsible for or involved in IDRC-supported projects have received various benefits not shared by their colleagues. A total of 37 have received training abroad of which 17 have subsequently been promoted to more senior positions. An example is Xu Zeming who, after training and research experience in the wood adhesives project, took over as one of the project leaders and helped bring the project to its successful completion. The IDRC requirement for submission of progress reports on a regular basis has undoubtedly improved the ability of project leaders to prepare and present written reports in both Chinese and English.

In terms of project management, IDRC-ASRO has provided advice and training in research management techniques. On occasions, it has also provided duplication equipment to facilitate the documentation and reporting of research results. Techniques acquired in the administration and management of IDRC funded projects have been extended to domestically-funded research.

Competition for IDRC funds within CAF has resulted in significant improvements in project proposals. In addition, there has been cross-fertilization among CAF's research institutes, resulting in overall improvements in the ability of Chinese researchers to prepare proposals and to manage projects.

5.3 Impact of IDRC Support on Forestry Research in China

We have been told, by various senior members of CAF, that IDRC support has had a positive effect upon forestry research in China, in far greater proportion than the amount of funding. Reasons given included the relatively liberal terms of IDRC aid. Once a project has been approved, money is advanced in US dollars, which remains on deposit with the Bank of China until required. Devaluation of the Renminbi (RMB) yuan, over the life of a research contract, has resulted in substantial savings on domestic purchases of manpower, supplies and equipment. In at least one case, the savings were carried over and used to support the project up to one year longer than originally proposed. IDRC support began at a time when there was a heavy demand on capital funds for building construction and not much money available for scientific instruments. Consequently, support for the latter was particularly effective and highly appreciated.

An advantage of IDRC support over that from other external agencies is the freedom to acquire the most appropriate equipment and to seek the best expertise, regardless of country of origin.

Although the practice of agro-forestry, prior to the initiation of IDRC support to CAF, had already reached a relatively high level of achievement, it came at a most propitious time. Canadian aid provided increased impetus to domestic research, its application on the ground and assisted in its significant expansion. State funding of key projects, enriched by IDRC funds, provided focal centres of R & D performance, bringing together state, provincial, prefectural, county and xian (formerly commune) concentrations of resources that resulted in enhancement of research performance and expanded land areas for experimental trials and field-testing. Actual application of preliminary test results by "model" farmers has even been initiated in some cases before final research or field-test results were available. While such early starts in applying new but not fully tested techniques should not always be condoned, it illustrates the contagious enthusiasm of the

land managers. In the opinion of the team, credit for the progress is due in no small way to the fact that IDRC's support fell on such fertile fields.

China's new policy of encouraging the entrepreneurial spirit among farmers has helped encourage keen interest in and prompt application of the most advanced techniques and has facilitated the use of the best available tree seedlings/cuttings among individual "model" farmers. With the abolition of the commune system, the nominal allotment per person in the allocation of arable land to farm families was from 0.10 to 0.13 ha. or 0.30 to 0.40 ha per family of three, depending on the country. However, the current movement of some farmers from rural to urban occupations is providing the more entrepreneurial farmers the opportunity to acquire management rights over larger and more economic land areas.

As an example, IDRC's support for Paulownia research has resulted in the publication of nine major scientific papers and the identification of three or four greatly improved "clones." The latter have been recognised by the MOF and distributed in 15 provinces over three years. Approximately 20 million improved tree cuttings have been planted with a potential yield of 6.5 million cubic meter of timber. Approximately 27,000 hectare of Paulownia are now under cultivation as plantation; and there has been an expansion from 7,500 to 22,500 hectares of farm land which is now intercropped with Paulownia. Revenue from intercropping with Paulownia averages 15 to 30 percent more than with conventional agricultural crops only. In part, at least, this has resulted from the improved genetic stock, less prone to the growth-inhibiting disease of witches brooms, and improved spacing. Research has shown the optimum spacing to be from 5x20 m. to 5x30m. Using Paulownia in intercropping, tree density optimization and use of superior growing stock have resulted in the tripling of unit-area income at harvesting age, from 7,500 to 22,500 RMB per hectare, over an area of some 3,400 ha. Hence, the key impact of IDRC support to Paulownia research relates more to improved genetic stock and optimal spacing, rather than to the increased number of trees established annually or the total area intercropped with Paulownia.

Although Shandong province is not a natural forest area like the North-East of China, the farmers readily adopted the growing of trees together with their other crops of wheat, corn, soyh beans and cotton. In all there are now roughly 0.63 million hectare of Paulownia growing in Shandong province. Initially, Paulownia was used only to protect

economics, it is not a major source of farm income. An example of the dramatic impact of Paulownia intercropping on farming in Shandong province can be readily seen in the Yellow River Basin. The creation of micro-climates with Paulownia trees has enabled the rejuvenation of land formerly ravaged by severe winds and uneven rainfall. Thousands of hectares of currently productive farmland were reclaimed from what, thirty years ago, was virtually desert.

Likewise, the IDRC-supported bamboo research project of which the second phase is scheduled for completion in 1988, has resulted in significant accomplishments. In the first phase (1982-85), the RISF established a 20-hectare bamboo garden, studied the impact of fertilizers on bamboo growth and identified the chemical and physical properties of 30 native bamboo species. The bamboo arboretum now contains 230 species, 46 local and 184 exotics, all of the exotic species being the direct result of IDRC support. This Monopodium collection, now the best in China, has attracted some 30,000 visitors, mostly farmers in the past five years. In the past four years, more than 5,000 visitors were from universities. Most of the eight bamboo species now recommended for interplanting are exotics. One offshoot of the bamboo arboretum has been the establishment of linkages with Japanese scientists working in the same field.

Using higher-yielding bamboo species, identified with IDRC support, with twice the density of stems per hectare and relatively little fertilization, the rotation yield of bamboo timber has been increased threefold (from three to 10.5 tonnes per hectare). Another outcome of the bamboo research is the identification of eight species especially suitable for bamboo shoot production, of which 30,000 "mother" bamboo stems have been sold to farmers, producing a net revenue of 11,000 RMB per annum.

5.4 Internal and External linkages

In our opinion, the international impact of IDRC support to CAF is in its infancy but holds great potential for the future.

IDRC participation has already resulted in additional funding from state, provincial, prefectural and county levels within China and has raised CAF's international profile, thereby attracting other external donors. External linkages are well illustrated by help from foreign consultants, the fact that 100 visitors have been received from 11 countries in recent years, and that 27 participants

from 10 countries attended the Bamboo Workshop held at the RISF in Fuyang, Zhejiang Province, in 1985. In addition, a recent agroforestry training course attracted 27 participants from 10 developing countries.

China's increasing pre-eminence in some fields of forestry research is thus being recognised. It is also exemplified by the fact that CAF currently receives over 350 enquiries annually from foreign countries requesting Paulownia information or seeds. In response, Mr. Xu Shilie, Associate Director, Division of Program Management, Beijing, has sent Paulownia seeds to 60 institutes in 30 foreign countries.

The potential role of CAF in international forestry is discussed in the following section.

Another impact of IDRC support to agroforestry in China appears to be the strengthening of vertical linkages between CAF researchers and the farmer. We perceive the downward linkages in the following order:

1. CAF
2. The Province
3. The Prefecture
4. The County (or City/Town)
5. The Xian (formerly the commune)
6. The farmer

Provincial, prefectural and county levels of government all engage in appropriate levels of science and technology, becoming increasingly applied and location-specific at the "lower" levels. We were greatly impressed by the high level of forestry knowledge exhibited by provincial, prefectural and county officials we met, irrespective of their educational/academic backgrounds. Such a high level of awareness and understanding of agroforestry problems and the need for appropriate forestry R & D would rarely be encountered in a developed country. The impact of IDRC funded R & D in China is therefore recognised and appreciated at every principal political level, down to and including the "model" farmer. Under these circumstances, the "ripple" effect of IDRC impacts appears to flow, both vertically and horizontally, among at least the more enlightened in Chinese society.

6. POTENTIAL INTERNATIONAL ROLE OF CAF

6.1 The Potential Areas of Collaboration

It is within the stated policy of the Government of China, in its push towards modernisation, to open its door to outside economic and scientific exchange and collaboration with other countries. China's commitment to IDRC-supported projects is an indication of its seriousness in putting this policy into practice. However, the policy also extends to foreign assistance to other developing countries. China has committed 1 to 2 billion RMB (CAD300-600 million) to foreign assistance since the 1950's, the largest program being the Tanzania-Zambia railway project. On the international scene, China has a large collaboration program with the USA. This covers 27 major disciplines and 500 research projects. The CAF is involved in this collaboration on research on the Gypsy-moth. China also receives support from the European Economic Commission amounting to about US\$0.5 million (CAD 0.4 million) annually. Besides that, China also receives support from Italy, Sweden and West Germany, the last involving considerable support in renewable energy through the GTZ. Most international support programs are handled and monitored by the SSTC.

All IDRC projects with the CAF are also channelled via the SSTC, which does not get involved in implementation of programs, once they have been officially approved. It is therefore the responsibility of the CAF to implement the projects, a task which they have done very well, as discussed previously. One of the benefits of IDRC support has been exposure of CAF staff to international contacts.

Besides affording an opportunity for some CAF staff to go overseas, numerous forestry scientists from other countries have had the opportunity and privilege to visit China and CAF. These exchanges and contacts have definitely made CAF scientists more aware of developments in other countries. The holding of international meetings and training courses in China, organised by CAF, has exposed CAF staff to the procedures and methods of holding international gatherings. This has not been possible in the past and experience in organising international meetings was very limited.

Limited ability to communicate in English has always been an impediment to China's greater collaboration with other countries; this has also been true with respect to CAF staff. However, there is, today, a deep awareness by the population at large of the need to learn foreign languages, especially English. Courses are offered on TV and radio, as

well as formal evening classes, all of which are enthusiastically followed. "English corners", where Chinese congregate to practice English, are found in many large cities such as Beijing. Members of the team, two of whom had visited China in the past, agreed that the use of the English language is much more widespread now and that many more CAF scientists can speak some English.

Discussions with CAF staff at Beijing and at the various institutes, showed a tremendous eagerness to share their knowledge with others overseas. There was open willingness to discuss detailed technical issues of their work and questions on possibilities of sharing with overseas scientists received spontaneously positive replies. No reference was even made to pending policy approval, which was assumed as implicit.

It is the team's view that the IDRC support over the past six years has adequately prepared CAF to play a bigger role in international forestry. CAF is a member of the International Union of Forest Research Organisations (IUFRO) and the Director of the RICPUFP at Nanjing, Dr. Wang Ding Xuan, has been a member of the IUFRO Executive Board since January 1987. CAF has sent participants to major overseas conferences such as the World Forestry Congress and IUFRO Congresses, as well as participated in the Asia-Pacific Forestry Commission of FAO and other FAO programs. However, given its manpower resources, technical experience and expertise over a wide range of topics, CAF is yet to play its full potential role in international forestry.

Given the open policy of the Chinese government and the eagerness for international exposure, IDRC could, and we believe should, play a facilitating role in promoting international linkages between CAF and institutions in other countries. While scientific and technical ability may be lacking in many fields, China, and the CAF in particular, is rich in forestry experience and scientific and technical ability in a number of areas. It can be said without doubt that CAF has reached a high level of competence in scientific ability in areas such as agroforestry, bamboos and chemical utilization of wood, for example. The team is confident that technology exists in a host of topics within the CAF which could be of special interest to other developing countries.

6.2 Mechanism for International Involvement

Tremendous potential exists for China in scientific collaboration with other developing countries. Exchange could take various forms and IDRC could play an important role in assisting the realization of this potential.

- To enable a larger number of scientists from overseas to gain the opportunity to study specific areas of Chinese forestry, group training courses can be organised. From reports and personal contacts of some members of the team, the training course on farm forestry, held in China this year, was a success. Similar courses could be held in some other disciplines. However, while such group training courses allow exposure for many scientists, it may not be the best form of inter-country transfer of technology. Nevertheless, while such training courses should be continued, the fields must be carefully chosen and the number of participants limited to not more than twenty. Appropriate fields for such group training courses could be in Bamboo research, Paulownia research, chemical utilization of wood, low-cost technology in forestry and fields related to agroforestry.

Expertise is present within the CAF organisation in a range of fields from production forestry to utilisation forestry. The team met only a few of the CAF scientists and were limited to those involved in IDRC-sponsored projects. However, based on this limited sample, which could be biased, we believe that among the 1,600 scientific personnel in CAF, there must exist specialists and experts in a range of fields, besides Paulownia, Bamboo and chemical utilisation of wood. There must be tremendous experience in lac technology since CAF has a Research Institute of Lac in Jingdong, Yunnan Province. There should be expertise in forest economics, as there is also a Research Institute of Forestry Economics at Beijing. The team was particularly impressed by the Research Institute of Chemical Processing and Utilisation of Forest Products in Nanjing, where scientists work on wood, bark, leaves, fruits and roots of a range of trees and crops to produce a host of chemical natural products. The expertise of the scientists was impressive. The Bamboo and Paulownia projects have similar expertise. All these people, most of whom are mature adults with years of experience, could be harnessed for international collaboration. They could contribute to courses held in China but they could also be used as resource persons for training courses held overseas. An added criterion of course, must be the ability to communicate in English, which unfortunately with few exceptions, is currently still limited among scientists whom we met.

Recognising that participation in international collaboration/exchange is a fairly recent development for CAF, one of the best means of exposure is to encourage CAF scientists to attend international meetings, workshops, seminars, conferences etc. However, in order to ensure participation and not just limited to attendance, a condition should be put that they must present papers or "posters" as well. Hopefully this would help in "breaking the ice" and lead to greater communication. The team believes that the Chinese have the technical ability but opportunities must be provided for them to breakdown their reserved, introverted nature, which is further reinforced by limitations in language communication. There are numerous meetings held regularly all over the world related to the activities of the Academy in which CAF scientists could participate and contribute. The other limiting factor is funds, which is where IDRC could assist.

There are a few mature scientists in CAF and its institutes competent in English, at least in spoken English. Where such a combination exists, such scientists could be invited as consultants to relevant and appropriate IDRC projects. However, the ability in written English should also be a criterion for otherwise, the editing of reports could become a burdensome task.

In the field of information exchange, this has been limited by the fact that nearly all CAF publications are in Chinese. The team was informed that the library in CAF Headquarters in Beijing is fairly well supplied but lacking in many overseas journals and publications. The practice of IDRC to encourage the purchase of books and technical publications for projects is an excellent way of promoting acquisition of foreign publications and should be continued. The recently approved Bamboo Information Center, to be based at the RISTIF in Beijing, is one way of encouraging the CAF to publish more in English and to share and disseminate information to other countries. However, it would be impossible to expect an information centre for every topic/discipline. The CAF should encourage every article to have at least an abstract in English and English subtitles for illustrations, and RISTIF or the library should be encouraged to have greater exchange with other institutions in the world. This will be a slow process which IDRC could expedite by supporting such a scheme of promoting publication exchanges with overseas institutions.

IDRC has initiated research networking among developing country institutions. A recently approved project illustrates the concept and its advantages. In the field of

palm "wood" or palm stem utilization, IDRC recently approved (Project No. 87-0013) a research network with the Philippines on coconut stem, Malaysia on oil-palm stem and Thailand on other palms. While there are significant differences between coconut and oil palm stems and the many other palms, there are also similarities. Such a project could help harness, in a supportive and complementary way, the expertise, experience and information available in all the institutions involved. Participation within such an R & D collaborative network would be ideal for CAF. While it still would allow individual research work, without direct participation by scientists from overseas, it would promote the exchange and sharing of experiences and knowledge and could lay the foundation for direct bilateral research collaboration in the future. IDRC could investigate possibilities of further involvement of CAF within existing networks. To some extent China is already participating in IDRC-sponsored Rattan and Bamboo research networks, in which a number of countries viz, Indonesia, Thailand, Philippines and Malaysia, have IDRC-supported projects in one or both fields. However, these projects were initially developed as individual country projects without considering the collaborative network elements, unlike the palm-stem project. It may be timely to reconsider these projects collectively and to reorientate them to fit into a network concept, as some of them are due to terminate.

6.3 Constraints

It is the team's view that CAF is ready for greater international involvement in forestry. As a matter of policy, as echoed by SSTC staff, China is willing to extend support to other countries. However, there are certain limitations.

An important limitation is funds, especially foreign currency. CAF cannot be expected to embark upon international collaboration, far less assistance, with its present budgets. The funds that CAF currently receives are hardly adequate to meet the challenges and necessities of the country and it would be illogical and detrimental to national priorities if part of these funds were to be channelled to international programs. External funding is therefore critical if CAF is to embark on any meaningful international collaboration.

The 1,600-strong scientific manpower in CAF is adequate to support and participate in international activities without being detrimental to national programs. However, as China is a large country with a huge population, problems in forestry

are equally serious and care should be taken to ensure that international involvement is not at the expense of national programs. On the other hand, international activities should directly or indirectly support national programs. While there is a high percentage of senior experienced researchers within China's scientific manpower pool, there is not a high percentage of researchers with post-graduate degrees, especially to a Ph.D. level. While the Institutes within CAF are authorised to grant graduate degrees including Ph.D.s, most of the researchers only have basic baccalaureate degrees only. While this should not limit their ability for international collaboration, it is the view of the team that, for effective research collaboration, it would be beneficial for scientists to have some graduate training.

Language is a real constraint for China's effective international participation. While there is an obvious desire to participate in international activities, language limitations at this time would severely limit effective participation. There appears to be a strong desire of the Chinese to learn English but this will take sometime to produce results. Furthermore this desire appears to be stronger amongst the younger generation. Consequently, it will take sometime for CAF to be able to assume a lead role in international collaboration. However, the team believes that this constraint can and will be overcome. The CAF has a Division of Foreign Affairs, staffed by very competent English speaking officers, who could act as interpreters. At every institute, the team found persons with a good working knowledge of English. While the situation may not be ideal, adequate backup facilities exist to enable CAF to continue develop its international capabilities.

The CAF and its programs have not been widely known overseas with the result that there has been little external demand from other countries upon its scientific manpower. However, we believe that CAF could provide meaningful and important contributions in certain fields and through IDRC, there is now an increasing awareness on the part of other countries of the capabilities and expertise within China.

Given the constraints faced by CAF, there is merit in considering joint collaboration between Chinese universities and overseas institutions. This would be especially useful in organising training courses and meetings in China, as the universities have resources and expertise which could complement and supplement those of the CAF. IDRC has taken steps in this direction during the 1985 International Workshop on Bamboo and the 1987 International Training

course on farm forestry as well as in the Bamboo Cellulose Membrane project in the "pipeline". This practice should be encouraged and we believe that CAF would welcome such arrangements.

6.4 Benefits

CAF and the international forestry community will both benefit if and when CAF embarks upon an active program of international collaboration. CAF scientists, who have been isolated in the past, can reap the benefits of developments in forestry science elsewhere in the world. This will surely help them in their own research endeavours. The sharing and exchange of experiences and information have always been part of the development of knowledge. CAF scientists would benefit from this as much as their collaborators. What is required is a basic desire and sincerity to truly collaborate without prejudice to national policies, tempered with respect for each another.

Collaborative work, built upon mutual interest, can result in not only more effective research but could also result in economies of resources and time. Of greater importance, however, is the bringing together of people similarly dedicated to the pursuit of knowledge. These contacts can lay the foundation for long lasting friendships which can contribute, in no small way, towards fostering harmony and understanding between people of different nations in the world.

7. CONCLUSIONS AND RECOMMENDATIONS

Our limited exposure to Chinese forestry research does not give us the necessary qualifications to comment authoritatively on this vast country's wide spectrum of forestry programs and challenges. It has, however, given us an insight into the programs that IDRC is closely involved in. The team unanimously concluded that the limited financial support from IDRC has indeed been used wisely and effectively. The basis of this conclusion lies upon the fact that IDRC's policy of providing funds "up front" has permitted the CAF to take advantage of foreign exchange and inflation rates and to use IDRC funds more effectively.

Due to the wage structure in China, one scientist year costs only about CAD 1200. In many other developing countries, this would not be possible as the cost of labour and other supporting resources would be much higher. A large amount of scientific capacity can therefore be mobilised with relatively little external financial support.

In general, the team was impressed with the overall spirit and commitment of CAF researchers. Scientific productivity of all the projects appears to be excellent. The creative and rigorous husbanding of scientific and technical resources by CAF and its affiliated institutes was impressive. The enthusiasm, dedication and wide-ranging knowledge of CAF staff were apparent. They appeared to have first hand knowledge of the needs and problems of farmers and foresters in the region where they worked, where an apparently high level of mutual familiarity and respect exists between CAF researchers and officials at all levels.

The team observed many examples of the use of CAF-developed and IDRC-funded knowledge and technologies by farmers and foresters. However, while IDRC programs in forestry in China have all been well thought of and are having an impact on forestry in the country, the issues and challenges of forestry in China are so great that a re-examination of priorities for support may be worthy of consideration at this time. While the Paulownia and Bamboo projects are wide in scope and address issues of national importance, some others are more narrow and directed at problems which, in the national context, do not appear to be of such high priority. Such projects as the Wood Utilization, Adhesives and the Gasification projects, while extremely useful, may not, in the opinion of the team, be addressing relatively major priority areas of forestry in the country.

This is not to imply that these projects are not useful. They are potentially very useful as both the Adhesives and Gasification projects, can have important value-added impacts on the utilization of wood in China. Furthermore, there are other considerations in IDRC support, and in support of wood utilisation research, these projects are very useful.

The projects are usually proposed on a bottom-up basis, where the scientists are the ones proposing projects and there is little effort at the CAF, MOF or SSTC levels to determine priorities on a national scale for projects requiring international funding. As a result, relatively small, narrow projects may be presented for support.

The team, however, believes that there may be other more urgent and bigger issues and challenges to forestry in China that IDRC could support with the levels of funding available. In a country with sparse forest resources and a great demand for wood, complete utilization is not so important a problem. This is clearly manifested in a country where leaves and twigs are gathered for fodder and fuel. China has embarked on ambitious and challenging programs to address the major forestry issues of the country. The "Spark" program has identified the development of fast-growing plantations as one of the top national priorities. The programs of the Great Green Wall, the "3 Norths", the transformation of the "Yellow Dragon" to a "Green Dragon" and the establishment of the "Green China Fund" are all manifestations of the country's desire to plant trees in the barren areas of the North, North-West and West. It is unlikely that such development programs could be achieved without strong R & D support. IDRC could play an important catalytic, motivating and facilitating role by investing funds to support relevant R & D projects considered necessary to support such national development projects.

The Paulownia project has played an instrumental role in the government's campaign to green the plains. A similar effort could help towards afforesting the barren northern and central western parts of the country. In fact, the Jojoba project, which is one of the "pipeline" projects for 1988/89, is in some ways directed towards the above objective. Jojoba is a hardy arid zone plant suitable for reforestation and also potentially of economic importance for the production of industrial "wax."

The issues of forestry globally are location specific in many ways but nevertheless there are many common problems that transcend countries, ecosystems and regions. When resources are scarce and needs for support many, there is merit in linking institutions into networks. The whole issue of networking has been well documented and takes many forms. In the field of R & D, networking basically involves collaborative research in complementary and supplementary fields/disciplines. This would not only distribute limited funds to more recipients but enable the harnessing of strengths in various institutions for certain problems which could offset the weakness of others. It is therefore recommended that, in order to increase funding to China yet not at the expense of other countries in the region, IDRC should develop more collaborative research networks which could supplement the weaknesses and draw upon the strengths of institutions in China. Indeed IDRC is already moving in this direction. The palm-stem project with Philippines studying the coconut stem, Malaysia the oil palm stem and Thailand the stems of other palms, is an excellent example of a collaborative R & D network. The Bamboo and Rattan projects could be developed into similar networks. The Bamboo Cellulose Membrane project aims at twinning a Chinese institution with a Canadian institution. There are other advantages of such collaboration, including sharing of information, experiences and research findings.

IDRC funding in forestry in China since 1981 amounts to about CAD2.5 million, a significant contribution in the context of overall funding to research in forestry in the whole of China. The results of this financial contribution have been impressive in projects such as the Paulownia and Bamboo projects, though much remains to be done.

Since 1981, when its development assistance program in China began, Canada's interest in and support for development in China have grown steadily. The very strong developmental/practical orientation of CAF research programs was coupled with a high respect and value for basic research. Our interviews with officials and staff of SSTC, MOF and CAF indicate that, to the Chinese forestry research community, IDRC is an important channel of China-Canada cooperation. CAF officials commented favourably on the financial and administrative procedures and the reporting mechanisms of IDRC, and substantial tangible support from other internal sources have been allocated (i.e. from local governments) to IDRC funded research projects.

IDRC should "capitalise" on this experience in two ways. It should show the Canadian public the results of its support to China through whatever means at its disposal and,

second, it should encourage the international sharing of what has been achieved in China. The unique and effective features of the Chinese research system would be a valuable example to other developing countries. This would demonstrate the role that Canada is playing in trying to solve some major problems in alleviating poverty in developing countries. It would also be particularly appropriate to utilize any forum that takes place in Canada to bring Chinese project scientists and/or project leaders to participate in such events, including conferences, seminars or workshops, particularly if such meetings were international in nature.

IDRC has limited its forestry funding in China largely to one agency, viz. the CAF, and through the CAF to the various institutions associated with it. However, there are many other institutions in the country carrying out research in forestry, especially the universities, of which three are national universities of forestry. At provincial, prefectural and county levels, there are research or experimental stations which also carry out research, albeit, in a limited applied area focussed at local problems. The issue of whether IDRC should continue to support primarily one institution, the CAF, or to spread its limited resources among other institutions as well, must be viewed from various perspectives.

The first is whether the current recipient institution has the necessary ability and capacity to deserve continued IDRC support. Based on the records of past projects and the team's limited exposure to the institutions and projects, there is no doubt as to the capacity and ability of the CAF to continue to receive IDRC support, even at an increased level, if such were available. CAF has the necessary human resources and institutional structure. As a national R & D institution, CAF addresses nationally important and recognised issues and problems. As a matter of policy, IDRC should support only such national research institutions, not regional ones. Another reason is that with the large number of regional institutions in China, it would be difficult to decide which of them to support and which not to support. Moreover, the capacities of these regional institutions are generally weaker. With few exceptions, many depend upon the CAF to provide much needed leadership and technical support. Furthermore, very strong formal and informal links currently exist between the CAF and its institutes with the regional institutions which, based on the team's experience, also extends to the local government leadership, resulting in very strong vertical linkages and excellent working relationships. IDRC should strengthen these relationships rather than weaken them by directly supporting regional

institutions. Under the present system, regional institutions involved in IDRC projects already receive direct and indirect benefits, including funds and facilities from IDRC through the CAF. As no major inefficiencies were apparent, we believe that this system should be continued and strengthened.

The universities, on the other hand, generally carry out more basic research than the problem-oriented research of the CAF. Unfortunately, from the team's limited exposure to the universities, it seems that there is limited collaboration between the CAF and the universities, though they have strengths in wide-ranging areas. It therefore appears that there is merit in bringing the CAF and the universities closer together by promoting collaborative research projects, where the universities are given the supportive role of carrying out the basic research needed to support an applied research problem carried out by CAF. The team, however, recognises that, while this would appear logical on paper, it may not be easy in practice, and the ideal must therefore be tempered with realities. However, though the cooperation between CAF and universities is not reflected in project proposals, the project staff have close internal links with universities and other institutions that can assist them in solving problems that they are confronted with. The project leader knows where he can get help and could make his own choice.

It is noted that two of the 1988/89 "pipeline" projects are with institutions other than the CAF. The Jojoba project will involve the Kunming Institute of Botany (KIB) of the Chinese Academy of Sciences (CAS), while the Bamboo Cellulose Membrane project is for the Second Institute of Oceanography (SIG) of the Chinese National Bureau of Oceanography (NBO) with the Industrial Membrane Research Institute (IMRI) of the University of Ottawa. In spite of our earlier observations, the final consideration in allocation of support is the ability of the recipient organisation to achieve the objectives of the project and we are confident that both the CAS and NBO have the strength and capability to do so. Furthermore, there could be other considerations such as specialised fields, for example membrane technology, that should be taken into consideration in project formulation.

During the whole period of the team's visit to the projects and institutes in China, there has been nothing but praise for IDRC, which was expressed openly, voluntarily and sincerely. With the change in government policy, China is perched on the springboard of science and technology and on the threshold of greater international collaboration and

cooperation. It is hungry for development, thirsty for resources and confident in its ability to perform. IDRC's support has contributed in a small but highly valuable way towards China achieving all those aspirations. The IDRC staff who have visited or come in contact with their Chinese counterparts, especially IDRC staff from ASRO, were warmly praised for their dedication, hard work and prompt support and their sensitivity to Chinese needs and peculiarities. IDRC and in particular, the forestry program, has not only supported forestry projects but has also attempted to look at the whole system, including the support services. IDRC has tried to strengthen CAF where weaknesses were apparent. IDRC-supported programs have not only resulted in the development of science and technology, but also in the transmission of research results to the people in the field, indeed to the farmers who have directly benefitted. While IDRC-supported scientists are working in the laboratories and institutes, they are simultaneously in the front line of development.

Furthermore, the areas of IDRC support to Chinese projects are generally in areas of little, if any, direct interest to Canada. Moreover, Canada has had a strong spiritual link with China through the latter's veneration of the personal sacrifices of Dr. Bethune and what IDRC is attempting to do now has been compared by one of the Chinese scientists as carrying on the aspirations of Dr. Bethune. In his own words, "IDRC is carrying out the spirit of Dr. Bethune" (to quote Mr. Zhu). This may be an emotional tribute to IDRC but it is a worthy cause that should form the basis for future IDRC support to this vast and challenging country.

8. ACKNOWLEDGEMENT

Members of the team are indebted to a large number of individuals and institutions who have contributed in no small way towards making this mission possible. First, we would like to thank the many Chinese friends that we met during our trip to China. Their hospitality and kindness have been exemplary, their concern for our comforts went beyond expectations and their willingness to assist us found no bounds. We thank them one and all.

We would like to express our appreciation to the Chinese State Science and Technology Commission (SSTC) and the Ministry of Forestry for their approval and support in carrying out the mission. Special thanks also go to SSTC for providing one of their staff to be a member of the mission.

IDRC, and its Regional Director, Dr. Jingjai Hanchanlash, provided essential support to the mission. We gratefully acknowledge the support and advice of Dr. Cherla Sastry, whose sharing of his vast experiences in China laid the ground work for our efforts. We thank Miss Cecilia Chung for the secretarial support in ASRO. We are indebted to Dr. Salleh's secretary, Ms. Ann Jackson, for typing, collating and finalizing this report. She worked beyond the normal call of duty to complete this report, for which we are grateful.

The mission also acknowledges the permission of the Malaysian Government, the Ministry of Primary Industries, Malaysia and the Malaysian Forestry Research and Development Board for allowing Dr. Salleh, the Director General of the Forest Research Institute Malaysia, to participate in the mission.

In China, we could not have found a better host than the CAF. We thank the President, Mr. Liu Yuhe, for his support and hospitality, and for allowing us access to his organisation. We acknowledge, with gratitude, the support and assistance of all the institutes that we visited and the many staff that we met. We thank the numerous provincial, prefectural and county staff that met us, entertained us and organized our visits to the field.

We must also thank our two special hosts whose company and friendship we had the privilege of sharing throughout our work in China. Mr. Zhu Zhao Hua not only showed us his Paulownia work but also took care of all our logistics (in spite of the non-cooperation of CAAC!) and often acted as

interpreter as well. The second is Mr. He Guangsen, who did an excellent job in translating and interpreting the numerous conversations that took place. We could not have done without their support.

Finally, we would like to thank Mr. Huang Weiguan, Director of the Division of Foreign Affairs of CAF, who we understand played a key role in the preparation for the mission. He was to accompany us but due to an unfortunate accident in the family, he was unable to accompany the mission. The mission thereby lost the opportunity to share the benefits of his experience. We trust that Mrs. Huang had a speedy recovery from her unfortunate accident.

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7. Cherla B. Sastry (1987). Forestry and China. IDRC unpublished internal notes.

10. APPENDICES

1. Terms of Reference
2. Elaboration of the Terms of Reference
3. Members of Evaluation Team
4. Outlines of Questions for Evaluation
5. Itinerary of Mission
6. List of Persons Met
7. Questionnaires for Project Evaluation

TERMS OF REFERENCE

1. To travel to Singapore and China as an evaluation team, led by Prof. J. W. Ker, to assess the impact of IDRC support to the Chinese Academy of Forestry (CAF) in the following areas:
 - i) achieving CAF objectives
 - ii) upgrading and development of CAF's resources/physical plant facilities
 - iii) upgrading the skills of CAF staff (technical and administrative)
 - iv) transferring research findings/technology to users
 - v) identifying future support to contribute to institutional viability and self reliance.
2. To assist Prof. Ker in conducting the evaluation exercise, including the development of suitable methodologies (to include discussions with IDRC staff and structured interviews with CAF staff and State Science and Technology Commissions (SSTC) officials) and the preparation of an evaluation report.
3. To submit a brief report of the evaluation exercise to the Regional Director, ASRO, Singapore by January 5, 1988. (This date was later extended to 29th. February, 1988).

The Terms of Reference were further translated into a set of guidelines as a focus for the mission, which are as in Appendix 2.

Appendix 2

ELABORATION OF THE TERMS OF REFERENCE

Based on discussions in September and a subsequent meeting of Smutylo with H. Zandstra, it was suggested that the evaluation of Centre support to the Chinese Academy of Forestry focus on three main areas:

- 1) An institutional profile of CAF;
- 2) The impact of IDRC support on CAF's research capacity; and
- 3) The potential for CAF to play an international role in forestry research.

The following evaluation issues in each area should be addressed.

(1) Institutional Profile

1.1 Management and Leadership:

- Internal operations;
- In relation to the external environment within China

1.2 Mission and objectives:

- Major purposes, mission and objectives;
- Methods of operation
- Level to which these are articulated and clearly understood by the staff (central and in the regional research stations)
- The congruency between the objectives and priorities of national programs and CAF's mission and objectives.

1.3 Programs

- The degree to which the institution's mission and objectives are articulated in its research programs;
- Description of the major program activities, mechanisms for program planning and objective setting
- Degree of continuity and autonomy among the programs of the regional research stations
- Level of productivity and quality of output of the various research programs.

1.4 Resources

- Inventory of resources (material and human)
- The identification of all sources of support (IDRC support in the context of all support to CAF)
- Adequacy of resources for existing programs
- Efficiency in the use of, and means of allocating, resources within CAF.

1.5 Organisational structure and functions:

- Financial management (budget planning and control)
- Personnel management, human resource development (training)
- Purchasing and inventory control
- Research management
- Research supporting services
- Capability to manage project funds at and above current level of commitment from external sources.

1.6 Linkages with other organisations:

- Organisation which control of resources or have either authority over CAF;

- Those which provide inputs or which use CAF outputs (colleague institutions)
- Exchanges with other research institutions within and outside of China (exchanges and access to information).

(2) Impact of IDRC support

Impact of all IDRC support to CAF will be evaluated relative to:

2.1 Impact on institutional capacity:

- Project contents;
- The direction of CAF's research programs and the content of individual projects;
- Research output;
- The development of human resources;
- Access to financial resources;
- Financial administrative management;
- Research management;
- Research supporting services; and
- Linkages with other organisations.

2.2 The dissemination and utilization of research results by CAF or other linked organisations.

2.3 How efficiently and effectively was IDRC support provided at the technical level, at the financial accountability level.

2.4 Gaps in support which IDRC could fill and which are crucial to institutional capacity or viability.

2.5 What level of impact can support, on the scale of that provided by IDRC, have on CAF and on other similar institutions in China in general.

(3) Potential for an international role in forestry research

- 3.1 What CAF's mandate and intentions with regard to collaboration with forestry research institutions in other Third World countries is.
- 3.2 What SSTC's policies with regard to Third World development agencies are.
- 3.3 Past, current and planned collaborative activities with other developing countries.
- 3.4 Opportunities for, and constraints to, south/south cooperation within CAF and SSTC.
- 3.5 Make recommendations for overcoming such constraints and taking advantage of such opportunities.
- 3.6 Identify ways to which IDRC support could assist CAF and SSTC to move in this direction.

The issues and information of interest to CAF and SSTC can be added in our discussion in Singapore and Beijing.

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Telex: 22349 SSTCC CN

*

IDRC/ASRO

OUTLINE OF QUESTIONS FOR EVALUATION

1. Institutional Profile

1.1 Management & Leadership, incl. management style

- 1.1.1 Internal: CAF - Beijing)
 CAF - Institutes) 4 levels
 Within Institutes)
 Between Institutes)

Keeping in mind the 4 levels above:

- 1.1.1.1 How are decisions made?
 1.1.1.2 How are managers chosen?
 1.1.1.3 How do you ensure good-quality leadership?
 - scientific
 - management
 1.1.1.4 What is the division in management/scientific leadership?
 - administrative vs. scientific leadership: How?
 Who does it?
 1.1.1.5 How are management policies/decisions communicated?
 - attitudes/cultural implications?
 1.1.1.6 Reward system: How is good management recognised/rewarded?
 -vertically, both above/below

- 1.1.2 External: 2 levels) CAF
) RI (Regional Institution)

N.B: Political & Cultural

- 1.1.2.1 To whom do CAF managers report?
 1.1.2.2 How does CAF maintain relationship with:
 - the government?) Political
 - the people (commune) Formal
 - the scientific)
 community) Informal

* Developed by Ker, Smutylo and Salleh in Singapore prior to departure for China.

- 1.1.2.3 With what other organisations does CAF have links for: financial, managerial, other support?
- 1.1.2.4 Forms of collaboration between CAF and counterparts?
- 1.1.2.5 How do you manage visiting donors/delegations/scientists/visitors?
- 1.1.2.6 Who, within CAF, is responsible for initiating and approving foreign assistance programs?

1.2 Mission and Objectives

- 1.2.1 Could you brief us in your Purpose, Mission and Objectives (PMO)? Could we have a copy?
- 1.2.2 How are these formulated/approved/revised?
- 1.2.3 How do they relate to national policies and programs?
- 1.2.4 How are they disseminated to ensure acceptance and adherence/compliance by CAF staff (at HQ and RI)?
- 1.2.5 (Rank & File)
 - 1.2.5.1 Do you know your Purposes, Mission & Objectives?
 - 1.2.5.2 How are the above communicated to you?
 - 1.2.5.3 Do you see the need for any changes or additions?

1.3 Programs

- 1.3.1 How do you formulate your Research Programs (RP) at HQ and RI:
 - linkages between RI's e.g. supplementary/complementary?
 - duration (length) of programs/projects/studies?
 - what is the role of Purposes, Mission & Objectives in formulating your Research Programs
 - is the capacity for management of existing programs adequate?
- 1.3.2 How do foreign donors influence formulation of RP?
- 1.3.3 May we have a copy of your RP?

- 1.3.4 Who approves the RP?
- 1.3.5 What is the system of monitoring RP implementation?
- 1.3.6 How do you evaluate your RP?
i.e.: at Program, Project & Study level?
by whom?
publications?
reports to whom?
frequency?
- 1.3.7 How are priorities set: for Programs/Projects/Studies?
by whom?
- 1.3.8 How autonomous are the RI's in determining their RP's?
- 1.3.9 Who manages your RP: at HQ?
at RI?
at organization level?

1.4 Resources

- 1.4.1 Could we have a list of your major equipment and buildings? Are they adequate? What provision is made for their maintenance/replacement?
- 1.4.2 Do you control/have access to experimental/research forests? Is there potential for expansion?
- 1.4.3 What is your staff strength?
1. HQ 2. Management-by program? 3. Prof.
RI Research Support Tech Support
- 1.4.4 What is your annual budget?) HQ
- by program?) RI
- 1.4.5 How is the budget (allocated) to RI
(audited & controlled) within RI
- 1.4.6 Internal sources/amounts of revenue?
- 1.4.7 Sources/amounts of External funding?

1.6 Linkages with Other Organizations

- 1.6.0 What are the other forestry institutions in China and what do they do?
- 1.6.1 With what institutions within China does CAF have linkages?
- 1.6.2 What form do these linkages take?
 - eg. info-exchange
 - collaborative research
 - sharing facilities
 - graduate research?
- 1.6.3 Who and how much resources (manpower & \$) are contributed towards maintaining these linkages?
- 1.6.4 What benefits are derived from these linkages by CAF (HQ)?
(RI)?
- 1.6.5 (a) What international organizations is CAF a member of?
 - (b) Repeat questions 1.6.1 - 1.6.4 for international organizations.
- 1.6.6 (a) How does CAF communicate research results (HQ & RI's)?
(Extension/Publications/etc.)
 - (b) Who are CAF's clientele?
- 1.6.7 Which organizations have a managerial/financial control over CAF?
 - at HQ?
 - at RI level?
- 1.6.8 What other institutions are very important to ensure CAF research is put to maximum use?

2. Impact of IDRC Support

2.1 Magnitude of IDRC Support

Form?
How much?
When?

N.B. Status of CAF prior to IDRC support?

- historical info, interviews, observations
- if with status of non-recipient programs

2.2 Impact

2.2.1 What are the other forestry institutions in China and what do they do?

2.2.2 How would you assess IDRC/CAF interactions?

2.2.3 (a) Has IDRC support resulted in internal/local support, eg. synergism vs substitution (push/pull effects) (and involvement of users)
- both local/overseas support!

(b) Effect on program: priorities/projects?

(c) Impacts on: technical skills

- research output, eg. publications, findings, etc.
- training/meetings/workshops
- access to additional financial resources
- financial management
- administrative management
- research management
- info management
- research-support services
- linkages with CIDA and other organizations
- research methodology, viz., statistical methods, experimental design
- utilization of CAF research findings
- use of English language
- policy, eg. of interplanting agri/for crops increase international assistance
- jealousy, both within CAF/RI and with other institutions, eg. less favourable IDRC/CAF relations with non-recipients.

2.3 Local Component

What is the magnitude of the local component and has it withdrawn resources from other programs?

N.B. Commitment: at policy vs project level?

2.4 International Component

- (a) What influence has relationship with IDRC had on China's relationships with other countries?
- (b) How does CAF view IDRC's priority of funding research - transferrable to other developing countries?
- (c) What gaps exist in IDRC support to CAF, from your point of view, which are crucial to your institutional research capacity and ability to fulfill your mandate?
- (d) What constraints in policy/institutional/financial arrangements should be eliminated in order to utilize more effectively findings/results from IDRC-supported programs.

- from internal sources
- from external sources, incl. IDRC

2.5 How efficiently and effectively was IDRC support provided:

- (a) at the technical level?
- (b) at the financial level?

N.B. What impact can IDRC support, in the scale currently provided, have:

- (i) on CAF
- and (ii) on other similar institutions in China?

3. Potential for an international role in forestry research

3.1 What is CAF's mandate and intentions with regard to collaboration with forestry research institutions in other Third World countries?

3.2 What are SSTC's policies with regard to foreign Third World development agencies?

ITINERARY OF MISSION

- Nov. 15 - Arrive at Singapore
- Nov. 16-17 - Preparatory meeting at ASRO
- Nov. 18 - Depart for Beijing
- Nov. 19-21 - Visit CAF and Institutes, MOF and SSTC
- Nov. 22 - Depart by train for Yangzhou at 2110 hrs.
- Nov. 22 - Arrive at Yangzhou at 0720 hrs.
Visit Yangzhou County Forest Experimental
Station, Shandong Sheng, Shandong Province
- Nov. 23 - Depart for Shangqiu County, Henan Province
by car. Overnight at Shangqiu.
- Nov. 24 - Visit Mingquan County, Henan Sheng Province
Overnight at Shangqiu.
- Nov. 25 - Visit Dangshan County, Anhui Sheng Province
Depart by train for Nanjing at 2045 hrs.
- Nov. 26 - Arrive at Nanjing, Jiangsu Province at 0440
hrs. Visit RICPUFP.
- Nov. 27 - Continue visit to the above institute.
- Nov. 28 - At Nanjing - discussion with Prof. Hsiung.
Flight cancellation (Smutylo leaves mission
for Guangzhou en route to Canada)
- Nov. 29 - Depart for Airport at 1100 hrs. Flight
scheduled at 1230 hrs. Final departure
was 1930 hrs. Overnight at Fuyang.
- Nov.30-Dec.2 - At Fuyang and Hangzhou
Visit RISF and Bamboo areas.
- Dec. 2 - Depart for Guangzhou at 2015 hrs. Arrive
2215 hrs.
- Dec.3 & 4 - Visit RITF and South China Botanical Gardens
- Dec. 5 - Team members depart for Beijing, Kuala Lumpur
and Singapore. Dr. Ker to Singapore to
report to IDRC.
- Dec. 8 - Dr. Ker departs Singapore for Canada

LIST OF PERSONS MET

Nov. 19-21: Beijing

The Chinese Academy of Forestry

Wan Shou Shan,
Beijing.

Tel: 281431 Cable: 0161

1. Liu Yuhe - President
2. Wang Shiji - Director, Research Institute of Forestry (RIF)
3. Huang Wei Guang - Director, Division of Foreign Affairs
4. Zhang Wei-Jun - Deputy Director, Research Institute of Wood Industry (RIWI)
5. Xu Shilie - Associate Director, Div. of Program Management
6. Zhu Zhao Hua - Deputy Director, RIF and Paulownia Project Leader
7. Chen Xu He - Chief, Division of Research Planning, RIWI
8. Zhou Ming - Chief, Department of Wood Processing, RIWI
9. Luo Wenshi - Engineer, RIWI
10. Zhu Huan-Ming - Associate Research Fellow, RIWI
11. Xiong Yao-Guo - Associate Researcher, RIF
12. Yang Pei-Shou - Director, Subtropical Forestry Research Institute (RISF), Fuyang
13. Fu Mao-Yi - Forest Ecologist, Bamboo Project Leader, RISF
14. Wu Zhang Lun - President, Chinese Society of Forestry
15. Chen Ping-An - Secretary General, Chinese Society of Wood Industry
16. He Guangsen - Interpreter, Div. of Foreign Affairs.
17. Lu Xin-Yu - Associate Professor, RIF

Nov. 20 - State Science and Technology Commission
54 Sanlihe Road, Beijing

1. Jin Xiaoming
2. Chen Futao

Nov. 20 - Ministry of Forestry, Hepingli, Beijing

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1. Qin Fengzhu - Director, Foreign Affairs Department
2. Zheng Rui - Deputy Chief, Economic Cooperation Division

Nov. 22 - Yanzhou County, Shandong Province

1. Zhang Dunlun - Deputy Director, FRI, Shandong Province
2. Wang Lian-Xiu - Head of the People's Government, Yanzhou County
3. Ge Quan Zi - Director, Government Office of Yanzhou County
4. Xue Shang Zheng - Secretary Foreign Affairs Office, Yanzhou County People's Government
5. Zhang Wei-Dong - Deputy Director, FRI, Yanzhou county and Paulownia Project Leader at county level
6. Lu Xin Yu - Associate Research Fellow, RIF Beijing

Nov. 24 - Henan Province

1. Yuan Bao-Xing - Deputy Governor, Shangqiu Prefecture, Henan Province
2. Li Xiaoxin - Magistrate, People's Government, Minguang County

Nov. 25 - Dangshan County, Anhui Province

1. Wang Kang Yin - Director, Forestry Bureau, Dang Shan County
2. Yang Chun Min - County Magistrate, Dang Shan County, People's Government of Dangshan County

Nov. 27 - Nanjing

Research Institute of Chemical Processing and Utilization of Forest Products
CAF, Long Pan Road, Nanjing

Tel: 645131 Cable: 0948 Nanjing

1. Wang Ding Xuan - Director
2. Chen Wenshu (Mrs.) - Senior Engineer
3. Jin Chun - Leader Wood Gasification Project
4. Wei - Scientist, Wood Gasification Project
5. Xu Zeming - Leader Adhesives Project
6. Ho Chin Ko - Director Emeritus and Chairman Chinese Society of Chemistry and Chemical Engineering of Forest Products
7. Dr. Hsiung Wenyue - Professor of Forestry and President of Chinese Bamboo Association, Dept. of Forestry, Nanjing Forestry University, Nanjing.

Nov. 30 - Subtropical Forestry Research Institute
Fuyong Zhejiang
Tel: 05813 - 22719 Cable: 0120

1. Chen Yi-tai - Deputy Director
2. Liu Benshu - Engineer Research Management
3. Ma Nai-xun - Silviculturist
4. (Mdm) Weng Yuexia - Forest Pathologist/Geneticist
5. (Mrs.) Fu Maoyi - Foreign Relations Dept.

Dec. 1 - Anji Bamboo Arboretum

1. Lan Ling Fu - Director
2. Hu Zheng Jian - Deputy Director, Anji County Forest Dept.
3. (Mdm) Fang Ming Yu

Dec. 3 - Research Institute of Tropical Forestry, Guangzhou
(Canton)
Tel: 78136 Telegram: 6340

1. Bai Jia-yu - Director
2. Huang Rungcong - Program Coordinator
3. Zheng Haishui - Fuelwood Project Leader
4. Xu Huang Can - Associate Professor, Rattan Project Leader
5. Luo Chen Xiou - Division Chief, Dept. of Forestry,
Guangdong Province
6. Zhangguo - Director, Gaozhou County, Forestry Dept.
7. Li Jazheng - Deputy Director, Qionghai County, Forestry
Dept., Hainan Island.
8. Xu In-Bao - Associate Professor, Forestry Dept., South China
Agricultural University, Guangzhou
9. (Mdm) Wei Chqa-fen - Associate Researcher,
South China Institute of Botany,
South China Botanical Gardens,
Guangzhou
10. Hu Chi Ming - Deputy Head, Laboratory of Plant Taxonomy,
South China Institute of Botany,
(Director - Tu Mon-zho)