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WORKING PAPER

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NETWORKING FOR THE GENERATION OF  
AGROFORESTRY TECHNOLOGIES  
IN AFRICA

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## EXECUTIVE SUMMARY

### Introduction

1. The rapid population growth and the consequent rising demand for food and fuelwood are leading to an increase in the pressure on the land. This, in turn, shortens fallow periods of traditional farming systems and decimates forest cover.
2. Under these circumstances the incorporation of woody perennials into existing farming systems can solve some of these problems, given the potential of trees to produce fuel in combination with food or fodder, as well as to protect soils and contribute to their fertility.

### Background

3. Comparatively little is known about the land use circumstances under which agroforestry can have maximum impact, and few guidelines exist on the management practices to be applied to optimize its multiple benefits.
4. The multidisciplinary nature of research on the agroforestry approach to land use requires the combined use of resources available in institutions from both the agriculture and forestry sectors. The implementation of such an approach faces an almost universal constraint: it lacks a proper "niche".
5. The major problem is, therefore, to develop viable and dynamic operational structures to integrate research and development institutions from both sectors to achieve a more effective use of existing research capacity, both at the national and regional levels.

### Objectives

6. It is proposed that four zonal agroforestry research networks are developed, based on four major ecozones in Africa. Their objective would be to facilitate a co-ordinated cooperation among countries in each ecozone, and between them and external organizations providing technical and financial assistance.
7. The main purpose of this cooperation is to strengthen the capability of national institutions to develop appropriate agroforestry systems by building organizational structures and training manpower. In

practice this would be done through activities focused on the planning and implementation of technology-generating projects.

#### Beneficiaries

8. The ultimate beneficiaries will be those using the land for agricultural or forestry purposes, particularly smallholders in marginal areas, while the direct beneficiaries will be national institutions participating in landuse research and training activities.

#### Operational principles

9. Institution-building activities should aim at the development of an agroforestry strategy and at the use of existing organizations, or the creation of new ones. This will advance interdisciplinary research and develop manpower.
10. An overall agroforestry strategy should include, inter alia, decisions on the type of landuse systems where the approach will be emphasized. Countries under similar environmental conditions should share a set of land use problems suitable for an agroforestry approach. On this basis an ecozone scope was chosen as the primary division for networking. Four such zones are proposed: arid (Sahel), semi-arid/bimodal (eastern Africa), sub-humid/unimodal (southern Africa), and humid lowlands (western Africa).
11. Given the prevailing institutional organization and roles, multi-institutional agroforestry structures should be based on the principle of integrated project planning but independent implementation of assigned responsibilities.
12. Training of national cadres would be the most important of the institution-building efforts and should qualify scientists with perception and experience in local landuse problems in judging the relevance of agroforestry and assessing its adaptability to prevailing circumstances.
13. Two principles ought to guide activities in this field: (a) sequential training opportunities, and (b) a preference for on-the-job training in the zone. Activities linked to the generation of technologies would become the focal point of these institution-building efforts.

14. Networks should play a leading role in technology generating by actively pursuing a co-ordinated programme in which resources are allocated to the development of specific technologies addressing common land-use problems; as opposed to merely a "coordination" aimed at just sharing the use of research facilities and methods without a common purpose.
15. To generate appropriate technologies, research projects in such programmes should be based on an understanding of the agro-ecological and socio-economic circumstances limiting production in existing systems, from which technology design specifications and corresponding research objectives are derived.
16. Three types of projects are envisaged: a) location-specific, addressing land use problems arising from a particular set of circumstances; b) problem-specific, developing the basis for a technology addressing common agro-ecological problems within zones; and c) component-specific, providing essential elements for the location- and problem-specific ones.
17. External assistance would be based on the assumption that when efforts aimed at generating and disseminating agroforestry technologies are conceived and executed in close collaboration with national institutions, they will be both more appropriate for the circumstances of the country and more conducive to a continuity of efforts, than those planned and implemented independently by international teams.
18. Three types of collaboration are visualized for international institutions: a) catalytic, for developing strategies and building institutional structures; b) complementary for the formulation and implementation of location-specific projects; and c) "executive", required for training and problem-/component-specific projects.

Organizational structure

19. Institutional cooperation within and among countries requires the development of institutional "niches", which could take a variety of forms according to existing national institutional structures and their present relationships. Networking support by international institutions also requires a specific structure in order to, effectively,

organize relationships between themselves and national/zonal organizations.

20. Cooperation within countries would be achieved by some kind of National Committee for research in Agroforestry ("NACRAF"), comprising existing national institutions - drawing on both the agriculture and forestry sectors - dealing with research, extension, development and training. In each country "NACRAFs" (or whatever form they may take) will be responsible for setting up an agroforestry development strategy and for encouraging complementary and cooperative research projects to be implemented by member institutions.
21. Collaboration among countries in a given ecozone would be ideally achieved through some kind of Zonal Committee ("ZOCRAF"), composed of representatives from the different NACRAFs. They would pursue a joint approach to the design of zonal strategies to enhance co-ordinated cooperation, promote national and zonal research projects, and act as a focus for initial training programmes. Since it may take a considerable time for such "ZOCRAFs" to become operational, their role would be initially pursued by the networking organization (see Fig. 1 on page 18).
22. International organizations would promote networking activities through a structure composed of a Regional Coordination supported by a Research Team, four Zonal Coordinations, and project staff to assist location-, problem-, and component-specific research.
23. The Regional Coordination will be essentially promoting network development among countries in each of the four zones, by
  - i. identifying potential network participants and leaders among national/zonal institutions- ii) assisting such institutions in designing national/zonal strategies; iii) promoting the establishment of adequate organizational structures; iv) recruiting and guiding the activities of the corresponding zonal coordinators; and v) mobilizing external assistance to zonal and national projects.The Research Team would back-stop national/zonal teams in obtaining, collating and analyzing relevant information and in developing experimental methods and techniques.

24. Zonal Coordinations would: i) promote and facilitate concerted zonal/national technology-generating projects that overcome common landuse problems; ii) organize zonal training to meet research needs of member countries; iii) maintain records of national and zonal agroforestry projects to produce and disseminate relevant information; and iv) encourage effective interaction between national institutions and International Agricultural Research Centres (IARCs: i.e., CIMMYT, ICRISAT, ILCA, IITA) or similar organizations.
25. Network development will be the responsibility of ICRAF, in collaboration with ISNAR, to support strategy development, and with other IARCs for managing problem- and component-specific research projects. Location-specific projects would be implemented by national institutions with technical assistance from ICRAF and financial assistance from the Network (see Fig. 2 on page 21).

#### Activities

26. Specific activities will be identified as a result of interaction with national teams. Therefore, only prospective ones are delineated along the three main Network functions: developing strategies, strengthening institutions and generating technologies.
27. The Network will encourage the development of national agroforestry-development strategies, providing technical assistance as deemed necessary. Such national strategies may then lead to the design of a zonal one.
28. The strengthening of national institutions will be mainly achieved through promoting inter-institutional arrangements, training national cadres, and building an agroforestry information system.
28. The generation of technologies will be the main focus of Network activities, on which all others will be centred. Network teams will assist national teams in planning and implementing location-specific projects, which will indicate issues for the problem- and component-specific ones, to be managed by the Network.
30. A considerable portion of the Network efforts will be devoted to mobilizing funds for supporting the mentioned activities.

## BACKGROUND

1. Population of the 39 countries in sub-Saharan Africa will almost double by 2000 A.D., but it has been estimated that food shortage could be reduced from 5 to 2 million metric tonnes at that time, assuming arable land is increased by 7 million ha and fertilizer consumption by 65%.
2. In much of the region shifting cultivation continues to provide the foundation for subsistence agriculture, as livestock herding does for semi-desert areas. These forms of land management are no longer an efficient and rational method of farming due to the ever increasing land pressure resulting from rising human and animal populations, leading to a deterioration in the growth rate of agriculture relative to the population growth rate.
3. The population in Africa is using fuelwood and charcoal as their main energy sources. When this is combined with agricultural activities, extensive forest destruction occurs; estimated as 1.3 million ha of closed forest per year for 1976-1980, and as 2.3 million ha of open forest between 1981-85. The enforcement of laws protecting forest lands does not appear as an effective approach to the problem. An alternative is to offer the encroaching farmer technologies capable of increasing agriculture and fuel productivity through better land management.
4. Under these circumstances the incorporation of woody perennials into existing farming systems seems a sound practice, given the potential of trees to produce food or fodder in combination with fuel or timber, as well as to protect soils and even restore their fertility. But little is known about either the agro-ecological and socio-economic land use circumstances under which agroforestry can play a role, or the management practices to be applied to achieve its multiple benefits.

## Institutional aspects

5. In most countries of Inter-tropical Africa research systems cannot generate all the technologies required to overcome the spectrum of pressing land use problems that they are now faced with.

6. In spite of a steady increase in the number of scientists, such situation arises from several causes: frequent reorganization of land use research structures; poor reward systems for scientists; lack of trained manpower; inadequate facilities; and budgetary stringencies, particularly acute with regard to operational funds.
7. Partly as a consequence of this, the proportion of total external assistance going to national agricultural research systems in Africa has increased from 36% in 1976 to 40% in 1980. Such assistance is aimed at both technology-generation and institution-building, and it sometimes constitutes more than 25% of the total research expenditure in any particular country.
8. However, much of this assistance goes into commodity- or discipline-oriented research, selection of location-specific improved varieties being the single most important activity of many projects (often in the context of high input/high output management "packages").
9. Implementation of an agroforestry approach to land use has faced, so far, a unique institutional constraint: in most countries it lacks a proper "niche". This makes it necessary to assemble ad hoc teams drawn from established agriculture and forestry bodies, not always a tempting proposition for experienced staff developing a "conventional" scientific career. Only junior staff may then be prepared to join such research endeavours.

Research aspects

10. In many countries of the region research on food crops and livestock for domestic consumption has received relatively less attention than cash crops, but priorities are switching from export to internal markets. There is also a growing concern about dwindling fuelwood resources, and on the need to preserve the natural non-renewable ones.
11. In addition to this, the induced commodity-oriented research strategy may be behind the gap between research results and the adoption of recommended practices. Much of the available technology is not entirely appropriate to farmers circumstances, particularly small scale farmers, who constitute the bulk of the population and depend

mostly on their own food production to satisfy family needs. Recognition of this problem has, lately, led to the application of a farming systems approach to research planning.

12. The problems encountered in assisting research implementation are particularly relevant with regard to agroforestry development, given its multidisciplinary nature. The concepts and principles behind the farming systems methodology are, therefore, valid for agroforestry. But the purposes for which such a methodology is applied may be quite different.
13. There are many validated technologies for improving the production of individual crops. Under these conditions the objective of systems research is to identify those farmers' constraints which hinder adoption of existing technologies. The latter are then adapted to meeting prevailing circumstances. However, there are only a few research-validated agroforestry technologies, and many promising ones require considerably more attention before they can become widely adopted. An agroforestry systems methodology must, then, be able to define the role of various agroforestry components in overcoming diagnosed land use problems, to specify their desirable characteristics, and to indicate appropriate spatial arrangements and management practices. In other words, it must be able to design and evaluate conceptual technologies from which research needs are then derived; the outcome of this process being readily-adoptable solutions to land-use problems.
14. Although research in agroforestry is a rather recent endeavour, it should be stressed that such an approach to land use has been practised by farmers all across the continent for decades, and probably centuries (if shifting cultivation is considered an agroforestry practice). An inventory of such practices is being carried out by ICRAF with the support of USAID, leading to an identification of relevant systems and practices and an understanding of their potentials and constraints.
15. Experimentation on agroforestry in inter-tropical Africa has been mostly confined to three types of systems: "zaungya", practised by forest departments with the main objective of reducing plantation costs; "alley cropping", as carried out at IITA; and browsing, which nutritive value is being researched by ILCA. ICRAF has received a grant from IDRC to promote research-cum-training networks in two ecological zones of Africa.

Training aspects

16. In institution-building the thrust has been on training national staff through short-term fellowships, mostly in developed-country institutions.
17. Short-term training, particularly of junior scientists, may not contribute much to the building of research cadres. Graduates attending advanced studies in developed countries certainly acquire the knowledge, methods and skills to plan and conduct scientific research. But they may later be enticed to pursue research subjects and apply methods which are neither directly relevant nor appropriate for the institutional circumstances under which they operate.
18. Training duration and "appropriateness" are, again, important issues in agroforestry, given the long gestation periods of such technologies and the absence of opportunities for advanced studies on the subject.

Cooperation aspects

19. There is an increasing awareness in the region of the need to promote stronger cooperation and co-ordination among countries in matters of agricultural research. The Agricultural Research Cooperation among the so-called SADC countries, CILSS and the Forestry Education Committee for East Africa are some of them.
20. Agricultural research networks are expanding at an increasing rate, the great majority of them initiated by International Centres. For example, networks for testing germplasm and devising improved agronomic techniques for the major cereal and root crops are the ones on which most efforts are focused at present. There are, however, some others in the fields of livestock diseases and "farming systems", the latter being of direct relevance to agroforestry research. It should be mentioned that the Secretariat of the Commonwealth Science Council is also developing a programme framework for an African Agroforestry Research Networking; and that IUFRO and ICRAF are organizing an African Workshop in late 1985 on forest research priorities (including agroforestry).

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21. Developed countries providing financial assistance to the region have also realized the need for co-ordinated efforts. The seven members of the Cooperation for Development in Africa (CDA) Group have agreed among themselves that before they enter into any extended commitments they would like to go through a stepwise process of consultative regional meetings, assessment of research resources, and preparation of long term "zonal plans".

#### OBJECTIVES

22. Networks will advance co-ordinated cooperation among countries from inter-tropical Africa and agencies for technical and financial assistance, enabling a joint approach to the design of zonal strategies, the definition of common objectives and the ability to programme corresponding activities in order to:
  - a. strengthen the capability of national research and training institutions from the agriculture and forestry sector to generate appropriate agroforestry technologies; and
  - b. promote the development of complementary technology- generating projects that demonstrate the technical, economic and social viability of combining woody, herbaceous and animal components to overcome any diagnosed constraints.

#### BENEFICIARIES

23. The ultimate beneficiaries of the proposed activities are those using the land for agricultural or forestry purpose, particularly smallholders in marginal areas, who will see the spectrum of alternative technologies widened by those incorporating trees to satisfy specific needs while increasing productivity in a sustainable way.
24. The direct beneficiaries of networking are national institutions participating in research and training activities. It will promote co-ordination among institutions of countries facing similar land use problems and receive technical and financial assistance for planning and implementing projects to generate agroforestry technologies, as well as for training interdisciplinary teams to assure continuity of effort.

OPERATIONAL PRINCIPLES

25. As indicated, furthering the development of agroforestry systems in the region requires promotional activities at the institutional and the technological fronts. On the former activities should aim at the use of existing institutional structures, or the creation of new ones, to advance interdisciplinary research activities, and at the training of scientists whose perception and experience in local land use problems qualify them to judge the relevance of agroforestry and assess its adaptability to prevailing circumstances. Activities linked to the generation of technologies should become the focal point of such institution-building efforts, so as to provide the operative framework for both an effective cooperation among research agencies and relevant grounds for meaningful manpower development.
26. Given the state-of-the-art, networking on technology generation should play a leading role by actively pursuing a co-ordinated programme in which resources are allocated to the development of specific technologies addressing common land use problems, as opposed to a coordination mainly aimed at just sharing the use of research facilities and methods without such a common purpose. The type of technologies to be promoted are determined to a considerable extent by the land use strategy in which the agroforestry approach is inserted.

On the development of an agroforestry strategy

27. Such an overall strategy includes, inter-alia, decisions on the type of land use system, or sub-system, where an agroforestry approach will be emphasized; the degree of government intervention in agroforestry production systems; and the envisaged institutional scope for research in agroforestry.
28. In selecting target land-use systems strategy decisions should take into account the scale and capital intensity of production units, as well as ecological zones that would be relatively more suitable for an agroforestry approach, vis-a-vis conventional agriculture and forestry ones. Given their predominance among African land use systems, it seems that, in principle, the agroforestry approach should be focused on those systems supplying for the needs of the household plus some growth-generating cash, while sustaining yields without depending too heavily on commercial inputs.

29. The degree of government involvement in agroforestry production systems depends to a great extent on both the political objectives of development and the type of land-use enterprises under consideration. In general terms, it is increasingly recognized that in developing new technologies voluntary adoption by farmers should be assumed. This implies a strong involvement of potential users in the technology-generating process.
30. A regional scope appears as the most sensible one for developing research in agroforestry. This would be justified by the scarcity, already discussed above, of research resources faced by many African countries, vis-a-vis the variety of land use problems, and by the multidisciplinary nature of the agroforestry approach. The latter makes research implementation a costly endeavour, which would be multiplied for every major land use problem to be addressed. Countries under similar environmental conditions and sharing a set of land use problems suitable for an agroforestry approach could then coordinate the allocation of resources to ensure efficient coverage.
31. Such co-ordination would be better pursued first within broad ecological zones. This approach would increase the possibility of them sharing both land use problems and existing institutional structures (like SADCC, CILSS). Four such ecological zones have been identified: arid (Sahel), semi-arid/bimodal (eastern Africa), sub-humid/unimodal (southern Africa), and humid lowlands (western Africa).
32. It is desirable that agroforestry strategies are designed at the country level before an attempt is made for co-ordinated cooperation at the zonal level. In designing such strategies existing projects should be considered and all institutions concerned with agriculture and forestry land use research ought to be involved.

On institution-building

33. To achieve network objectives (see 22) it is necessary to understand existing institutional structures under which decisions are taken. Without this any new technologies potentially suitable for benefitting the farmer may just increase the stock of available, but unadopted, practices.

34. Decisions taken at four institutional levels appear to be relevant for the generation of new technologies: farmers' households, the rural communities where farms operate, government organizations, and external agencies for technical and financial assistance. It is these systems which establish priorities, create incentives and identify constraints and opportunities.
35. Network effectiveness will be greatly influenced by the ability of such networks to build structures and design procedures to make decisions compatible among the four institutional levels on the "vertical" axes of social systems, as well as to further strong "horizontal" interactions between structures in the region as a whole.
36. Government research organizations from the agricultural and forestry sectors, in cooperation with those responsible for extension, development and training, should be the conveners to achieve such a vertical compatibility, given that it is their function to interpret national policies and to promulgate the corresponding land use strategies. They should also become the centre of technology-generating activities, and the hub of regional networking.
37. The multidisciplinary nature of agroforestry poses a special institutional problem of creating viable and dynamic operational structures to integrate research and development institutions from the agriculture and forestry sectors. Given existing institutional organization and roles, such structures should in most cases be based upon the principle of integrated project planning but independent implementation of assigned responsibilities. These could, in principle, be distributed according to the predominant use of the land where the problem to be addressed has been identified, i.e., agricultural or forest land.
38. It is on the training of national cadres that most of the institution-building efforts should be concentrated. Given the state-of-the-art in agroforestry training, it seems that emphasis should be placed on medium-term training vis-a-vis formal post-graduate studies. Two principles ought to guide activities in this field: that of alternate and sequential training opportunities, and that of using technology-generating projects as the main training grounds.

39. Sequential training means that research officers in the agroforestry field should be given the opportunity to gradually move from courses on methods to assess the potential of agroforestry in a given situation to on-the-job training for improving research knowledge and skills. They could then be crowned by graduate studies in a discipline relevant to the agroforestry systems the trainee is working on, or in the planning and management of land-use research. All these training opportunities should alternate with normal duties assigned to the trainee by his/her national institution.
40. Project activities should be systematically coordinated with training of national personnel, so as to ensure meaningful manpower development.

On technology-generating projects

41. Research projects are visualized as key components in processes leading to a vertical integration among social structures (see 36) and a horizontal one among government institutions involved in agroforestry development.
42. Two basic principles appear to be relevant to the attainment of these objectives. First, that in order to develop effective national and zonal research programmes to generate appropriate technologies a detailed understanding of agro-ecological and socio-economic circumstances limiting production in existing systems is required. The adequacy of such an understanding is strongly enhanced by an interdisciplinary approach to the analysis, and by the experience of the team-members undertaking such studies. Given these requirements and prevailing institutional mandates and organizational structures, planning and supervision of research should be carried out by specific interdisciplinary and multi-institutional teams of senior scientists, which will operate under the leadership of the institution responsible for executing the project.
43. The required level of understanding of farmers' circumstances depends on the purpose and nature of the project. Three types of research projects are envisaged according to the scope of the technology to be generated:
- 1) Location-specific: addressing land use problems arising from a particular set of agro-ecological and socio-economic circumstances (e.g. improved fallow for "covered beans");

- ii) Problem-specific: developing the basis for a technology that could address common agro-ecological problems under different socio-economic circumstances (e.g. boundary planting?, hedge intercropping?)
- iii) Component-specific: providing essential elements for the generation of location- and problem-specific technologies (e.g. testing selected multipurpose tree species/provenances).

For a location-specific project the understanding required involves three levels of social systems: household, rural community and production and support systems. Objectives for a problem-specific research are derived from understanding the behaviour of common agro-ecological problems under different socio-economic circumstances. On the other hand, specifications for component-specific research could be derived from a "macro" analysis of ecological conditions and the most relevant needs of prevailing land use systems.

44. It is necessary to stress the vital importance of concurrent activities on "component" and "systems" research. They are complementary, and not competitive, in the search for improved technologies. Without an understanding of prevailing systems it is difficult to identify those components likely to constitute a valuable input into them, as well as the research required to improve these components. But without these improved components the generation of appropriate technologies may be seriously hampered.

On external assistance

45. External assistance should be based on the assumption that when efforts aimed at generating and disseminating agroforestry technologies are conceived and executed in collaboration with national institutions, they will be both more appropriate for the circumstances of the country and more conducive to a continuity of efforts than those planned and implemented independently by international teams.
46. Three types of collaboration are visualized for international institutions, vis-a-vis the three roles identified for national institutions (strategy development, institution-building and technology generation). Such types of collaboration could be of a catalytic, a complementary, or an executive nature. It seems that, in principle, the role of external agencies in developing an agroforestry strategy is of a subsidiary nature, i.e. that of eventually compiling an inventory of existing land use projects in each zone, and supplying expertise

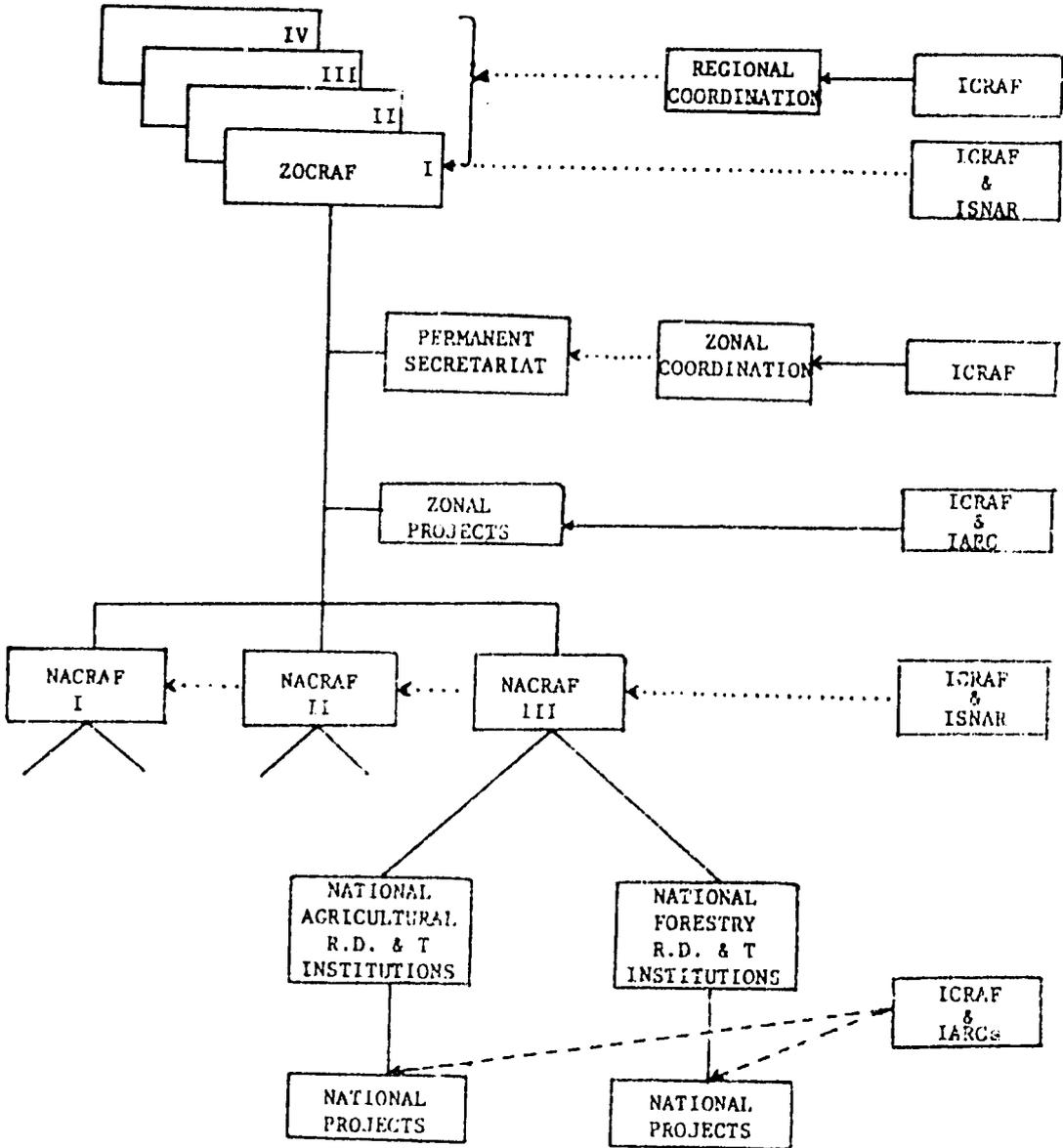
to identify the potential role of agroforestry in relevant ecological zones. Again a catalytic role appears to be the most appropriate for the design of inter-institutional arrangements, while a complementary one would be desirable at the formulation and implementation stages of location-specific projects, and an executive one may be required for training and the development of problem-/component-specific projects.

#### ORGANIZATIONAL STRUCTURE

47. In order for the envisaged co-ordinated co-operation to become functional, there is a need to develop institutional "niches" that advance such an objective within and among countries, as well as between countries and external agencies (see 35).
48. Within any particular country "niches" could take any form according to existing institutional structures. This notwithstanding, it is envisaged that to satisfy the "integrated planning but independent implementation" principle (see 37), co-ordinated co-operation could be achieved by some kind of National Committee for Research in Agroforestry (NACRAF). These NACRAFs, or whatever form they may take, would be constituted by government organizations, from both the agriculture and forestry sectors dealing with research, extension, development and training.
49. In each country the NACRAFs will be responsible for setting up an agroforestry development strategy (see 27 - 32), and should preferably be given the authority to allocate funds that encourage complementary and co-operative research projects to be implemented by member institutions.
50. Networking among countries within each of the four ecological zones (see 30) would be ideally achieved through a Zonal Committee for Research in Agroforestry (ZOCRAF), composed of representatives from the different NACRAFs. ZOCRAFs, or any other type of organization countries decide to create, will essentially pursue the development of a zonal strategy to enhance co-ordinated co-operation on agroforestry research and development, as well as to facilitate and promote research activities to be executed by national and zonal projects. In achieving these functions ZOCRAFs would be assisted by a Permanent Secretariat, with the main role of catalyzing and facilitating interaction among the NACRAFs to reach mutually agreeable decision on common research programmes.

51. The Diagram in Fig. 1 (on page 18) shows possible organizational relationships between national and zonal committees, permanent secretariats, national institutions, and projects, as well as the type of back-stopping to be provided by the international institutions.
52. However, it is recognized that in most zones, with the possible exception of SADCC, agreements may take considerable time for such committees to become operational. Until such agreements are reached the envisaged activities would be promoted by the Network through co-ordinating mechanisms. This notwithstanding, consensus within and between countries on issues in the realm of functions envisaged for the committees should be achieved before common activities are undertaken.
53. The process of setting up zonal networks (see 50) would be enhanced by the establishment of regional and zonal co-ordination units. The main function of a Regional Co-ordination Unit will be that of promoting network development among countries in each of the four zones, by:
  - i) identifying potential network participants and leaders among national/zonal institutions;
  - ii) assisting such institutions in designing national/zonal strategies and in the initial stages of programme development, from which relevant networking issues will be derived;
  - iii) promoting the establishment of adequate organizational structures;
  - iv) recruiting staff for and guiding the activities of the corresponding zonal co-ordination units; and
  - v) identifying sources for external funding and mobilizing such funds to assist zonal and national projects
54. At the technical level regional networking activities will be assisted by an interdisciplinary team of senior and junior scientists. The main task of this team will be to back-stop national/zonal project teams in obtaining, collating and analyzing relevant information to contribute improved agroforestry interventions at particular project sites, and in developing agroforestry research methods.

FIG. 1 : ORGANIZATIONAL RELATIONSHIPS



**ROLES**

CATALYTIC .....>

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55. Zonal co-ordinations would fulfil, inter alia, the following functions:

- i. channelling assistance to national institutions to identify zonal priorities in agroforestry development, and to promote and facilitate concerted zonal/national technology-generating projects that overcome common landuse problems;
  - ii. promoting zonal training to meet research needs of member countries;
  - iii. preparing an experts' roster drawn from institutions in participating countries and other entities in the zone;
  - iv. maintaining records of national and zonal agroforestry projects to produce and distribute relevant information;
  - v. encouraging effective interaction between national institutions and International Agricultural Research Centres (IARCs: i.e., CIMMYT, ICRISAT, ILCA, IITA) or similar organizations.
56. Location-specific research projects will be executed by national institutions, with technical and financial assistance being provided by the Network, as deemed necessary.

57. Projects of the problem- and component-specific type would be managed by the Network itself, through one of the International Centres operating in the region.

58. As mentioned (see 46), external agencies could act as catalysts, complement national/zonal projects, and/or execute new ones. In this context it is envisaged that such agencies could play, in principle, the following roles:

- i. ICRAF - an executive one of setting up zonal networks, including recruiting and back-stopping coordinators and the research team that would support regional activities;
- ii. ICRAF and ISNAR - a catalytic role of supporting activities of the NACRAFs and ZOCRAFs, particularly in designing national and zonal agroforestry development strategies;

- iii. ICRAF and the IARCs - a complementary one of technically back-stopping location-specific research projects (back-stopping could take the form of consultants, training and/or project staff, as deemed necessary).
  - iv. ICRAF and the IARCs - an executive one of managing zonal problem-specific and/or component-specific research projects.
59. The diagram in Fig. 2 (page 21) shows a possible organizational structure to promote and support networking activities

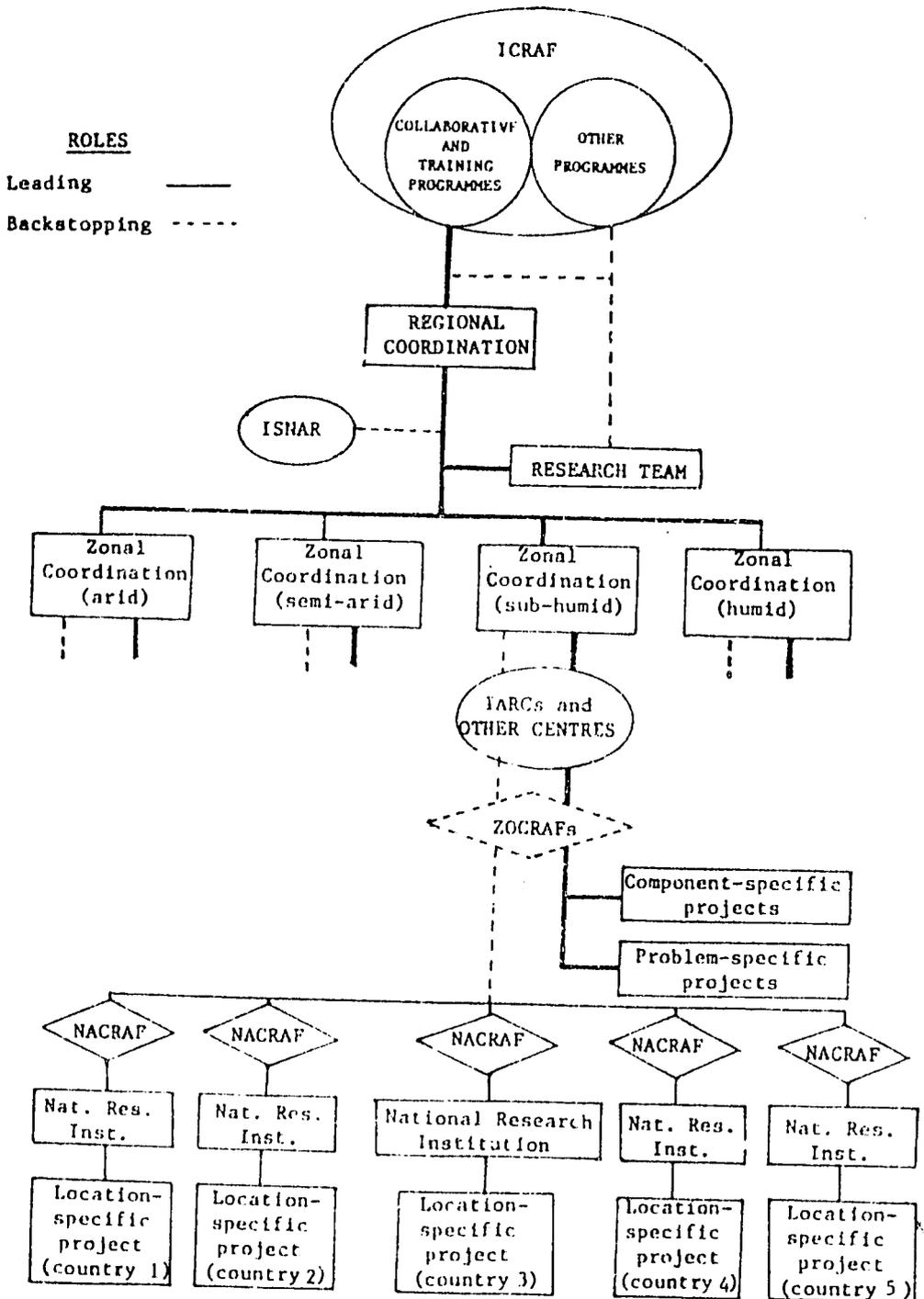
#### ACTIVITIES

60. The basic principle underlying the proposed network is that national institutions should be involved right from its inception, and should play an active role in identifying issues to be addressed and ways and means to approach them. Specific activities can, therefore, only be identified as a result of interactions with national teams assigned with the responsibility of implementing agroforestry research programmes.
61. A regional meeting to discuss networking objectives, methods and activities should be organized by the Regional Coordination, with the participation of leaders from institutions of national, zonal (e.g. SADCC, CILSS) and regional (e.g. OAU) nature, as well as technical assistance institutes (e.g. IARCs) and funding agencies.
62. Networking is envisaged as having a regional nature, but a zonal focus. Zonal agroforestry networks would have three basic functions: developing strategies, strengthening institutions and generating technologies. While there would be some overlap, this distinction seems useful to delineate prospective networking activities within ecological zones.

#### Developing strategies

63. Given the relatively recent awareness of agroforestry as an alternative approach to landuse, there is a need for each country to identify potential roles for such an approach in development, vis-a-vis more conventional ones, as a guideline for allocating research resources.

FIG. 2. ORGANIZATIONAL STRUCTURE TO SUPPORT NETWORKING



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64. ICRAF/ISNAR teams will visit interested national institutions in each zone to acquaint themselves with on-going or planned agroforestry activities and to assist these institutions in discussing strategic issues (see 27 - 32).
65. On the basis of these discussions ICRAF/ISNAR will prepare a proposal for a zonal agroforestry strategy, including suggestions on zonal organizational structures and indicating objectives for component-specific research projects in the zone.

Institution-building

66. The lack of specific institutional "niches" and the multidisciplinary nature of agroforestry research require a multi-institutional discussion on operational structures and procedures to combine the efforts of agencies operating in the agriculture and forestry sectors. The network could promote such discussions, which should be linked to those on the development of an agroforestry strategy.
67. The collection and dissemination of information on the generation of agroforestry technologies should be the concern of the Network; this could be achieved through the publication of regional/zonal newsletters reporting on:
  - i) zonal/regional/global scientists involved in agroforestry research;
  - ii) on going projects;
  - iii) relevant bibliography;
  - iv) training activities.
68. Given the scarcity of formal training opportunities and the importance of such training for institution-building, these activities should receive the primary attention of the Network. They could take the form of:
  - i) courses to strengthen the capabilities of research teams for planning and implementing technology-generating projects;
  - ii) on-the-job training linked to project activities in the region; and
  - iii) exchange of scientists among projects.

69. Workshops should also be important components of networking activities to facilitate communication, and to address special problems affecting several projects.

Generating technologies

70. Activities in the field of technology generation will be the main focus of the Network, and all the other activities will be centred on them. Multi-disciplinary Network teams will complement national teams to diagnose land-use problems and design agroforestry alternatives, as a method to identify research priorities and plan technology-generating projects. Network teams should also provide technical back-stopping during the implementation phase of such location-specific projects.
71. Network teams will also be responsible for the comparative analysis of location-specific projects to identify common problems, which could then become the objective of problem- and component-specific projects. These would be implemented by special Network teams.
72. As long-term financial support from donor agencies is necessary to achieve stated purposes, a considerable proportion of networking efforts will be devoted to mobilizing funds for supporting strategy development, institution building and technology-generating activities.

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