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**An Account of the Activities of the
International Council for Research in Agroforestry**



ICRAF

International Council for Research in Agroforestry
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Contents

Agroforestry	1
ICRAF	3
Programme of Work	4
Field Station, Machakos	6
Agroforestry Systems Programme	10
Agroforestry Technology Programme	14
Information Programme	17
Training Programme	20
Collaborative and Special Projects Programme	23
Agroforestry Advisory Unit	26
Funding	28
Board of Trustees	29
Staff	31

How do we
Start
Teaching about
all this?



Agroforestry

"Agroforestry", as the term is used at ICRAF, is a collective word for all land-use systems and practices in which woody perennials are deliberately grown on the same land management unit as crops and/or animals. This can be either in some form of spatial arrangement or in a time sequence. To qualify as agroforestry, a given land-use system or practice must permit significant economic and ecological interactions between the woody and non-woody components.

Within this broad definition, a wide variety of both traditional as well as relatively new systems and practices fall under the umbrella concept of agroforestry. Shifting cultivation, taungya afforestation, various types of so-called "home gardens" in humid tropical areas, silvo-pastoral systems in dry areas, growing crops or rearing animals under commercial tree crops (coconuts, rubber, oil palms, etc.), alley cropping, windbreaks and live fences are some of the host of agroforestry practices found throughout the tropical and sub-tropical developing world.

Some of these practices have traditionally fallen under the disciplinary mandate of agricultural institutions, others under forestry, still others under horticulture or animal husbandry. Most of them, however, have attracted little or no attention from established research, extension or development institutions. There are literally thousands of woody plants, and countless practices where such plants are combined with other crops and animals; these are in more or less widespread use by farmers, but fall outside the boundaries of existing disciplines.

Fuelwood production is one of the serious problems facing land users in developing countries. Agroforestry techniques have a considerable potential for alleviating this problem, among many others.



The novelty and challenge of the agroforestry approach to land development lies in the realization that all these different systems and practices have a principle in common worth exploring and developing. This principle is the deliberate use of the special productive and protective features of woody plants to increase, sustain and diversify the total output from the land.

These beneficial effects are by no means automatically achieved by combining trees with food crops or animals. There is no doubt, however, as shown both by successful traditional practices and by recent research, that by using compatible species in optimum spatial and temporal arrangements, and applying appropriate methods of management, agroforestry technologies have a considerable potential for addressing some of the serious problems facing land users in developing countries. Producing fuelwood, maintaining soil fertility, reducing erosion, supplementing food and fodder, producing building material, providing cash incomes, improving micro-climate, etc., are some common problems which, potentially, agroforestry could alleviate.

In order to realize this potential, many constraints have to be overcome and many gaps of knowledge filled. The most difficult constraints are the institutional and disciplinary boundaries which govern all aspects of land development - training and education of staff, land legislation, research, extension, administration and, no less important, allocation of limited funds. These boundaries, which may be rational when dealing with wood production from natural and plantation forests, or with cash and food crop production from commercial and mono-cropping agricultural systems have proved to be an obstacle to the systematic and relevant improvement of subsistence land use. To the small farmer, the lack of fuelwood, declining crop yields, lack of fodder for his animals, lack of cash for paying school fees, etc., are all closely interrelated problems which cannot be solved in isolation one from the other.

Owing partly to the very recent interest in agroforestry practices and partly to the rigid disciplinarity of existing institutions, there is very little quantitative data available on agroforestry. The challenge ahead of us is not merely to evaluate the merits of traditional practices, but to combine this with systematic, scientific development of new technologies addressing real problems. Genetic improvement of multipurpose trees, optimization of spatial crop/tree arrangements, improved management practices - these are but some fields where determined research efforts can yield significant results in a relatively short time. But such efforts must be determined in terms of resource allocation, willingness to cooperate across disciplinary boundaries and, above all, in their consistency of objectives and unity of purpose.

ICRAF

The International Council for Research in Agroforestry (ICRAF) was established in 1977, following an initiative by the International Development Research Centre (IDRC) of Canada. With IDRC as initial executing agency, and with the Swiss Development Corporation, the Dutch Ministry of Development Cooperation and the Canadian International Development Agency (CIDA) as co-sponsors, ICRAF was chartered and set up its headquarters in Nairobi in 1978, under an agreement with the Government of Kenya.

ICRAF is an autonomous, non-profit international council governed by a Board of Trustees with equal representation from developed and developing countries. With the exception of a representative of the host country, Kenya, trustees do not represent countries or organizations but are elected on individual merit. ICRAF derives its financial support from voluntary contributions from governments and international private and public organizations and agencies.

The ultimate objective of ICRAF's work, as laid down in the charter, is "to improve the nutritional, economic and social well-being of the peoples of developing countries by the promotion of agroforestry systems designed to result in better land use without detriment to the environment". Being a council, with neither the mandate nor the necessary resources to carry out its own field research on a large scale, ICRAF fulfils its objectives through acting as an international catalyst in agroforestry research. As such, ICRAF initiates, promotes and supports research for the development of appropriate agroforestry systems and technologies.

More specifically, ICRAF's activities include:

- the systematic collection, evaluation and dissemination of information on agroforestry;
- providing training facilities (courses, internships, fellowships) to scientists and development experts from tropical and sub-tropical countries;
- developing methods which aim at helping research institutions to identify relevant research which addresses real problems in land-use systems;
- developing methods for evaluating agroforestry technologies, e.g. multipurpose trees;
- arranging or co-sponsoring workshops, seminars, conferences and other meetings relevant to agroforestry;
- undertaking collaborative projects with national, regional or international institutions in field research, information exchange, publications and training;
- general promotion of the concept of agroforestry through participation by ICRAF staff in various local and international meetings and by publishing in popular and scientific media articles which aim to broaden and deepen awareness of it, etc.

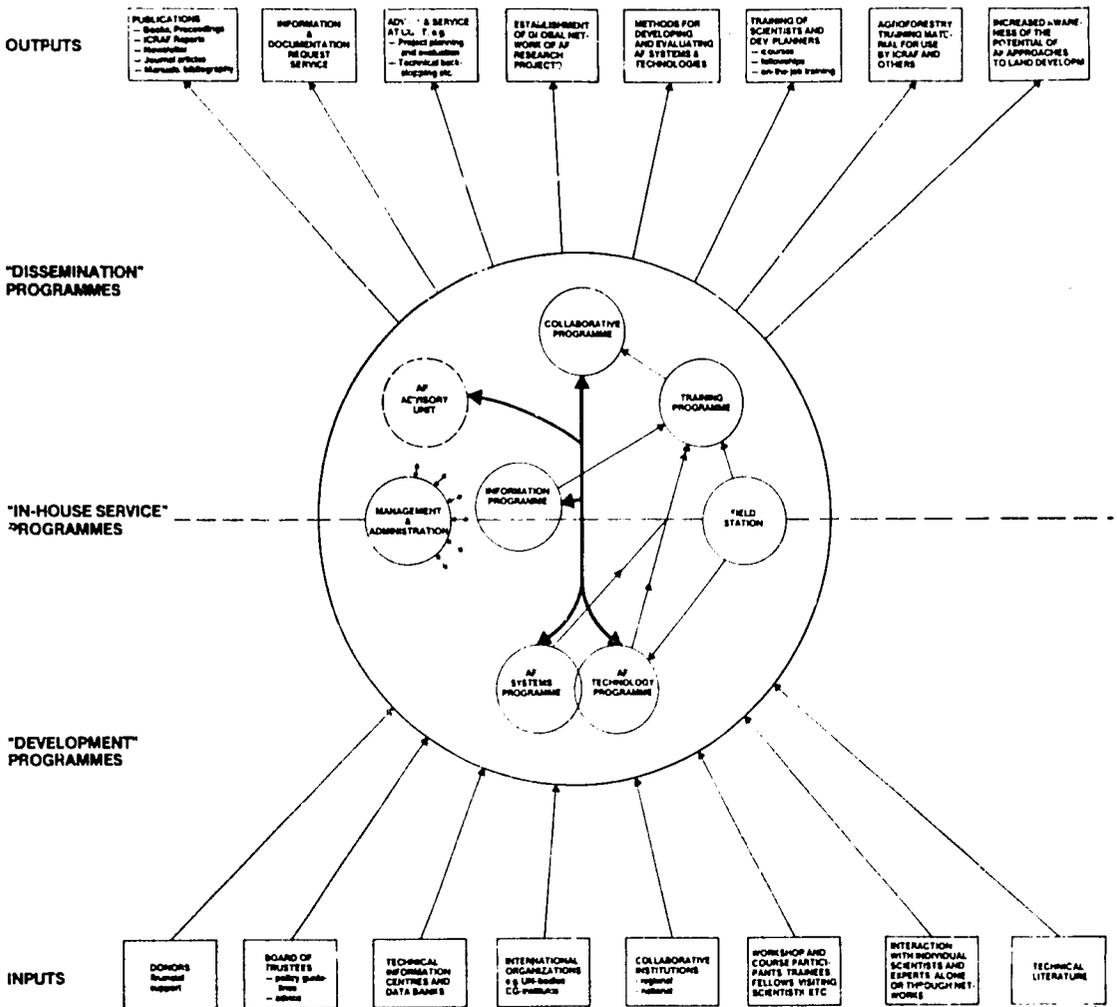
In order to provide a structured and efficient tool for fulfilling its mandate, the Council developed a programme of work which became operational on 1 January 1982.

The programme is built around three focal points which summarize our mandate:

- the development of methodologies for identifying social, economic and ecological constraints in land-use systems and for assessing the potential of agroforestry technologies to overcome such constraints;
- the systematic collation and assessment of agroforestry knowledge and the development of methods of studying and evaluating agroforestry technologies;
- the efficient dissemination of methodologies and knowledge to scientists and development planners in the tropical and sub-tropical developing world.

Programme of Work

Schematic diagram to illustrate the main linkages between the individual programmes, and the dynamic relationship between programmes and outside inputs and outputs.



The programme of work is implemented through eight closely interactive programmes, each with a number of projects and activities.

The work programmes are:

- | | | |
|---------------------------------------|---|--------------------------|
| 1. Management and Administration | } | Service programmes |
| 2. Field Station, Machakos | | |
| 3. Agroforestry Systems | } | Development programmes |
| 4. Agroforestry Technology | | |
| 5. Information | } | Dissemination programmes |
| 6. Training | | |
| 7. Collaborative and Special Projects | | |
| 8. Agroforestry Advisory Unit | | |

The last programme, the Agroforestry Advisory Unit, will be run on a cost-bearing basis separate from the seven core programmes.

In order to ensure interdisciplinarity in all ICRAF's work, the programmes are not demarcated by disciplinary boundaries. All core senior staff members will provide their respective disciplinary input into all programmes and most projects. There are, of course, specific programme coordinators and project leaders who are responsible for the planning and implementation of individual activities.

The programmes are interlinked and there are also strong and essential feed-backs from scientists and institutions at the recipient end of our dissemination programmes.

The schematic diagram illustrates the main linkages both between the programmes and from programmes to outside inputs and outputs.

In the following pages the programmes are described in more detail.

Field Station, Machakos

The Field Station is being established on a 40-hectare piece of land allotted to ICRAF free of charge by the Government of Kenya, initially for a period of ten years commencing 1981 but on an extendable basis. The site is in Machakos District, about 70 km south-east of Nairobi, at 1500 m altitude and accessible by an all-weather road. It is situated between the fields of Kenya's National Dryland Farming Research Station, Katumani, and Machakos Farmers' Training Centre. The area has a sub-humid to semi-arid climate with about 700 mm annual bimodal rainfall; the natural vegetation consists of tropical savanna grass and low trees; the soils are moderately fertile but erodible. The station was officially inaugurated in March 1982.

The overall objective of the Field Station is to serve as a demonstration and testing unit. It is mainly intended to provide support functions for the Training Programme and for the Technology and Systems Programmes.

'Trials' will be undertaken on the station primarily to develop methodologies for use by agroforestry research scientists and institutions in tropical countries. The work will include:

Visitors to the ICRAF Field Station have the opportunity of viewing a wide range of agroforestry practices and species



- developing methods for evaluating the components and technologies of agroforestry systems, e.g. multipurpose trees and shrubs, and tree/crop/environment interactions, etc.;
- verifying and improving the problem-solving technologies identified in the Machakos diagnostic and design work (see under Systems Programme);
- developing methods and designs for agroforestry field experiments;
- developing criteria for evaluating appropriate nursery and establishment techniques for multipurpose trees and shrubs in agroforestry.

Demonstration plots of agroforestry technologies will be established to show students, trainees and other visitors a wide range of agroforestry practices and their potential benefits. Plots will be monitored in order to be able to put quantitative values on benefits, disadvantages, interactions, etc. The technologies and components that will be demonstrated will include the following:

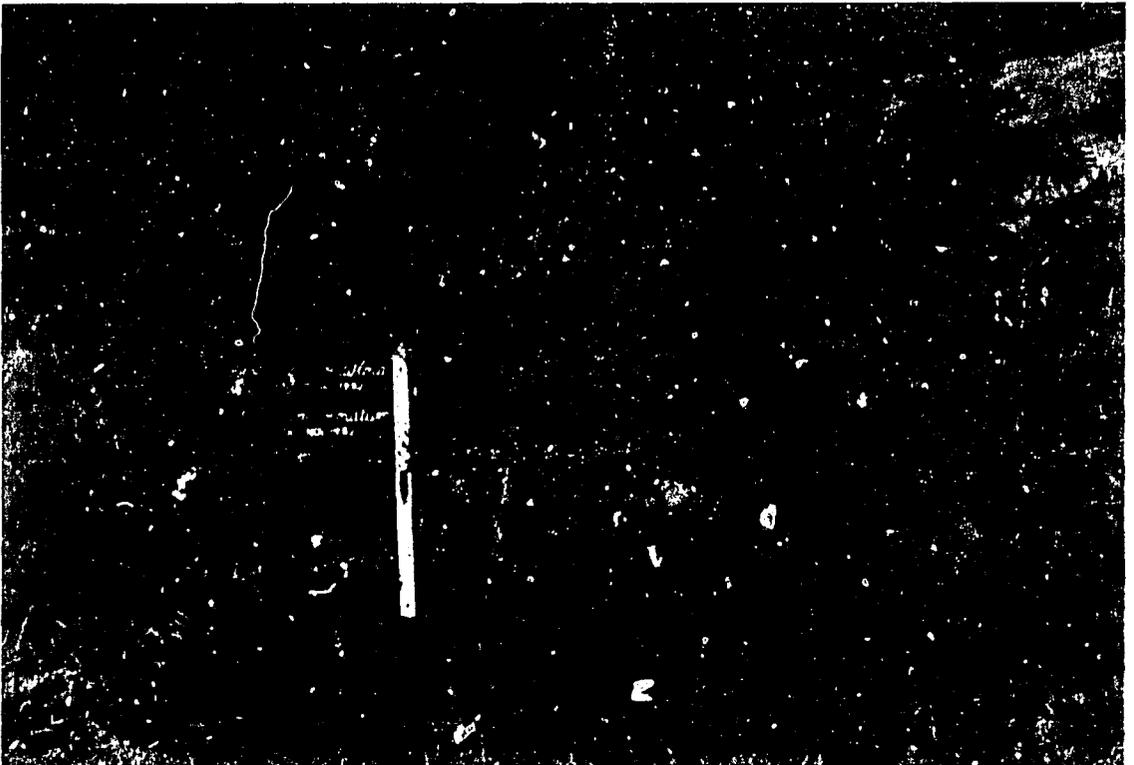
A wide range of multipurpose trees and shrubs from all over the world have been established. This provides research workers and other visitors with a very convenient way of familiarising themselves with a species that they would not normally encounter in their regions



- a wide range of multipurpose trees and shrubs with information on their potential uses;
- agroforestry techniques for soil conservation (formation of natural terraces, stabilization of physical structures, mulch-production, etc.);
- windbreaks/shelterbelts and live fences;
- integration of fuelwood production in farming practices;
- cut-carry systems of fodder production;
- tree/crop interaction patterns;
- a unit farm based on agroforestry approaches derived from ICRAF's diagnostic and design procedures.

As a *training facility*, the Field Station will be used mainly by ICRAF's Training Programme. Opportunities will be provided for the students and Fellows attached to the Programme to get involved in the on-going station activities, such as taking part in the design, lay-out and monitoring of the demonstration plots. ICRAF will also encourage study visits by other groups or individuals, both from Kenya-based institutions and from other international courses, seminars, etc.

An anti-erosion tree-plus-grass strip along the contour for soil conservation. In addition to stabilising the soil, the trees and grasses can provide fuel, mulch, and fodder



The demonstration plots are monitored so as to enable quantification of yields and the positive or negative interactions of the various components



Agroforestry Systems Programme

The inherent complexity of agroforestry has prompted ICRAF to adopt a *systems approach* as a major focus of its overall approach to the improvement of tropical and sub-tropical land use. The objective of this programme is to develop an in-house capability and methodologies, for wider use, for evaluating land-use systems in general and agroforestry systems in particular.

In practical terms, we endeavour in this programme to deal with agroforestry in terms of *whole systems*, to deal with these systems in an *interdisciplinary way*, and to place the overall emphasis on *problem-solving*, rather than merely academic research and evaluation. Each of the four projects which constitute the Systems Programme in its present form makes a distinctive contribution towards the achievement of a balanced understanding of agroforestry potentials and a capability to effect viable improvements in tropical and sub-tropical land-use systems.

Diagnostic and Design Methodology. In accordance with the Council's emphasis on development and dissemination of methodologies to further agroforestry systems, this project concentrates on developing a framework and a set of practical tools for diagnosis of land-use problems and for design of appropriate agroforestry systems and technologies to solve or mitigate the identified problems. Since many agroforestry technologies are still of a preliminary or an undeveloped nature, the main use of the D & D methodology at present is in the identification of priorities

A Philippine farmer explains his land management problems and strategies to members of a multidisciplinary D & D field team in the Philippines, while another team member explores an aspect of the emerging diagnoses in greater depth with other informants. Diagnosis and Design is a flexible process which assists researchers to identify and solve problems where they exist



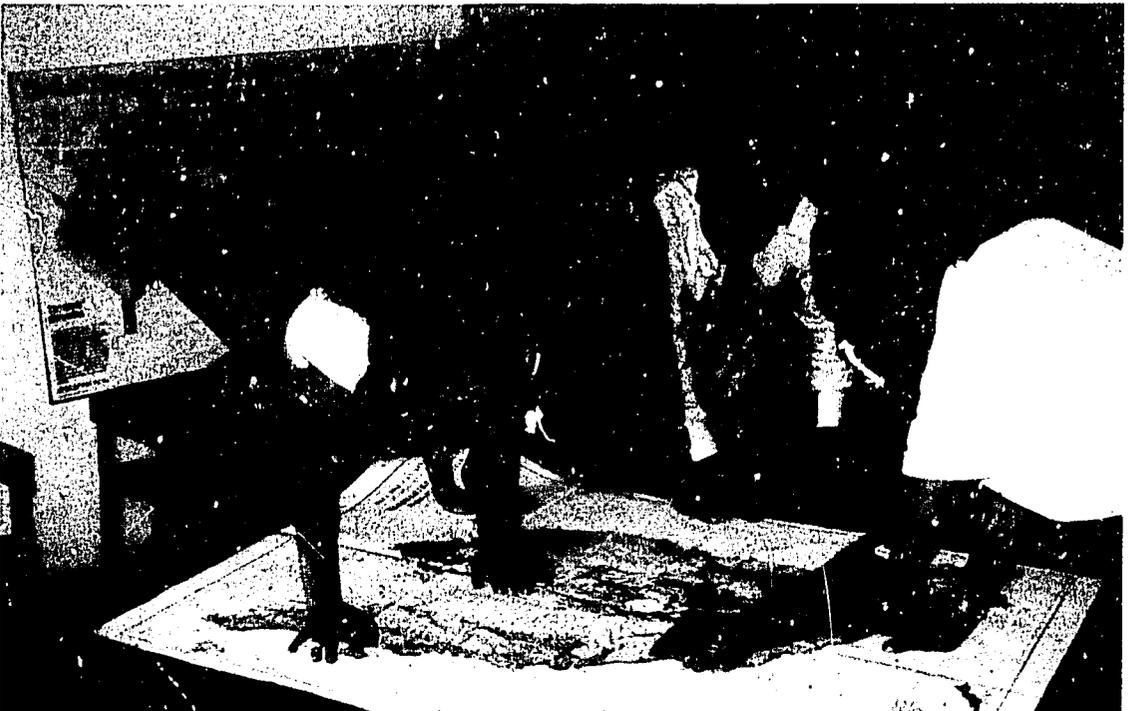
for research to develop and test sound agroforestry technologies to fill the identified gaps. Close cooperation between the Technology and Information Programmes is essential in this process.

By providing an internal guidance system for agroforestry research and development projects, the diagnostic and design methodology aims to improve the ability of agroforestry researchers to generate relevant and adoptable technologies and thus increase the overall impact of agroforestry in the landscape. Through applications at project sites in Kenya and elsewhere - through the Collaborative and Special Projects Programme - and through publication of a series of methodology manuals and case studies, the methodology will be disseminated to potential users. The gradual development of a case study data bank, based on applications of the methodology around the world, will contribute to the theory and practice of agroforestry interventions in ailing land-use systems.

The focus on the land-use system as the appropriate unit for the analysis of agroforestry potentials provides ample scope and challenge for interdisciplinary collaboration and synthesis within the Systems Programme. Shown here pointing over a land-use map are ICRAF's geographer/ecologist, bioclimatologist, agronomist/soil scientist, and land evaluation soils expert. Not shown, but equally involved in the interdisciplinary process, are the economist, the livestock scientist, the horticulturalist, the ecological anthropologist and, oh yes, the foresters!

Agroforestry Systems Inventory. One of the prerequisites for an effective effort to generate improved agroforestry technology, is a systematic inventory and cataloguing of existing agroforestry systems and practices. This is the objective of the global inventory of agroforestry systems which is being carried out by ICRAF with the assistance of a team of regional coordinators, each of whom is an authority on agroforestry in his home region.

Launched in late 1982, the project is in the process of



surveying and documenting the major agroforestry systems in the developing countries of the following regions: Southeast Asia, South Asia, the Mediterranean and the Middle East, East and Central Africa, West Africa, the American Tropics and the Pacific.

The project will also seek to gather sufficient quantitative information to evaluate the performance of the respective systems, assess their strengths and weaknesses, determine their extrapolability in new areas, and identify priorities for research to improve existing agroforestry practices.

Information from the survey will be entered into a computer-based *agroforestry systems data bank*. This will be maintained at ICRAF headquarters in Nairobi and updated from time to time in a continuing effort to record global statistics and trends in agroforestry. The findings of the inventory will be disseminated through various publications and through ICRAF's Information and Training Programmes.

Economic Analysis of Agroforestry Systems. To ascertain whether specific agroforestry technologies represent feasible and beneficial forms of use of land, labour and capital, economic analysis and comparison of different agroforestry and non-agroforestry land-use options is necessary. General methods of economic analysis exist, but these need to be tailored to the specific requirements of agroforestry. The objective of this project are, therefore:

- to evaluate existing economic methods and determine their suitability for analysis of agroforestry systems;
- to adapt the existing methods and develop guidelines and tools for economic evaluation of agroforestry projects;
- to compile case study materials and economic data on agroforestry systems from all over the world.

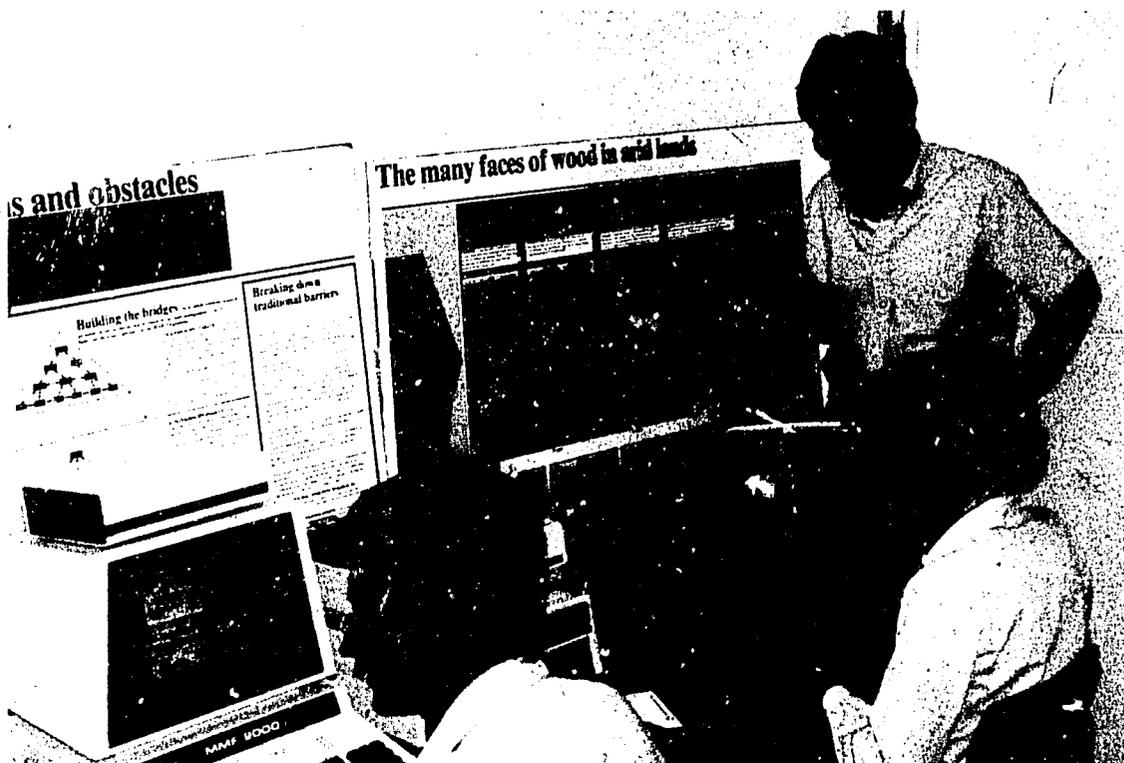
One of the main undertakings to date has been the work with collaborators from the Australian National University to adapt a microcomputer software called MULBUD (multi-period multiple-crop budgeting). This "user-friendly" microcomputer software package has proved its value as a tool for rapid economic appraisal of agroforestry potentials. The aim is now to expand its utility as a general purpose economic tool for agroforestry applications. MULBUD 3, an enhanced version of the original software developed at ANU, will be ready for dissemination in late 1983.

Land Evaluation. In accordance with the Council's avowed aim to treat land-use decisions involving potential agroforestry applications in an objective way, ICRAF has initiated a project to develop and apply the methods of land evaluation as a necessary step in the assessment of agroforestry potentials.

In order to be in a position to recommend adoption of an agroforestry practice, it is not sufficient to demonstrate that the practice is beneficial. The benefits and cost of agroforestry systems must be compared with those of alternative forms of improved land use, including agriculture and forestry.

Land evaluation provides a basis for such comparisons. Like existing economic methods, however, land evaluation methodology needs to be expanded and adapted to meet the needs of agroforestry. An element of the project of particular importance to agroforestry is the development of rapid appraisal methods to evaluate and compare the sustainability of agroforestry and alternative land-use systems. Taking as a starting point the principles of the *FAO Framework for Land Evaluation*, together with recently developed techniques for evaluation of crop production and forestry, ICRAF's Land Evaluation Project is developing a methodology to compare, on specific sites, the relative value of alternative land-use systems based on agriculture, forestry and agroforestry.

The understanding of complex biophysical and socio-economic interactions within whole systems can be greatly aided by the use of appropriate analytical tools and techniques. The aim in the Systems Programme is to develop and disseminate practical, user-friendly tools and methodologies to bring relevant aspects of systems analysis within easy reach of agroforestry workers around the world.



Agroforestry Technology Programme

This programme is concerned, on the one hand, with collecting and evaluating information about current or potential agroforestry components and practices and, on the other, with devising field research methodologies and arranging for their testing and evaluation. The focus is on multipurpose trees and other woody plants of potential interest in agroforestry. The programme is closely associated with the Information and the Systems Programmes. It is being carried out through a range of activities.

Technology information. Focussed collections of appropriate technology information, gathered in collaboration with the Information Programme, lead to annotated specialized subject bibliographies, crop sheets and computerized data bases. The following documents have been completed or are in hand:

- an agroforestry crop sheets manual (1981);
- specialized bibliographies on animals in agroforestry (1983/84) and the phenology of trees in the tropics (1983/84);
- a multipurpose tree data base (1983).

Workshops. With the help of various donor organizations, ICRAF has organized several meetings on a large scale which have contributed a considerable amount of information about agroforestry technology, including:

There are a number of potentially useful crops of short or long duration that could have a place in some AF systems. The picture shows visitors to ICRAF Field Station looking at and discussing possibilities of grain amaranths in agroforestry.



- a Consultative Meeting on Soil Research and Agroforestry (1979);
- a meeting on International Cooperation in Agroforestry (1979);
- the Kenya National Seminar on Agroforestry (with the University of Nairobi) (1980);
- a Consultative Meeting on Plant Research and Agroforestry (1981);
- a Workshop on Multipurpose Tree Germplasm (1983).

Reviews. Five technology reviews are planned for completion over the next few years:

- Fodder production potential in agroforestry (in preparation);
- Fuelwood production potential in agroforestry;
- Agroforestry and soil conservation;
- Agroforestry in relation to man;
- Food production potential in agroforestry.

Science and Practice of Agroforestry. This will be an on-going series of booklets, each on one of a wide-ranging number of agroforestry subjects. They are aimed at a wide audience from resource planners and administrators, scientists in agroforestry and other similar fields, to high school and university students. The following titles are in preparation, or are planned:

- Agroforestry in Kenya: an outline;
- Soil productivity aspects of agroforestry;
- Selected agroforestry systems: a pictorial description;
- Agroforestry and the improvement of tropical lands;
- Plant management in agroforestry.

Manuals and networks. A 500-page draft manual of a methodology for the exploration and field assessment of fast-growing nitrogen-fixing trees has been prepared for the National Academy of Sciences, USA, in cooperation with the Commonwealth Forestry Institute, UK. It includes discussions, guidelines, checklists, procedures and information about germplasm collection and assessment (e.g. experimental layouts, measurement practices). An expanded version of the manual is in hand which will include extra material and additional sections on palms, vines and bamboo.

The field manuals are an essential step in the development of the Technology Programme which leads on to research network activities.

International networks. These are of two kinds: networks to develop the principles and theory of agroforestry research methodology, and those to test the proposals in the field through existing international and national programmes.

Later, donor-sponsored programmes on specific research methodology topics of high priority will be proposed. The networks will result in working papers and reports compiled for specific purposes.

Field demonstrations and trials. As ICRAF is a council, it has only limited facilities for field experimentation. Nevertheless, both at its field station in Machakos and at suitable sites in Kenya, some limited demonstrations and trials are being carried out; these include:

- a stick fuelwood trial in bush pastureland;
- tests of dry season planting methods for multipurpose trees;
- a collection of multipurpose tree species for demonstration purposes;
- a soil conservation demonstration.

Further details are given above in the description of the field station. It is planned to have an increasing number of field experiments testing selected aspects of field research methodology.



Acacia albida is one of many multipurpose tree species that have been shown to provide a range of useful products to improve top soil fertility whilst growing compatibly with agricultural crops. ICRAF is actively collecting information about multipurpose trees and also deriving suitable experimental methodologies for working with them.

Information Programme

The objectives of this programme are to acquire, analyse, interpret and synthesize information relevant to agroforestry; and to disseminate this to scientists, development planners and others with an interest in agroforestry.

The *library* contains over 3,000 reprints and 2,000 books and monographs, reports, etc., dealing with agroforestry and related land-use systems and practices, as well as information on tree species that have a potential in agroforestry.

Information is at present being assembled as a result of the inventories of agroforestry systems (see under Systems Programme) and of multipurpose trees (see under Technology Programme). The information acquired will be maintained in the library, in a form easy to up-date and retrieve.

An accessions list is available on request; such requests should be addressed to the Librarian, ICRAF. The library is open for use by visitors through prior arrangements with senior ICRAF staff.

ICRAF provides *information and documentation services* to answer incoming requests. Copies of documents available at the Council or from nearby libraries can be sent to correspondents who need them. The requests must be relevant to agroforestry. Preference is given to requests originating from developing countries. Searches can be undertaken to answer these queries. The Council provides interpretative information services and can offer advice to agroforestry researchers and planners.

The ICRAF library is open both for internal use and to outsiders who need the services of this highly specialised library



ICRAF has access to the computerized versions of the common agricultural and biology abstract services (AGRICOLA, CAB, BIOSIS, etc.) along with AGRIS, another computer data base listing non-conventional literature, much of which originates in developing countries. Information that is not available from conventional sources can be obtained from regional agroforestry information centres or from other specialized centres dealing with selected aspects of agroforestry or from a network of correspondents which ICRAF is actively building up.

Environmental data base. As with other kinds of land use, agroforestry systems and practices are linked to the physical environment - landforms, climate and soils - in which they are found. This applies both to the systems as a whole and to individual components, e.g. crops, multipurpose tree species. A computerized data base is being developed which will store the environmental conditions under which these systems and components occur, and their requirements. In due course, this will enable information to be retrieved on trees, crops, practices and systems suitable for any specified environment. Cooperation is being maintained with other organizations engaged in similar activities, including FAO and the Commonwealth Forestry Institute, U.K.

ICRAF publications are an effective vehicle for disseminating information about agroforestry and for reporting achievements and results from the various programmes and projects. A number of books, mainly proceedings of seminars and workshops, have been published by the Council. These are provided free of charge or on an exchange basis to non-profit research institutions, libraries and information centres in developing countries. Some of these publications include:

Agroforestry Systems for Small-scale Farmers: Proceedings of an ICRAF/RAT Workshop (1983), which is the latest title in the category of book-length volumes.

Agroforestry Systems: An international journal, is published by Martinus Nijhoff/Dr. W. Junk, Publishers of The Netherlands in collaboration with ICRAF. A significant proportion of the membership of the editorial board is made up of ICRAF's senior scientific staff.

ICRAF Newsletter, an update of the Council's activities and other relevant information, appears in English, French and Spanish editions three or four times a year.

Four different series of publications are planned for production starting this year (1983):

Working Papers: These are issued in limited numbers for comment and discussion and to inform interested colleagues about work in progress. Technology reviews and case studies in agroforestry diagnosis and design will be issued in this series.

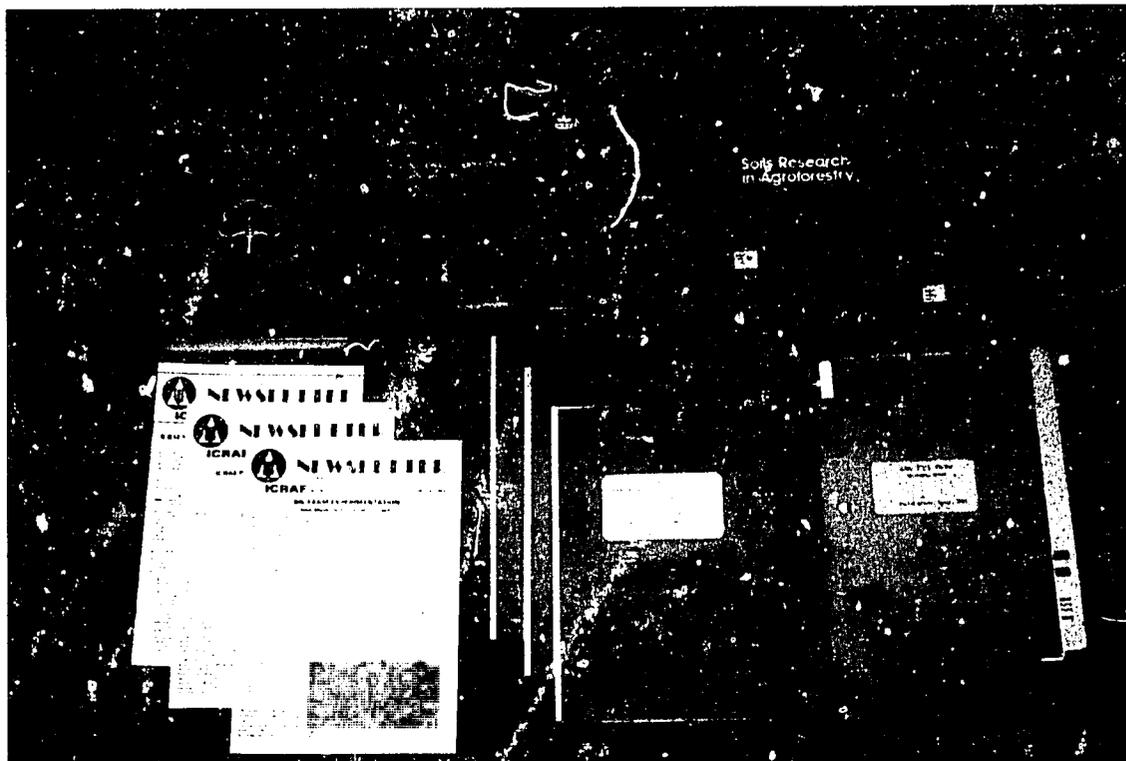
Research Reports. These will be definitive versions of Working Papers reflecting comments and suggestions from interested members of the research community.

Reprints. The Council will reissue, under its own imprint, articles first published elsewhere by ICRAF staff or papers by other research scientists first published elsewhere but originally presented at conferences organized or sponsored by the Council.

Science and Practice of Agroforestry. This series will feature a wide range of agroforestry subjects and will have audiences ranging from resource planners to high school students (see under Technology Programme).

Training manuals for the various courses offered under the Training Programme will also, after extensive testing, form part of the Council's publishing programme.

A selection of publications from the Council's small but vigorous and rapidly growing publishing programme



Training Programme

This programme will play an increasingly essential role in the Council's dissemination of methodologies and knowledge, built up in the other programmes, directly to scientists, development planners and administrators in developing countries. All ICRAF senior scientific staff members provide technical back-up to the Training activities. The following projects and activities are planned or are already in hand:

On-the-job Internships. These are aimed at providing national personnel from developing countries with an opportunity to become familiar with ICRAF's activities and to participate in agroforestry research methodology and information development. The internship scheme includes only limited amounts of formal training and candidates are expected to carry out agroforestry-related work alongside ICRAF's multidisciplinary team of scientists for a six-month period.

Two on-the-job trainees get to grips with the task under the supervision of a senior research scientist



The project is designed for professionals employed by national institutions that are in a position to grant leave of absence with pay during the training period. A sponsoring agency must cover ICRAF's cost plus a round-trip ticket.

The scheme started in 1982, with two young professionals from East Africa spending six months at ICRAF; two more six-month internships will be offered in 1983 to candidates from East Africa under the sponsorship of the Ford Foundation Regional Office for Eastern and Southern Africa. Several donor agencies have expressed interest in extending similar support to professionals from other developing regions of the world.

Fellowship Scheme. This scheme aims at enabling professional scientists from developing countries to undertake research in specified areas of agroforestry or information development for a one-year period at ICRAF under the technical advice of senior scientific staff.

The project, which commenced in 1983, is funded by donor agencies or by the candidates' employer organizations. Both the candidates' and ICRAF's costs have to be covered from outside sources. Most activities will be based at ICRAF's headquarters in Nairobi, but opportunities will be provided for work to be undertaken in field projects in Kenya depending on a given candidate's selected field of research.

Agroforestry Short Courses. The target group for these courses are scientists and development planners from developing countries who are responsible for research and development activities. The focus of the courses will be to disseminate ICRAF's multidisciplinary capability and methodological approaches to agroforestry land-use systems and technology development in tropical and sub-tropical regions. The course content will provide for both conceptual and methodological, as well as practical, training on subjects related to agroforestry. In particular, it will demonstrate how to undertake the interdisciplinary identification, design and implementation of research and development projects, provide the participants with practical information on agroforestry technologies, and show them where they can obtain more information.

Two courses per year are planned, each of 2-3 weeks' duration and with 20-30 participants. Every second course will be held at ICRAF's headquarters in Nairobi (including the Field Station) while the others will alternate between Latin America (in Spanish), Asia (in English) and West Africa (in French). The first course is planned to take place in Nairobi in November 1983.

Agroforestry Training Materials. Agroforestry being a new field for systematic training, a logical first step must be the development of appropriate training materials. Just as training

is a continuous process, so is the development of training materials. Case studies, demonstrations, lectures, field practicals and audio-visuals will be put together in packages suitable both for ICRAF's own training courses and for use by others.

In addition to using in-house results, the development of the training package materials will also rely on collation and evaluation of relevant information from other cognate disciplines and other organizations, and the integration of such information into a new format suitable for agroforestry training courses.

An **International Workshop on Professional Education in Agroforestry**, organized by ICRAF and the German Foundation for International Development (DSE), was held in Nairobi on 5-10 December 1982. More than seventy participants from all over the world attended the workshop.

A range of useful information on the development of curricula, teaching materials and institutions involved in agroforestry teaching around the world became available as a result of the workshop activities. ICRAF is compiling a publication to disseminate the proceedings of the meeting; this publication is expected to be ready early 1984. ICRAF is also evaluating the recommendations of the workshop with a view to defining the role and level of its involvement in agroforestry professional education from 1983 onwards.

Between plenary and working group sessions of the International Workshop on Professional Education in Agroforestry, participants took the opportunity to examine displays and discuss their ideas further.



Collaborative and Special Projects Programme

Land-use constraints differ according to the circumstances under which existing systems operate, and so will potential problem-solving agroforestry technologies, which are essentially location-specific. This programme aims at establishing collaborative projects with a network of institutions interested in carrying out research for development of such location-specific agroforestry technologies.

In order for this network to cover as wide a spectrum of agroecological and socio-economic conditions as possible, the programme is organized on the basis of geographical regions, on the assumption that regional land management systems share broadly similar cultural conditions. Five regions have been identified: the American Tropics, sub-Saharan Africa, South Asia, Southeast Asia, and the Mediterranean/ Middle East. Within each of these regions, three or four major ecological zones (e.g. humid lowlands, highlands and the Sahel in sub-Saharan Africa) are selected. This geographical/ ecological matrix offers a total of 15-20 potential project sites where collaborative activities are expected to be initiated over the next four to five years.

ICRAF will help to develop this network by cooperating with national or regional institutions in the design of agroforestry alternatives to existing land management practices, wherever this is deemed appropriate, and in the identification of research necessary to generate the required

Semi-commercial systems in the upper basin of the Peruvian Amazon



technology. Collaborating institutions are expected to participate actively in these activities, and will be responsible for the generation and dissemination of the designed technologies.

Three stages are envisaged in developing research projects at each particular site: *identification*, *formulation* and *implementation*. The first stage, *identification of partner(s)* within the designated zones, is based upon analysis of institutional objectives and infrastructure, and of the potential of an agroforestry approach to improve existing land management systems. At this time, the lack of immediately apparent institutional niches for agroforestry research and development appears to be the most challenging problem. Fortunately, ICRAF has no disciplinary or mandatory restrictions as to what collaborative partners should be approached, a situation that permits the Council the freedom to promote interinstitutional arrangements for back-stopping the interdisciplinary requirements of an agroforestry approach.

The project *formulation* stage is considered by ICRAF as the most crucial and the one where the Council's contribution will be particularly relevant: since it is meant to disseminate and validate its methodology for deriving research objectives. It comprises two steps: the pre-diagnostic step, and the diagnostic and design step. In the former, predominant land management systems in the project area are classified and stratified to allow the selection of farms to be used as case

Subsistence systems in the semi-and highlands of Kenya



studies. It is carried out by the local institution. The diagnostic and design step is based on the application of the methodology described under the Systems Programme and requires the active field participation of an interdisciplinary team of local and ICRAF scientists.

The *implementation* stage is meant to carry out the research necessary to develop the preliminary or notional technologies designed at the previous stage, while at the same time validating experimental methods specifically designed to deal with tree-crop-animal interactions. Although it is the main responsibility of the partner institution, ICRAF envisages the possibility of a complementary role at this stage, which would require the contribution of a third party, preferably in the form of a bilateral agreement between the collaborative partner and a donor agency.

As an initial step to promote the development of regional networks, project formulation missions were sent in 1982 to three of the identified regions: American Tropics (Peru), sub-Saharan Africa (Kenya) and Southeast Asia (Philippines). In each case formulation exercises were carried out with the support of local institutions responsible for research in both agriculture and forestry. In two cases, regional institutions joined the mission (CIAT in Peru and SEARCA in the Philippines). Project proposals are now ready for submission to prospective donors. In the course of 1983 formulation activities are being conducted in Costa Rica, India and Malaysia.

Subsistence systems in the uplands of Leyte, Philippines



Since its inception, ICRAF has received frequent requests from donor organisations, development banks, private companies, and others, to provide advisory and consultancy services in respect of research and development projects. As long as these were limited to requests for information, they could be and were dealt with within the framework of ICRAF's normal core service functions. However, when requests were received for senior staff to take part in missions, meetings, report preparation and similar activities extending over periods longer than a few days, the Council was forced to turn them down. The reason is simple - with a core staff of less than ten scientists, and with an ambitious programme of work, it has not been possible to divert staff time on an *ad hoc* basis, often at short notice, to extra-programme activities without seriously disrupting the programme of work.

Still, there is no doubt that ICRAF, with its unique knowledge of agroforestry practices and technologies, can provide much useful advice to development projects and activities. Many of the requests received are professionally very challenging and ICRAF's participation could provide a very fruitful feed-back into the core programme of the Council. Furthermore, since most of the requests refer to projects and activities whose goals are to develop agroforestry land use practices, it is clearly legitimate from the point of view of ICRAF's mandate to provide an input into them. For these reasons, ICRAF's Board of Trustees at its 1982 meeting decided to set up an Agroforestry Advisory Unit, which started operating late 1983.

The Advisory Unit is self-financing (but non-profit-making) by charging clients the time cost for its use. It is thus financially separate from ICRAF's normal programme of work but is closely integrated professionally. Initially, the unit has four positions: a forester, an agronomist, a range management specialist and an economist. The aim has been to build a Unit with a solid and wide range of geographically relevant professional experience in research, development and consultancy. Furthermore, the Unit is operational in the three official languages of the Council - English, French and Spanish.

Since the Unit is not profit-making, it is, from ICRAF's point of view, a service to donors, banks, governments, private companies, etc. The use of the Unit by a donor will not be a substitute for support of the Council's programme of work. Consequently, if the demand for the Unit's services exceeds the time available, priority will always be given to requests from those organizations that support ICRAF's programme of work through core or significant project funds. This is because these organizations are the ones that have helped build ICRAF's institutional knowledge and capacity on which the Advisory Unit draws in carrying out its assignments.

Through the Advisory Unit, ICRAF is able to provide the

services of a highly qualified multidisciplinary team of experts with the full professional backing of the Council's core staff of scientists, its unique data banks on agroforestry technologies, and its worldwide experience of land development problems. Among the types of work the Unit undertakes are:

- taking part in project identification work;
- evaluation of ongoing research and development projects;
- entering into long-term professional back-stopping agreements for projects;
- arranging specially designed agroforestry training courses, workshops, etc.;
- providing site-specific information on the management and integration of multipurpose trees in agricultural land use systems.

Priority is given to assignments that require the input of a multidisciplinary team rather than to requests for individual experts' time. Furthermore, ICRAF will neither enter into any project management undertakings, nor provide staff for long-term field project work.

ICRAF reserves the right of use of the technical and professional results of the Advisory Unit's work, so that the experience and information obtained can be disseminated through the Council's normal channels for the benefit of scientists and organisations in developing countries.

ICRAF depends for its operations entirely on voluntary financial contributions from bilateral, multilateral and private donor organizations. Three different types of support are distinguished:

- unrestricted core support;
- staff secondment (core or project staff);
- restricted project support.

For 1983, the total support confirmed is close to US\$ 2 million, of which about 40% is unrestricted core and the rest more or less restricted funds. ICRAF has estimated that for the next two or three years, a funding level of US\$ 2.5 - 3 million in core support per year would permit the implementation of an efficient and flexible programme of work.

Apart from direct financial contributions from donor agencies, ICRAF also receives significant support in kind from the Government of Kenya. This includes tax and duty exemption privileges, land allocated free of charge for the field station, and a prime piece of land which has been set aside for ICRAF's planned permanent headquarters building.

In 1982 and 1983, the following donors supported ICRAF:

Donor Agency

Canadian International Development Agency (CIDA)
 International Development Research Centre (IDRC)

 Swiss Development Corporation
 Dutch Ministry of Development Cooperation
 US Agency for International Development (USAID)
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 Swedish International Development Authority (SIDA)
 Ford Foundation Regional Office for Eastern and Southern Africa
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 German Foundation for International Development (DSE)
 Rockefeller Foundation
 Beijer Institute (Sweden)

Type of Support

Core
 Core (until 1982),
 secondment, project
 Core, secondment
 Core, secondment, project
 Project
 Core
 Secondment, project
 Project

 Project
 Project
 Project
 Secondment
 Project

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(1983/84)

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