

First Congress of the African Chapter
The International Federation of
Agricultural Research Systems
for Development (IFARD)

Convened June 6-10, 1983 at the
International Institute of Tropical Agriculture
Ibadan, Nigeria

Sponsors

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Table of Contents

3	Foreword
4	List of Participants
10	Introduction
11	PART ONE: Opening Ceremony
13	PART TWO: Assistance to National Agricultural Research Systems
13	International Service for National Agricultural Research (ISNAR)
13	Food and Agricultural Organization of the United Nations (FAO)
14	International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
14	Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT)
14	International Livestock Centre for Africa (ILCA)
14	FAO Regional Office for Africa
15	Discussion: Questions and Responses
16	PART THREE: International Institute of Tropical Agriculture: Its Current Programs and Long-Range Plan
16	Long-Range Plan
16	Farming Systems Program
16	Grain Legumes Improvement Program
17	Tuber and Root Improvement Program
17	Cereals Improvement Program
17	Training Programs
18	International Programs
18	Discussions
19	Field Tour
20	Reflections on IITA Programs
22	PART FOUR: Technology Transfer and Information Exchange
22	Agricultural Technology Transfer in Africa
22	Information Exchange in Agricultural Research
23	PART FIVE: IFARD Business Meeting
26	PART SIX: Closing Session: Reports and Recommendations

The founding congress of the International Federation of Agricultural Research Systems for Development, African Chapter, was held June 6 to 10, 1983, at the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria. Twenty-seven directors and high-ranking representatives of national agricultural research systems attended the congress.

Also, representatives of donor governments and agencies, foundations, the OAU, UNDP, FAO, ECA, IRAT, ECOWAS and sister institutions in CGIAR, CIMMYT, ILCA, ICRISAT, IRRI, participated in this meeting. The congress was cosponsored by:

- The International Institute of Tropical Agriculture.
- The International Service for National Agricultural Research.
- The Netherlands Government.
- The Swedish Agency for Research Cooperation with Developing Countries.

The theme of the congress was agricultural research and farmers' productivity in Africa.

This report is a resume of the proceedings of the congress. Part One deals with the opening ceremony, conducted under the chairmanship of the OAU/STRC representative. Part Two provides information on assistance to national agricultural research systems by international agricultural research centers and FAO. Part Three is devoted to the presentation and discussion of IITA's current research programs and long-range plan. Part Four deals with technology transfer and information exchange. Part Five deals with IFARD business, particularly the founding of its African Chapter. Part Six presents the recommendations for concerted efforts.

This publication also provides a unique opportunity for us to express our deep sense of gratitude to the cosponsors of this important meeting. Special gratitude is due to Dr. W. K. Agble for his indefatigable efforts toward the holding of the congress. Two staff members of ISNAR made special contributions to the preparation of this report of the congress: Senior Research Fellow Dr. John McKenzie, who wrote the main body of the report, and Senior Research Officer Dr. T. Ajibola Taylor, who prepared the summary of the IFARD business meetings. The greatest contributions to the success of the congress came from the African directors and the high-ranking officials of the national agricultural research systems. To them, and to all those who contributed to the success of this endeavor, we are most grateful.

We hope that this publication will receive wide circulation among African agricultural research leaders and thus promote effective cooperation.

E. H. Hartmans
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Introduction

Since the last decade or so, tropical Africa has seen a disturbing decline in food production in the wake of increased population. This decline calls for a concerted effort by national, regional, and international research systems to arrest the trend. Various short-term measures have been taken to tackle emergency situations of food shortage and famine, but the whole problem of self-sufficiency in food crops production requires proper planning and development of agricultural research systems at the national levels, cooperating with regional and international agricultural research centers.

To achieve these ends, the idea emerged of an IFARD Congress that would bring together directors of all African national agricultural research systems and representatives of regional and international agricultural research centers and perhaps donor agencies, providing the forum for formulating the modalities for such concerted efforts. The congress provided a unique opportunity for IITA, with its regional mandate for Africa, to present its current research programs and long-range plan for discussion and comments.

Assistance activities and programs for national agricultural research systems were presented by ISNAR and FAO, respectively. Other papers discussed dealt with the following topics:

- Agricultural Research and Self-Sufficiency in Food Crops Production.
- Agricultural Technology Transfer in Africa - Problems and Prospects.
- Information Exchange in African Agricultural Research.

Copies of these papers will be available on request.

The various recommendations formulated in these proceedings reflect the general consensus of participants.

The first congress of the African Chapter of IFARD thus constituted an important watershed for developing and strengthening cooperative efforts between national agricultural research systems and international agricultural research centers in achieving the objective of increased food crops production towards self-sufficiency in Africa.

Chairman: Professor Johnson, Deputy Executive Secretary of OAU/STRC.

Dr. E. R. Terry, Head of International Programs, IITA, greeted the participants to the congress, which was jointly sponsored by IITA, ISNAR, SAREC, and the Government of the Netherlands, prior to the Director General of IITA's welcoming speech. The theme of the congress was "Agricultural Research and Farmers' Productivity in Africa." Apart from the business sessions of the African Chapter of IFARD, the program of the conference was focused on this theme.

Professor Johnson, Deputy Executive Secretary of OAU/STRC. The inaugural session of the congress was chaired by Professor Johnson, Deputy Executive Secretary, representing Dr. A. O. Williams, Executive Secretary of OAU/STRC, who was unable to attend the congress due to a prior commitment to the 19th Summit of OAU heads of state in Addis Ababa. Professor Johnson stated that the major purpose of the conference was to promote agricultural research in the service of development. He reminded the conference that the target date for African self-sufficiency, the year 2000, was not far off, and he urged the participants to concern themselves with strategies for action.

Dr. E. H. Hartmans, Director General, IITA, made his welcoming address to the participants of the congress, representatives of the IARCs, international agencies, and the donors to various development programs. He explained that the task of IITA, improving the tropical farming systems and the genetic potential of the crops within its mandate, was to be viewed against the harsh reality of an ever-widening gap between the population curve and the food production curve in Africa south of the Sahara. He suggested that Africa could not borrow its development, but that African scientists should strive to defeat the problems particular to their continent. This would involve cooperation between agencies at national, regional, and international levels. Dr. Hartmans defined cooperation as meaning that one worked with another, or with others, for common objectives, goals, and benefits, with mutual trust, respect, and understanding. He explained cooperation in terms of "something to offer." He believed that the work of IITA over its 12 years of existence had focused on "something to offer."

IITA research has produced valuable results in land management for the tropics; disease resistance in cassava, maize, and cowpeas; insect resistance in cowpeas, cassava, and sweet potatoes; improvement in the productivity of cowpeas, maize, and rice; and in adapting soybeans to tropical farming systems. In its research efforts, IITA has cooperated with the other institutes of the CGIAR. IITA also welcomed joint ventures with the research leaders of Africa.

Dr. W. K. Agble, Vice President of IFARD, recalled the objectives of establishing IFARD in 1977. These included the exchange of information between national agricultural research systems, promoting research activities for accelerated development, planning guidelines for national research methodology for national systems, and proposing strategies to the various national governments for fostering the development of their research systems.

The early successes of the IARCs had tended to attract the donor community away from investments in national systems. ISNAR had emerged to focus attention on the urgent need for assistance at the national level. IFARD had played an active role in conceptualizing the way in which such a service institute could benefit the national systems. IFARD had recommended to the CGIAR system that part of the international research effort be involved in strengthening national systems. In Africa, this would involve expansion of training facilities for African scientists, the creation of a special fund for African agricultural research development, and the promotion of a greater interaction between the research directors of African countries and the IARCs. The choice of IITA as the venue for the First Congress of the African Chapter had such promotion of interaction firmly in mind.

The congress would further the objectives of IFARD and serve to update its members. A governing council of IFARD for Africa would be elected. The congress would also need to take a decision over the location of its new secretariat. The congress would also consider the specific issues of:

1. resource allocation to agricultural research;
2. mechanism to support national agricultural research systems;
3. constraints in adoption of technology;
4. the role of IARCs in supporting regional and national institutes.

Mr. O. Awoyemi, Director, Federal Department of Agriculture of Nigeria, conveyed to the congress the message of the Minister of Agriculture of the Federal Government of Nigeria, the Honorable Mallam Adamu Ciroma.

The Honorable Minister considered that the fundamental cause of poor African performance in the second United Nations Development Decade and the persistence of famine and food shortage, was the inadequate use of science and technology for the process of development. The international community had willingly helped Africa with food aid and food sale at concessional terms, but these were no more than temporary palliatives. The transfer of technology and the establishment of science-based farming in Africa is essential to its development. The federal government of Nigeria would support this effort.

Chairman: Mr. C. H. H. Bonte-Freidheim, Director, AGO/FAO.

Mr. Bonte-Freidheim expressed regret that there had been inadequate opportunity for the exchange of information between the research leaders of the African countries about their success stories. The congress was an opportunity of witnessing IITA's contribution to research and of reviewing the activities of other international agricultural research centers (IARCs), at a national level.

The International Service for National Agricultural Research (ISNAR)

Dr. T. Ajibola Taylor, Senior Research Officer, ISNAR, expressed a hope that the current congress would give rise to a strengthened African Chapter of IFARD that would fully exploit the activities of IITA and other IARCs across the continent. ISNAR was presently engaged in activities in 22 countries covering three continents. Its major involvement in Africa included on-going activities in Kenya, Ivory Coast, Malagasy, Senegal, Sudan, Somalia, Rwanda, Zimbabwe, Upper Volta, and with IRAZ – involving Zaire, Rwanda, and Burundi. ISNAR was fulfilling the role conceived for it as a service organization, helping to strengthen national agricultural research linkage and liaison mechanisms with a wide range of international research resources including the IARCs. This was envisaged as a long-term task.

ISNAR's program components fell into five broad areas:

1. Review, Planning, and Development of National Agricultural Research Systems: At the request of 12 governments and institutions in Africa, ISNAR had embarked on various levels of attempts at assisting the strengthening of national systems.
2. Training, Conferences, and Workshops: ISNAR was pursuing training activities in the area of research management. A course in research management had been held at IITA for 60 postgraduate scientists in November 1982. The course was co-sponsored by IITA and gave ISNAR the opportunity of testing some of its training materials that had been developed jointly with CIMMYT. ISNAR's next training activity would be a research management course to be held in Arusha, Tanzania, in July 1983.
3. Research Studies on Organization and Management of Agricultural Research Systems: ISNAR was attempting to identify and disseminate key elements of successful organizations, such as research-farmer linkages and motivation and retention of trained staff.

4. Communications and Information Management: ISNAR was concerned with the problems of transfer of research findings to a range of clients including farmers, extension agents, and policy-makers.
5. With regard to ISNAR's activities in formulating recommendations for strengthening national research systems, Dr. Taylor stressed that ISNAR was capable of assisting with the implementation of recommendations, but only when the countries themselves sought further help.

The Food and Agriculture Organization of the United Nations (FAO)

Dr. John Monyo, Chief, Research Development Centre, Agricultural Department, FAO, outlined some of the problems that have been typical in the agricultural sector in Africa. These included low investment in research, poor research-extension linkages, and the preponderance of poorly organized and poorly managed national research systems. There was no blueprint for agricultural research development that could be applied in all countries of Africa. National agricultural research in Africa often depended largely on testing and adapting research results developed elsewhere. In 1982, over 70 FAO projects were assisting national agricultural research. It was estimated that in 1981, for example, about \$30 million was spent on research support activities. Besides direct investment in agricultural research and extension, FAO was also assisting in research planning, organization, and management. FAO had been involved in improving linkages with over 30 projects having extension and training as the major components. FAO had also been active in manpower training for research.

FAO was seeking to provide a comprehensive information and documentation service through its International Information System for the Agricultural Sciences (AGRIS) and the Current Agricultural Research Information System (CARIS). FAO was also involved in fisheries and forestry.

FAO had attempted to assist the national agricultural research systems at a regional level. Institutes such as the West African Rice Development Authority (WARDA) and the Regional Centre for Integrated Rural Development, in Arusha, were seen to be playing an important role particularly in mitigating the brain drain from their regions.

Several major aspects of national research in Africa would require external support for some time to come. These related to manpower development, supply of operational funds, and research organization, review, and planning. Increased external assistance is also needed for appropriate design of extension services and functional linkages between research, extension, and farmers. Assistance in these areas was a pressing need in more than half of the countries in Africa south of the Sahara.

Within FAO's assistance to governments in agricultural policy and rural development planning, the priority given to agricultural research would be emphasized. In-depth reviews of the national agricultural research systems would be encouraged and assisted, when required. Such reviews would include organization, structure, and management of research, research expenditure, research priorities related to development needs and rural populations, research manpower, linkages in technology transfer, and international cooperation. FAO would seek appropriate collaboration in such reviews from other organizations, such as the World Bank, UNDP, CGIAR-supported institutions, and bilateral assistance agencies.

The representatives of other IARCs were invited to make brief presentations on the work of their institutes that might concern the directors of agricultural research in Africa.

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

Dr. C. R. Jackson outlined the farming systems mandate of ICRISAT in the semi-arid regions of the world and the global mandate in crops – sorghum, millets, pigeon-peas, and groundnuts. Although the center was headquartered in Hyderabad, India, the institute had a Sahelian center located in Niamey, Niger – where 15 full-time scientists would be stationed. The Sahelian center would host the scientists from IFDC and ILCA. A modest training facility was also planned at Niamey.

Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT)

Dr. Donald Winkelmann, Director of the CIMMYT Economics Program, defined the CIMMYT mandate as increasing the productivity of resources devoted to maize and wheat. The institute had nine full-time scientists located in Africa. It assisted the national programs by supplying germplasm, providing training, and communicating its procedures and techniques. About 20 African scientists participated in the CIMMYT training programs. The East African farming systems research program was unique in developing procedures for on-farm research methodology. Many national programs, for example, in Ghana, Ivory Coast, Nigeria, and Tanzania, had released maize varieties based upon the germplasm supplied by CIMMYT.

International Livestock Centre for Africa (ILCA)

Dr. C. Okali reported that ILCA's mandate was limited to the African continent and was exclusively system-based. The institute's work was carried out in several countries. The institute had based scientists in Nigeria, Mali, and Kenya and had planned to locate other scientists in Cameroon, Senegal, and Zimbabwe. ILCA interacted with national programs by a network approach on the problem of trypanosomiasis and through special studies on small ruminants and traction animals.

FAO Regional Office for Africa

Dr. S. N. Kassapu considered that the IFARD Congress provided the opportunity to evolve short-, medium-, and long-term solutions to the food problem in Africa. The potential for rapid increases in food production was evident from research results achieved. The key to success rested in the imaginative transfer of technology. The gap between potential and performance at national level was traceable to scientific and technological factors (researchers addressed sole cropping, while the farmers practiced mixed cropping), socioeconomic factors (non-availability of inputs), and sociocultural factors. The farmers chose the traditional technology which they were sure of. To overcome this inertia, countries in Africa had to integrate new technology within the production systems by:

1. a greater emphasis on food crop research;
2. a rapid transfer of technology;
3. a greater focus on farmers' production systems;
4. a reduction of post-harvest losses.

Discussion: Questions and Responses:

- Q. The roles of ISNAR and FAO look similar; has there been any coordination of effort in national programs?
- R. FAO is a co-sponsor of the CGIAR. As a constitutional requirement, FAO is represented on ISNAR's program committee. FAO is therefore fully aware of ISNAR's activities, areas of overlap are minimized and cooperation fostered. Occasionally, FAO has worked in collaboration with ISNAR; for example, on the review and report for strengthening the national agricultural research system of Upper Volta.
- Q. To what extent are the priorities of the three organizations – IITA, FAO, ISNAR – likely to conflict with various national priorities?
- R. As the goal of these organizations is to strengthen the national systems, the particular national priorities and, indeed, characteristics of their systems, will be taken into account. There is no blueprint for any one country. When countries are presented with recommendations by ISNAR, for example, the choice is theirs as to whether they adopt them. ISNAR can only help national systems that are firm in their resolve for betterment and are able to coordinate their demands.

Q. The conference seems to be mainly concerned with crops. Should there not be more emphasis on livestock and forestry? Or is there a particular chapter of IFARD concerned with these areas?

R. IFARD avoids the compartmentalization of research. To the extent that IFARD members should be concerned with systems, they should be equally concerned with livestock or forestry as part of those systems.

Q. How can research scientists be sure that the product of their work is being used by the farmers?

R. In the case of Lesotho, researchers are no longer seeking to impose their new technology on farmers but are focusing on on-farm research by "starting where the farmer is."

Q. Certain countries seem to be more heavily favored than others by IARCs. What guide do the IARCs, such as ISNAR, have with regard to the distribution of their efforts?

R. In the case of ISNAR, the service must first be invited to a country. Second, that country must be seen to have a commitment to agricultural research and, third, be prepared to accept changes if these are recommended. Any developing country may request ISNAR's assistance.

Dr. Bonte-Freidheim closed the discussion with remarks urging conference participants to bear in mind the clients of the agricultural research effort. Some of his key statements were "Remember the farmer." "Scientists should be aware of the trap of setting agricultural research targets too high." "The search for the best is the worst enemy of the good."

PART THREE: International Institute of Tropical Agriculture (IITA) Its Current Programs and Long-Range Plan

Chairman: Dr. L. Fakambi, Director of Agricultural Research, Republic of Benin.

Dr. Fakambi considered that the congress provided a unique opportunity to get better acquainted with IITA and to determine the areas of cooperation in order to work collectively towards self-sufficiency for food in Africa.

Long-Range Plan

Dr. Hartmans, Director General of IITA, said that the long-range plan of IITA was the product of the collective effort of the scientists, the management, and trustees of IITA. The plan had found the approval of the Technical Advisory Committee (TAC) of CGIAR. While the institute had to limit its work to its mandated areas, the institute invited the comments of congress members on the relevance and adequacy of this mandate with regard to the needs of Africa.

The international agricultural research centers (IARCs), such as IITA, have the opportunity to attract scientific talents from anywhere in the world. These talents can be organized into multidisciplinary teams to tackle key production restraints within particular regions. Their international and apolitical character engenders professionalism, minimized bureaucracy, and ensures a rapid generation of technology. IITA also provides a unique opportunity for training African scientists and motivating them in applied research.

IITA has a global responsibility for the farming systems research in the humid and the sub-humid tropics and for genetic improvement of cowpeas, yams, and sweet potatoes. It also has a continental responsibility for the improvement of cassava, maize, and rice, which it carries out in collaboration with CIAT, CIMMYT, and IRRI. Located in a country of diverse agroecological conditions, the institute is able to take advantage of this diversity by working in association with other Nigerian national institutes. Appropriate technologies can only be developed by understanding local problems and by collectively tackling them with the scientists of national institutes. The target of the institute continues to be the development of technologies relevant to the resource-poor small farmers in Africa. The needs of large-scale commercial farming enterprises in Africa, however, are not forgotten.

A network of on-farm research has been launched, involving several West African countries. The institute has joined forces with several development projects in order to speed up the transfer of technology.

Farming Systems Program

Dr. C. H. H. ter Kuile introduced the farming systems program of IITA. African farming systems are believed to be multicrop enterprises conducted by resource-poor farmers. Therefore, a conventional approach to genetic improvement of single crops is inadequate to influence their development. In seeking to generate technology, however, one has to come to terms with the environment in which that technological package would operate. Examples of such technology are appropriate land-clearing techniques, such as no-till farming and alley cropping — these are examples of technology in land management developed by IITA. By appropriate land management techniques, the annual soil loss by erosion could be reduced to as little as 0.4 t/ha from 20 t/ha as prevalent with conventional land-clearing and management techniques. The rotational bush fallow system, which is the widespread farming system in tropical Africa, is both under-productive and labor-intensive. The farmer spends 50% of his labor in land clearing and 30% in weed control, leaving limited time for crop management. With a moderate level of mechanization, the farmer could extend the size of his holdings to 10 ha, giving him a fair income and rendering the farm unit viable.

Grain Legumes Improvement Plan

Dr. S. R. Singh introduced the grain legume improvement program, which addresses the improvement of cowpeas and soybeans. African diets are poor in protein. Grain legumes which provide a cheap protein source are, therefore, most relevant in Africa. Local varieties of cowpeas are most vulnerable to insect damage, with estimates of loss in yield ranging from 75% to 80%. All elite germplasm now developed by IITA has high-level resistance to all the major diseases and to leafhoppers and aphids.

The next target was to develop resistance to insects that attack the cowpeas in afterflowering. One variety has already been developed with a fair level of resistance to thrips. A high level of resistance to bruchids has been incorporated into elite germplasm. The most significant recent development has been highly determinate growth habit and very early maturing cowpea varieties — the so-called 60-day cowpeas. The improved plant types enable the crop to be grown either as a sole crop or as a companion crop with cereals. The program has also developed vegetable cowpeas that produce decent yields without trellis.

Soybean improvement at IITA focuses on developing varieties which do not need to be inoculated with *Rhizobium japonicum* and which farmers could keep as seed from year to year without loss of seed viability.

Tuber and Root Improvement Program

Dr. F. Caveness introduced the root and tuber improvement program. This program addresses the improvement of four crops: cassava, yams, cocoyams, and sweet potatoes. Breeding for resistance to mosaic and bacterial blight diseases in cassava brought the first major accomplishment. The institute has been successful in developing means to contain two exotic insect pests, cassava mealybug and green spider mite, by both genetic resistance and biological control. By the supply of elite seed initially, and more recently by the supply of disease-free clones in a tissue-culture form, the institute has benefited several African national programs.

The genetic improvement in yams has been slower but satisfactory. Resistance to yam scorch and yam virus has been developed. The mini-set technique has permitted rapid multiplication of elite germplasm. Techniques have been developed for the production of healthy seed yams.

Cocoyam improvement has been accelerated with the development of techniques for the induction of flowering by application of gibberellic acid. The key production constraint has been cocoyam blight.

Cereals Improvement Program

Dr. Y. Efron introduced the cereal improvement program which addressed the improvement of rice and maize. The genetic improvement efforts on these crops focuses on African-specific problems. IITA maintains a close working relationship with CIMMYT and IRR1 in the program. IITA also works in close cooperation with WARDA, IRAT, FAO field projects, and World Bank development projects in elaborating its international testing program in African countries. IITA links with the national programs are fostered through the regional program (SAFGRAD) and the EEC-funded High-Yielding Varieties Technology Project.

The directors of research are encouraged to cooperate in extending the testing of elite germplasm to appropriate locations, and to provide IITA with feedback on the strength or weakness of the IITA germplasm. A wealth of highly productive germplasm exists both in maize and rice, but its adoption in Africa is impeded by risk consciousness and poor management at the farm level. In order to minimize the risk, IITA's preoccupation has been with stabilizing yields. Once this stability is

assured, the farmers can be motivated to improve the crop agronomy, to make the needed investment in inputs, and to realize yields close to the potential of the varieties they grow. In cooperation with CIMMYT, high-yielding and locally adapted populations are being converted to streak resistance.

Although the food crop production systems in many African countries are often subsistence enterprises, there is a growing interest in commercial farming. The future need is for germplasm that is highly productive and responsive to management. IITA has embarked upon a hybrid maize program. A similar high potential exists for rice under irrigated farming.

The maize improvement program across Africa addresses the breeding for resistance to rusts, blight, streak virus, downy mildew, mottle virus, stem borers, stalk rots, and ear rots. The rice improvement program faces the challenge of breeding for resistance to blast disease, leaf scald, yellow mottle virus, panicle discoloration, stem borers, and stalk-eyed fly. Some progress has been made on breeding for blast resistance. Also good progress has been made in breeding for resistance to seasonal drought and iron toxicity.

Training Program

Dr. W. H. Reeves introduced the training program of the institute. During the last year, 22 courses have been held in which over 500 trainees have been exposed to IITA technology. The training function of the institute is shared by all the scientists, so that the trainees have an opportunity to gain a working knowledge of the latest techniques. This way the trainees also establish contacts with IITA scientists. The training office functions to relieve the scientists of the non-technical services associated with the organization and conduct of training courses.

IITA offers training for individual participants in four categories: degree-related (M.S. and Ph.D.), non-degree related on-the-job training, senior research fellowships, and vacation student scholarships. Many African universities take advantage of the IITA degree-related training program. Courses are conducted in English and French.

As manpower development is a priority concern for Africa, the demand for IITA training programs is on an increase. IITA alone cannot meet the requirements of all African nations, but makes a considerable contribution. The institute makes every effort to keep in touch with the trainees after their return to their respective countries.

International Programs

Dr. E. R. Terry introduced the international programs office, which manages all the extra-core activities of the institute. In addition to the country-level cooperative programs, the office manages the core-supplementing projects, notably the EEC-funded High-Yielding Varieties Technology Project and UNDP project on nitrogen-fixation.

The role of the international programs office is to make collaborative research arrangements between IITA scientists and scientists of the national programs. The aim is to strengthen national programs and to withdraw when the national programs have developed their own capability. Such collaboration attempts to focus national research on key production problems and also to speed up technology transfer. Country-level projects invariably have a training component. During the life of a project, the national program develops a capacity to take over on-going programs from IITA scientists. This arrangement benefits the research team on the IITA campus by extending its scope to different environments. This also provides feedback on IITA technology in the process of development.

The success of a cooperative project is determined by the clarity with which its program is defined and the commitment with which it has been carried out. The objective of strengthening the national research systems is shared by FAO and ISNAR. FAO keeps the overall problems in food and agriculture under review. ISNAR is a service and not a research institute. IITA's international program has its major resources based on its campus and its activities focus on its mandated crops and farming systems.

Discussion

Most participants expressed satisfaction with IITA's research programs, considering them relevant to the various countries' needs. Some of the institute's research, despite its brief existence, could already be seen to be benefiting the farmer. The following details, however, were brought to the institute's attention:

1. IITA's role in the Sahel countries is minimal, with the exception of the SAFGRAD linkage.
2. National programs should not be looked upon merely as the receivers of the IARC's research products; they should have the opportunity of participating in shaping IITA's research programs.
3. Some problems are of such magnitude that no one national program has the full range of skills or

research facilities to tackle them. IITA should focus on these sorts of problems and then pass on solutions to be adapted locally by national institutes.

4. IITA should interpret its role as developing the components of technology, such as new varieties, agronomic practices, and methods of plant protection. The national institutes should be left to synthesize these components into a package relevant to their own farming systems.
5. The crop improvement programs of IITA appear preoccupied with the performance of genotypes in sole cropping. These results may not be relevant to the mixed-cropping system practiced by farmers.
6. The true test of technology is not production in a physical sense, but in terms of economic return. IITA presentations conspicuously lack data on the economics of their enterprises.
7. The problems of production are serious, but IITA can ill afford to neglect the post-harvest handling of food crops.
8. Partly due to language barriers, and partly due to restrictions imposed by donors on the usage of fellowship funds, the francophone countries have not taken full advantage of the IITA training programs.

Dr. Hartmans, in response to the various comments, clarified that:

1. The mandate of IITA restricts its role in the semi-arid regions. The national programs should turn to ICRISAT for help in these areas. On crop improvement, however, IITA work on early maize, 60-day cowpeas, and tied-ridging for maize could be most relevant to the Sahel countries.
2. The input from national programs on priorities and research planning has been obtained through the program committee of the Board of Trustees, scientific conferences at IITA and elsewhere, and the visits of national scientists to IITA. The present congress could be an example of such an input.
3. The IITA program has addressed the front-line problems which no one national program has been able to tackle. It has also produced solutions which have benefited more than one country. It has also relied on the advanced research laboratories of the developed countries for basic research. Superficially, when it seems that IITA has been engaged in work which ought to have been done at national institutes, it has done so only for the purpose of demonstration.

4. IITA has produced, for example, elite germplasm which in some cases has been directly utilized by the national programs. In most cases, however, this has required further adaptation in a manner that is entirely left up to the national programs.
5. Within the institute, extensive research on mixed cropping has been done by the farming systems group.
6. The socioeconomics group within the farming systems program has been engaged in the evaluation of technology.
7. IITA has already undertaken a regional project on post-harvest problems. This has been considered to be a valuable adjunct to the farming systems program. For example, IITA research on bruchid resistance in cowpeas, weevil resistance in sweet potato, and weevil resistance in rice has already addressed the problems encountered in post-harvest loss.
8. IITA dropped livestock from its mandate in 1972. This was due to the burden of too great a number of research programs. The on-going arrangement of hosting ILCA on the campus, however, provides ample opportunity to begin to integrate livestock into IITA's own programs.
9. Soil degradation is a serious problem in the tropics. IITA has been concerned with developing the most appropriate media to propagate appropriate land-clearing and management techniques in order to inform national bodies.
10. IITA programs may have given the impression that their major emphasis has been on resistance breeding, perhaps ignoring the elevation of yield levels, consumers' preferences, and nutritional quality. This is not true; it is only that the most important production constraint had to be tackled first.
11. The tropical belt is known to be eminently suited for tree crops, but IITA does not work on them because there are established institutes conducting research into cocoa, oil palm, etc.

IITA Field Tour

Members of the conference were given a tour of the institute's field experiments and laboratories. A brief summation of elements of the program follows:

The cowpea improvement program: Extra-early cowpea varieties, maturing within about 60 days and yielding between 1.5 to 2 t/ha, had been identified. Research results to date were considered to be promising. Several resistant lines combined high-yield potential, and insect and disease resistance. Bush-type vegetable cowpea varieties had also been developed.

The soybean breeding program: The newly developed varieties could nodulate effectively with indigenous rhizobia and had good seed longevity characteristics.

The land clearing project: The effects of different land-clearing methods on changes in soil and biotic environments, bush regeneration, and crop growth have been investigated. The ameliorative effects of seeding a leguminous cover, for example, *Mucuna* species, had been examined.

The West Bank Project: In a 50-ha experiment, the scientists were investigating the effects of land-clearing methods and of post-clearing management on runoff rate and erosion, alteration in soil and environments, and crop production.

The agricultural engineering program: Tools and equipment for reducing the labor and time inputs before harvest and after harvest, while increasing the productivity and efficiency of small farmers, were being developed.

The live mulch program: A food crop was planted directly into an established cover crop without tillage or destruction of the fallow vegetation. Advantages of the live mulch included elimination of weed control, improvement in soil physical and chemical properties, reduction in the inorganic nitrogen requirements of maize, and erosion control.

The alley cropping program: Trees or shrubs were planted in rows adequately spaced to allow for cropping between rows of trees or shrubs. The leaves and twigs were added to the soil as mulch and a nutrient source. Also, stems and branches could be used for staking or firewood.

The in-situ mulch program: Mulch formed by the residue of a cover crop (usually vigorous legumes) were specially planted to provide soil protection during the fallow.

The maize breeding program: Maize population and varieties resistant to streak virus had been developed for the major maize ecological zones in Africa. These cultivars had been tested in many countries. Their efficiency to the resistance had been proven. Advanced-generation inbreds combined streak virus resistance with a resistance to major tropical diseases. Some maize selections resistant to stem borers had been identified.

The upland rice improvement program: Nine improved upland varieties and a common farmer's variety were compared. Experiments to monitor the relative incidence and the rate of blast occurring in the IITA fields were carried out. Different methods of inoculation were studied in search of easy and reliable screening methodology, and also to obtain lowland material tolerant to rice yellow mottle virus.

The genetic resources unit: This unit collected, evaluated, documented, and preserved the genetic resources of food legumes, rice, and root crops from sub-Saharan Africa.

The tissue culture laboratory: The tissue culture laboratory was investigating methods of disease elimination, rapid multiplication, germplasm distribution, and germplasm conservation for tropical root crops.

The insect rearing laboratory: Stem borers were reared on artificial diets to support insect resistance breeding.

The virology unit: Appropriate resistance screening and evaluation methods were being developed by this unit. The incidence and importance of the various virus diseases identified in crops and weed species were monitored.

The root and tuber programs: Under study were 5 cassava varieties, 6 sweet potato varieties, 4 yam varieties, and 4 cocoyam varieties.

The microbiology program: Soybean varieties had been planted with and without rhizobium inoculant.

Reflections on IITA's Programs

Chairman: Dr. J. Menyonga, OAU/STRC, Upper Volta.

Dr. Menyonga encouraged participants to express their views freely on the program of IITA. The observations of participants and the response of the director general and his colleagues have been summarized.

General

1. The institute has a global responsibility, though presentations and discussions had given an impression that far too much emphasis was on Nigeria. IITA is conscious of this, but it is believed that the tests of its success ought to be Nigeria itself. As it is a large country, with adequate institutional development, and diversity of climatic zones with a large population, it could be considered a valuable testing ground. IITA is engaged in a wide range of activities in many African and non-African countries.
2. IITA research on land-clearing techniques, and on agricultural machinery are of wide applicability; they should be widely popularized. The institute should test, adapt, and promote them through the West African Farming Systems network. It is also trying to attract private companies to enter into the manufacture of appropriate machinery.
3. IITA's role is somewhat limited in East and Southern Africa. Resources permitting, the institute intends to locate some of its core staff in these sub-regions.
4. The reference point of traditional farming systems and the traditional checks in crop improvement research need to be clearly thought out due to enormous diversity within Africa. Traditional farming enterprises were defined as being small and using local varieties without agro-chemical inputs. The 'traditional' label was also associated with rotational bush fallow systems in the humid and sub-humid tropical Africa.
5. There is always a question of whether IITA is working on real-world problems. The institute is constantly attempting to ensure that it is by formal and informal contacts with national scientists, discussions in conferences, and its Board of Trustees meetings. This information feedback is built into the prioritization of the institute's research programs.
6. IITA crop improvement technologies were scale neutral; as such, they were adoptable by small as well as large farmers. The main difference in focus came in the choice of machinery because power available at the farm level determined the size of a holding cultivated. The machinery program addressed the problems of small holders (1.5 ha) to big (30 ha) farms. No-till farming could be adopted by large or small farmers.

Farming systems

7. The approach to farming systems research is heavily weighted towards technical problems rather than socioeconomic ones, although the latter might be even more important. The institute recognized that technical problems are more readily correctable.
8. Traditional farming systems, despite the enormous variation, are basically bio-energy enterprises which utilize limited inputs and which are low in productivity.
9. IITA emphasized the difference between the farming systems approach to research and research on farming systems. The former approach pervaded the crop improvement programs. It also influenced the design of technology to fit farmers' particular circumstances.
10. The West African farming systems network proposed to encourage the national programs to identify on-farm research teams, to address constraints at the farm level, and to test available technology. IITA inputs would be included in the development of procedures, training, and dissemination of resources.
11. IITA should explore with ICRISAT and ILCA the possibility of adopting machinery and tools for animal traction, because animal traction is widely used in the savannah and in the highlands.
12. IITA should consider research on agroforestry, which has great relevance to the maintenance of soil fertility.

Crop improvement program

13. The gap in the pace of genetic improvement of crops between IITA and the national programs caused alarm. The evaluation and utilization of IITA-generated germplasm needs to be accelerated. The multiloational breeding system international testing project, undertaken under the auspices of EEC, has helped bridge this gap.
14. The identification of resistance to diseases and insects in the sole-crop system is just as valid for mixed-crop systems. Most of the screening tests were designed to have a high pressure of the stresses.

15. At the present stage of the breeding programs, IITA did not consider a multiline approach to resistance breeding. Biotypic variation in insects and strains of disease organisms are detected from international testing. The object is to breed for stable resistance.
16. While major progress is being made on varietal improvement, the progress of seed multiplication with countries has been slow due to the state of national seed services. IITA can only supply small quantities of seed from elite varieties or clones in tissue culture form. It is inappropriate for IITA to respond to requests for bulk seed.
17. Production levels of cereals in the developing countries have emulated the yield levels of the developed countries and even surpassed them. But the progress in elevation of yield plateau in grain legumes has not been as striking. This has to do with overcoming such yield-depressing factors as diseases and insects. Having consolidated gains in this area, the programs are moving towards elevation of yields, as is evident in development of the 60-day cowpeas.
18. The bio-control program of cassava mealybug and green spider mite would undertake the release of natural enemies in 10 sites within Nigeria in 1983. IITA had requests from seven countries, but the institute could respond to them only after import permits had been released by the OAU Phytosanitary Council.
19. The hybrid maize program constituted a small part of the maize improvement effort. (The major emphasis has been on development of populations whereby the farmer could keep his own seed from year to year.) The hybrid program, however, aims at elevation of yields and is addressed to large scale enterprises which can make investments in inputs and anticipate higher yields.

Training

20. The priority is for African scientists to be included in group training courses. Any national program which intends to organize an in-country training course should receive resource persons and materials from IITA.
21. IITA might step up capacity for training at higher levels (M.Sc. and Ph.D.) and also to train extension managers.

PART FOUR: Technology Transfer and Information Exchange

Agricultural Technology Transfer in Africa

Chairman: Dr. T. Ajibola Taylor

Dr. Taylor mentioned that technology transfer and information exchange systems are crucial to agricultural development and also involved the interplay between IARCs and national institutes.

Dr. C. H. H. ter Kuile addressed the issue of technology transfer. Dismal performance in food production is traceable to the growing gap between research and its utilization. The gap between technology generation and its utilization suggests that part of the resources devoted to research be redirected to extension. Researchers should go beyond technology generation to become directly involved in the delivery of technology. They tend to see their role as generating technology for optimum growing conditions. Experiment station workers have labored under the hope that eventually farmers would modify their crop growing environment and adopt new technology. This approach delays the adoption of new technology and diminishes support to research. A potent means of speeding technology transfer is on-farm research. The role of IITA is limited to developing methodologies, training national staff, and guiding their programs. Then, research itself is conducted totally by the national programs. Once extension services become involved in on-farm research, their prestige and efficacy will develop. This would diminish the frustration experienced by researchers in reaching their clients.

In the discussion that followed, the following points were made:

The Agricultural Extension Research Liaison Service, associated with the Institute of Agricultural Research, Zaria, can be taken as a model in its approach to the linkage between research and extension.

In the constitution of on-farm research teams, there should be no clear demarcation between researchers and extension staff.

The basic problem is low resource allocation to research, which restricts the researchers to working on their experiment stations.

The attitude of researchers, that farmers should be the ones to change rather than that technology should be modified to suit the farmers' conditions, is delaying progress.

Food production programs have been successful when the right technology has been offered, together with the inputs and marketing services.

The skepticism of some developing countries towards on-farm research might be attributed to the fact that no such system exists in the developed countries. What is overlooked is that private sector plant breeders (who make a major contribution in developed countries) have developed the market for new varieties by programs similar to on-farm research.

Information Exchange in African Agricultural Research

Chairman: Dr. Coulibaly, Director General, Institute of Rural Economics, Mali.

Dr. Fakambi traced the evolution of research information systems from the colonial era to the present. The colonial era was characterized by the centralization of a data-base outside the continent, with research conducted in a limited number of stations within Africa. Hardly any communication was possible among the various stations or countries within the continent at that time.

In the post-independence era, the number of experiment stations has greatly increased and research has been expanded to food crops. The problem of communication among the stations continues. In the 1970s, the IARCs became a new element in the system which had well-developed mechanisms for communicating research results to the national programs. However, the countries themselves had not developed appropriate systems to disseminate the results of the IARCs within their countries. Feedback to IARCs has not been as intense perhaps as required. IFARD and ISNAR should arrest the problem and attract donor interest to support such activities.

In the discussion that followed, it was suggested that the Association for Advancement of Agricultural Sciences in Africa (AAASA) and IFARD should join hands in reviving the *African Journal of Agricultural Sciences*, and in developing a directory of African agricultural scientists. In conclusion, Dr. Fakambi emphasized that every research institution must have an organized system to receive and disseminate the results of research.

PART FIVE: IFARD BUSINESS SESSION

The business session of the International Federation of Agricultural Research Systems for Development (IFARD) was convened three times during the congress at the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria.

The first session, on June 6, 1983, considered and, with minor amendments, adopted the following provisional agenda:

1. Introduction to IFARD: Dr. J. C. Madamba.
2. Report on IFARD activities in Africa 1980-1983: Dr. W. K. Agble.
3. Report on IFARD activities in Asia and Latin America: Dr. Madamba, Asia; Dr. Marcano, Latin America.
4. Discussion of IFARD activities, current and proposed.
5. IFARD membership in Africa, individual and institutional.
6. Funding and support of IFARD
 - International Chapter
 - African Chapter
7. Designation of IFARD regional secretariat.
8. Election of Governing Council.
9. Election of Vice-President and Secretary.
10. Meeting of the Vice-President, Secretary, and Governing Council.
11. IFARD future programs and activities.
12. Date and venue of next IFARD Congress.
13. Other business.

Dr. W. K. Agble, Vice-President (Africa), and Dr. Madamba, the Secretary-General, reintroduced IFARD, its history, objectives, and activities since its incorporation on April 2, 1980. Drs. Marcano, Agble, and Madamba also reported on regional activities in Latin America, Africa, and Asia respectively.

On the suggestion of Dr. Agble, the session agreed to set up a nominating committee which would consider and nominate candidates to serve as vice-president, secretary-general, and members of the governing council of the IFARD African Chapter.

It was understood that apart from the vice-president, who would serve on the international board of trustees as of right, the chapter would be represented on the board by two other members (the secretary-general and one other person).

It was also agreed, in the absence of a governing council, to elect an interim steering committee to guide the deliberations of the congress and propose programs and plans for the future. The following were elected to serve on the nominating and interim steering committees:

Nominating Committee

Dr. E. R. Terry, IITA, Ibadan (Sierra Leone)
Dr. J. Monyo, FAO, Rome (Tanzania)
Dr. J. Menyonga, SAFGRAD (Cameroon)

Interim Steering Committee

Dr. W. K. Agble, Ghana (Chairman)
Dr. B. Oteifa, Egypt
Dr. M. S. Sompo-Ceesay, Gambia
Dr. P. Chigaru, Zimbabwe
Dr. P. A. Thiongane, Senegal
Mr. H. E. Okereke, Nigeria
Dr. Mosala Mokambo, Zaire

The interim steering committee was requested to:

1. Consider and recommend programs and activities.
2. Review and make recommendations on the status of membership.
3. Explore and recommend possible sources of funding for the proposed programs and activities.
4. Recommend a possible location for the regional secretariat.
5. Recommend dates and venue for the next IFARD Congress.
6. Make other recommendations essential for the proper evolution of the IFARD African Regional Chapter.

Business was resumed in a second session on June 9, 1983, when the group received reports and recommendations of the interim steering committee and the nomination committee.

Steering committee

The following decisions based on the recommendations of the steering committee were approved:

Membership

- That in accordance with the provision of the constitution, individuals who have made or are making contributions to the building of national or international agricultural research systems in Africa be invited to become individual members.

- That all representatives of national agricultural research systems at this congress be invited to become members.
- That all institutions, including inter-governmental agencies, at the forefront of implementing agricultural research programs at the national level in Africa should be invited to become **institutional members**.
- That IARCs and other agencies interested in agricultural research, and working on the African continent, be invited to become **associate institutional members**.

Location of the Secretariat

- That the Secretariat of the African Regional Chapter be located at HTA, Ibadan, Nigeria.

Funding

- That subscriptions should be paid at the current congress and regularly in the future in accordance with the following approved rates (in US\$):

Members

Individual annual fee	10.00
Institutional annual fee	100.00

Associate Members

Individual annual fee	25.00
Institutional annual fee	250.00

Patrons

One life-time or permanent entrance fee	5,000.00
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- That sympathetic international organizations should be requested for financial assistance; among these are CGIAR, Ford and Rockefeller foundations, UN Fund for Science and Technology, UNDP, FAO, IDRC, GTZ, EEC, USAID, IFAD, ADB, ISNAR, et al.
- That good programs and activities would be required to attract assistance and donors' funds.
- That the possibility of linking IFARD with OAU/STRC be explored, particularly with a view to funding core activities of IFARD.
- That each national agricultural research system should designate a national liaison officer for IFARD matters.

Programs

That the following programs be considered for implementation by the governing council of IFARD:

- Updating of the volume on African Agricultural Research Capabilities.
- Production of a directory of high-level manpower in agricultural research in Africa.
- Seminars, workshops, and training sessions in agricultural research management.
- Promotion of exchange of visits between staffs of national and international agricultural research centers.
- Promotion of farming systems research networks involving national research workers.
- Development of mechanisms to support national agricultural research systems.

That IFARD should in the future meet once every two years at a place to be determined by the governing council.

Nomination Committee

The following participants, nominated and recommended by the Nomination Committee, were elected as officers and members of the Governing Council of the chapter for a period of three years:

Vice-President (Africa):	Mr. D. E. Iyamabo, Nigeria, forester.
Secretary:	Dr. L. Fakambi, Benin, plant scientist.
Members:	Dr. H. Faraj, Morocco, soil scientist.
	Dr. P. A. Thiongane, Senegal, animal scientist.
	Dr. M. Makambo, Zaire, soil scientist.
	Dr. J. N. R. Kasembe, Tanzania, plant scientist.
	Mr. W. P. Ntsekhe, Lesotho, agricultural economist.

Other recommendations of the nomination committee approved by the business meeting were:

- That the outgoing vice-president, as past vice-president of the chapter, be requested to serve on the new governing council in an advisory capacity.
- That in recognition of the efforts made by Dr. W. K. Agble in promoting the IFARD Chapter in Africa, he be proposed by the African Chapter to serve on the international board of trustees of IFARD. Dr. Muriithi, who was serving on the international board of trustees, had indicated his intention to withdraw.

Consultative Group

On the recommendation of the steering committee, it was agreed to set up a Consultative Group of African Agricultural Research personalities, including persons working in international organizations, to advise the governing council on program identification, formulation, and funding. The following were proposed and accepted to serve on the Consultative Group:

Dr. E. R. Terry, IITA, Nigeria.
Dr. T. Ajibola Taylor, ISNAR, Netherlands.
Dr. B. A. C. Enyi, WARDA, Liberia.
Dr. J. Monyo, FAO, Italy.
Dr. Kassapu, FAO, Ghana.

The business meetings were attended by representatives of the Rockefeller Foundation, Ford Foundation, the World Bank, USAID, EEC, OAU/STRC, FAO, IITA, CIMMYT, IRRI, ICRISAT, ISNAR, IRAT, UNDP, France, Australia, CIDA, and ECOWAS.

Bank Account

In the business meeting, members passed a resolution to open a bank account in the name of IFARD African Chapter with the IITA bankers, the Standard Chartered Bank, New York. The following officers of the chapter were designated as joint signatories to the account:

Mr. D. E. Iyamabo, vice-president IFARD (African Chapter).
Dr. L. Fakambi, executive secretary and treasurer.

The executive secretary and treasurer was authorized to take necessary action to open the bank account.

PART SIX: Closing Session: Reports and Recommendations

Dr. Agble opened by introducing his successor, the newly elected vice-president of African IFARD and chairman of the session, Dr. Iyamabo. Dr. Iyamabo then called the leaders of the discussion groups to present their recommendations.

Group A: Strengthening linkages between national agricultural research systems (NARSs) and international agricultural research centers (IARCs).

Preamble:

- Having considered the present and future prospect of food production in Africa, based on the information presented by participants to the congress, and
- Having considered that agronomic research would continue to play a vital role in attaining the objective of self-sufficiency in food for Africa, and
- Having considered that for research to be effective, a close cooperation would be necessary between IARC's and NARSs.

the IFARD Congress recommends that:

1. On relationships:

- A formal relationship be established between IARC's and NARSs and that a standard format of memorandum of understanding be evolved;
- The IARC's provide sufficient service at a sub-regional level in the areas of their mandate;
- National and international efforts be aimed at mutually benefiting the strengthening of national research systems;
- IARC's intensify cooperation among themselves in areas where two or more centers have a complementary task within a particular mandate area;
- Whereas it is desirable that IARC's conduct on-farm trials in order to validate their research findings, such trials must be carried out in collaboration with the NARSs;
- Other IARC's be encouraged to host meetings for the directors of the NARSs to facilitate dialogue among themselves and keep informed of developments at the IARC's that they can incorporate into their national programs.

2. On training:

- IARC's introduce in-country training or, where this is being done, intensify efforts particularly at the train-the-trainer level;
- In order to increase the effectiveness of training, IARC scientists should be involved as supervisors in post-graduate training outside the IARC host country;

- Efforts be made to strengthen programs and facilities for training in agricultural research management for present and potential leaders of NARSs;
- IARC's utilize countries in addition to their host country for crop improvement in order to facilitate core program execution as well as to provide an avenue for on-the-job training of national scientists;
- The current practice of inviting national scientists to IARC's be stepped up in order to complement training, as well as to provide feedback for IARC activities;
- IARC's determine the weakness in specific disciplines at the national level and seek to fill such gaps.

3. On germplasm:

- IARC's with a mandate for crop improvement introduce uniform international testing programs for their mandated crops, in consultation with national programs;
- In order to ensure that such international trials are promptly and reliably executed, assistance be increased where necessary to national institutes handling those trials;
- IARC's and NARSs should cooperate in the collection, conservation, and use of genetic material of those crops which have only regional importance, including perennial crops.

4. On information systems:

- Whereas IARC's distribute periodicals to NARSs – such as annual reports – it is recommended that more special publications such as bibliographies and training manuals be made available to NARSs;
- In order to further improve the information system between IARC's and NARSs and among NARSs, scientists should submit their findings to IARC's which could summarize and distribute them in the form of a newsletter.

Group B: Strengthening linkages among national agricultural research systems (NARSs) in Africa.

Preamble:

Having considered the status of national research in several countries in Africa, the following strategies for strengthening linkages are recommended:

1. On training:

- In order to avoid duplication of work and to improve the regional, national, and international

linkages, there is the need for greater involvement in training programs. The means for such training are to be sought at the regional, national, or international level. Governments, directors of national institutes, and faculties should be approached to give support for this program.

2. On exchange and visits of scientists and research personnel:
 - In order to acquaint themselves with the latest technology, and thereby to help the national programs, scientists and their research personnel should be enabled to visit other experiment stations and national institutes. This could include exchange of scientists on sabbatical leave, short-term consultancies, etc. The program should receive support from the national governments and international agencies.
3. On seminars, workshops, and conferences:
 - Participation in sub-regional, regional, national, and international meetings, seminars, and the like, will generate greater interaction and strengthen the linkages in the national agricultural research programs. National governments should support such participation, particularly by fostering the exchange of scientists between countries.
4. On exchange of biological material:
 - There is urgent need for free exchange of biological material between national and international agencies. Exchange of germplasm should be encouraged, and the effective functioning of phytosanitary and quarantine regulations should be strengthened if this exchange is to be facilitated.
5. On documentation and information exchange:
 - There is the need for cataloging all available information on the various aspects of agricultural research and exchange of such information to institutes within and outside the national programs. Publications and microfilms can be of great value in the dissemination of scientific information. The services of agencies like FAO (AGRIS and CARIS) will be beneficial and should be used fully.
6. On commodity research networks and farming systems:
 - There should be a network of research on commodity areas and farming systems. The network should involve multifocational trials of crop varieties, (nationally and internationally) as well as a farming systems network in the areas of irrigated, rainfed ecologies, and livestock.

Aquaculture, insects and weeds, agroforestry, agroclimatology, and integrated pest management aspects also need greater attention. This is why the congress recommended that national agricultural centers should take part jointly with IARCs.

7. On identification and utilization of centers of competence:
 - Certain centers in national or international programs should have a technical competence in one or more areas of agricultural research. These centers, as well as their areas of competence, should be identified and all IFARD member countries should be notified. Help from the centers should be available for meeting the needs of other national agricultural centers.

Group C: Recommendations on areas of comparative research advantages between IARCs and NARSs.

Recognizing that:

1. There is urgency to augment African food production through concerted effort in agricultural research, and
2. Certain problems are local, while others are of international importance, and
3. International funding and staff are required to tackle complex problems on a scale and magnitude that no one country can afford, and
4. Communications constraints between countries may be partially overcome by the function of centers,

the IFARD Congress recommends that:

1. The IARCs should concentrate their efforts on problems which have international significance such as:
 - Maintenance of germplasm preservation and exchange between the IARCs and NARSs;
 - Collection of local varieties of various plants and their preservation at the IARCs where storage facilities are available.
2. Work on biological control and other research requiring specialized equipment – for example, physiology, virology, nitrogen fixation, etc. – should be done at the IARCs and results made available to NARSs. Cooperation in farming systems research between the IARCs and NARSs should be strengthened.
3. In the area of training, the IARCs should help the NARSs reinforce their scientific and technical capability through training; NARSs should identify and communicate their training needs to the IARCs.

Group D: Recommendations to IITA on its current and long-range plan.

Preamble:

The opportunity of holding a congress at IITA has given IFARD a chance to get a closer look at IITA, its research activities, and future plans. Participants in the IFARD Congress are impressed with the amount of research information on component technologies that has been accumulated by the farming systems program within the last decade and are happy to note that the program is now in the process of testing these technologies through its on-farm research activities.

The crop improvement programs have made significant progress towards the introduction of improved cultivars of major tropical food crops. IITA's contribution in such crops as cassava, sweet potatoes, maize, rice, cowpeas, and soybean are already reaching farmers in various parts of the tropics. IITA's future plans in meeting its research mandate have been clearly stated. In order to strengthen its link with the scientific community in the developing countries and ultimately reach the farmers, IFARD feels strongly that some areas of IITA's activities need to be strengthened.

The IFARD Congress, therefore, recommends that:

On the farming systems programs:

1. IITA should participate in the on-going farming systems research activities in the whole continent of Africa, with a view to including many of its component technologies in those ecologies that fall within its mandate.
2. IITA should intensify efforts to study the biophysical and socioeconomic environments in which traditional farming is carried out, with emphasis on the socioeconomic reasons that influence farmers' decision-making processes.
3. IITA should explore the possibilities of introducing an animal component into its farming systems research, preferably in cooperation with the NARSs. It is recommended that IITA should keep some animals on site to enable it to undertake research on animal-drawn machinery.

4. IITA should collaborate with NARSs to identify the major multiple-cropping systems of Africa and to intensify research on crop mixtures. There is also need for research on post-harvest handling of farm produce.

5. IITA should collaborate with the Committee on Farming Systems Research Network to work out the logistics of transferring component technologies to the NARSs.

6. IITA should extend its current research on starchy bananas to different ecologies.

On the crop improvement programs:

1. IITA should extend its research to meet the needs of the NARSs in the mid- and high-altitude regions of Africa (for example, by developing cold-tolerant rice and cowpea varieties, streak-resistant maize, etc.).

2. IITA should assist NARSs with the control of greater corn borer (*Prostephanus truncatus*) pest of maize.

3. IITA should initiate activities that will assist NARSs with:
 - improved techniques for rapid multiplication of planting materials;
 - training of personnel in seed production techniques.

On the international programs:

1. IITA should encourage the development of testing and liaison units in its international programs to serve as channels for transfer of technologies that will benefit small holder farmers, the majority of whom are women.

2. IITA should support collaborative programs with NARSs through core funding, especially in those countries where bilateral or multilateral aid programs do not exist.

On training:

1. IITA should assist NARSs by intensifying training to improve the skills of extension agents in those component technologies that have been developed at IITA.

2. IITA should strengthen its activities in regional training for the benefit of the NARSs.
3. IITA should assist national programs in training documentalists for the NARSs. It is also recommended that exchange of information between IITA and NARSs be strengthened.
4. IITA should increase emphasis on degree-related training for African countries in order to meet the manpower needs of many of the NARSs.

In summing up, Drs. Iyamabo, Monyo, Taylor, and Hartmans expressed their warm sentiments towards participants at the congress. It was felt that IFARD Africa Chapter's first congress had provided a unique opportunity for bringing together the representatives of national agricultural research systems. The organizations responsible for sponsoring the congress were thanked, particularly IITA for its efforts in hosting the event.