Office copy

Not to be removed from office of International Coord.

REPORT OF THE JOINT IFAD AND MINISTRY OF CO-OPERATION (FRANCE) REVIEW MISSION OF THE OAU/STRC/SAFGRAD FARMING SYSTEMS RESEARCH PROGRAMME

IFAD TA 110

NOVEMBER - DECEMBER 1987

Table of Contents

List of Acronyms Mentioned in the Report

AGR	Agroforestry
ACPO	Accelerated Crop Production Officer
BOAD	West African Development Bank
CARDER	Regional Rural Development Agency (Benin)
CCCE	Central Fund for Economic Cooperation (France)
CGIAR	Consultative Group for International Agricultural Research
CIRAD	International Center for Agronomic Research and Development (France)
CPU	Central Planning Unit
DRA	Agronomic Research Directorate (Benin)
FSR	Farming Systems Research
FSRT	Farming systems Research Team
GRET	Group for Research and Technological Exchange
IARC	International Agricultural Research Center
IITA	International Institute for Tropical Agriculture
ICRAF	Internatinal Council for Research in Agroforestry
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
INERA	Institut National d'Etudes et de Recherche Agronomique
IRA	Agronomic Research Institute (Cameroon)
IRCT	Cotton and Textiles Research Institute (France)
IFAD	International Fund for Agricultural Development
IRBET	Biology and Tropical Ecology Research Institute (Burkina Faso)
ILCA	International Livestock Center for Africa
IRH	Social Sciences Research Institute (Cameroon)
IRZ	Animal Husbandry Research Institute (Cameroon)

NARS	National Agricultural Research Systems
NFSRP	National Farming System Research Programme
OAU	Organisation of African Unity
PNRA	National Programme of Agricultural Research
SAFGRAD	Research and Development on Food Crops in Semi-Arid Zones
SCO	SAFGRAD Coordination Office
SODECOTON	Cotton Development Company (Cameroon)
STRC	Scientific, Technical and Research Commission (of the OAU)
SWC	Soil and Water Conservation
TAC	Technical Advisory Committee
TLU	Technical Liaison Unit
TOR	Terms of Reference
UNDP	United Nations Develoment Progrmme
UNSO	United Nations Sahelian Organisation
USAID	United States Agency for International Development
URP	Research and Production Unit
WASAT	West African Semi-Arid Tropics

PART ONE

INTRODUCTION

1. The joint IFAD and Ministry of Cooperation (France) Review Mission[1/] of the OAU/STRC/SAFGRAD Farming Systems Research Programme (IFAD Technical Assistance Grant No. 110), which was held from 23 November until 12 December 1987, followed the Terms of Reference (TOR) (Attachment 1) in identifying and evaluating the past and present strengths and weaknesses of the programme. Following the numbering used in the TOR, Part One of this report discusses the five Strategic Issues, while Part Two elaborates upon the ten Specific Issues. Part Three concludes the report with summary remarks and recommendations.

2. The rationale of this research programme is to be found in the recurrent problems that in the early 1980s plagued rural Africa - particularly its semi-arid regions - the most important of which were a high degree of food insecurity, production based on the use of traditional know-how, lack of adequate investment in agricultural research, lack of proven locally-adapted improved technology, and a generally very low level of economic development. IFAD's Technical Assistance Grant 110 was conceived in order to cope with this environment, with the perception that something new must be tried.

A. The project was focused on disadvantaged areas characterised by extremely impoverished, agriculturally-dependent populations living in areas of rather low (less than 1000 mm) but strongly seasonal and highly variable rainfall. These circumstances made for a natural marriage of IFAD and SAFGRAD.

B. The project was also focused on bridging a perceived and surely prevalent gap between technology generation institutions (including the Internatinal Agricultural Research Centers) and the resource-poor farmers, using the methods of what has become known (if not universally agreed upon) as Farming Systems Research (FSR). The most special feature of the project in getting this work under way was the recruitment of the technical assistance primarily from Africa.

C. Finally, the project was intended to develop national capacity for this sort of research and thus, through the three case-study country

1/ The Mission was composed of: Jock R. Anderson, University of New England, Australia (team leader); Hervé Wibaux, GRET/Ministry of Cooperation, France; and Piero Bronzi, Technical Unit, IFAD. Hermi Trupke, Africa Division, IFAD, joined the mission in Cameroon, and Cheikh Sourang, Africa Division, IFAD, met with the mission in Ouagadougou, Burkina Faso.

programmes, show the other 23 SAFGRAD Countries how such research work can and should be done.

3. The project has been fairly appropriately targeted in terms of A. There are surely more impoverished, more arid, and more variable environments in which the initial three programmes could have been placed, but those chosen are not inappropriate. The villages and households which are the main cooperators with the FSR teams are rather far from being the poorest and weakest in the research domains but are not too far.

4. The gap-bridging role B was definitely needed, especially since it does not fit well the operational mandates of the International Agricultural Research Centers (IARCs), and there is clearly a need for a much better two-way flow of materials and ideas between the farmers and the research centers. There has been no green revolution in the semi-arid tropics and it is not in prospect. Progress, if made at all, will be slow, but even small gains will be of profound importance to the households concerned. Plant breeding for multiple stress resistance and multi-purpose cultivars is intrinsically complex and slow. Measures relating to resource management, especially of soils and trees, depend crucially on custom, ownership or tenure, and attitudes of farmers - none of which is very amenable to technological innovation and intervention, especially if it involves coordinated group action. The FSR teams in the field thus had a broad if not overwhelming research challenge to face.

5. The "Africanisation" of the technical assistance was a worthy experiment to have included in this project since previous experiences with non-African technical assistance have demonstrated that there are typically many difficulties of implementation and effectiveness with such assistance. The present project seems to suggest that much of the same sort of difficulties are experienced with the African "variety", suggesting to the Mission that such difficulties (as noted in section I) are not ethnically related but are inherent in external technical assistance. On the positive side, the African specialists involved now represent a new pool of talent and experience that must be useful for addressing Africa's problems. In a similar vein, the support of OAU and SAFGRAD in the implemented manner has been helpful to the continuing process of wider institution building in Africa.

6. On role C, the capacity building (and related demonstration effect) aspect of the project, the Mission must record some disappointment. The potential achievement and the reality of what has happened depend overtly on the degree to which support, especially through counterparts, has come from the national host agency. In all three cases this has amounted to a very small committment in absolute terms, although perhaps still a significant one in the context of a resource-starved national system of agricultural research. The national research directors, constrained as they are in access to both funds and personnel, have accepted the IFAD/SAFGRAD teams warmly but have used them in essentially substitutive modes. The short period of implementation combined with the scarce resources devoted to training has, of course, severely limited the possibilities for building the national research capacities.

PART ONE

STRATEGIC ISSUES

I Progress of the Programme Within the Overall Strategy of SAFGRAD

7. The project design is complex, but the essence is the testing of a model for resource-poor-farmer-oriented applied agricultural research in the semi-arid areas of Africa with the primary purpose of potentially replicating it, if successful, within the 26 SAFGRAD cooperating nations.

8. The mode of implementation has featured international recruitment, essentially from within Africa. This feature makes the endeavour a rare and remarkable attempt in seeking to find African solutions to African problems. Recruiting mainly African technical assistance should mean that most of the broader human capital formation associated with the project should stay in Africa and be available for similar problem-solving research work in the many other countries that so badly need it. Notwithstanding the limited formal training achievements detailed below (especially in section 3), in this broader sense the project represents a major FSR training experience for Africa.

9. This same fine feature has, however, been directly responsible for a variety of difficulties, including local acceptance and integration, jealousies with respect to terms and conditions of the externally hired research staff, timing of implementation, and some of the problems of international coordination. Some of the difficulties of effective local implementation are related to linguistic facility. All in all, the design is not one that is quickly effective and clearly the best if the primary purpose of temporary technical assistance is to foster the building of truly national research capacity. A potential alternative would give primary involvement to people already within national systems and perhaps use external scarce technical expertise to advise, preferably regularly and with strong continuity, on the nationally implemented work. It could profitably also involve some networking assistance such as is discussed in section 10. The main limitation of this alternative model is the extreme scarcity in Africa of local professional staff on which to build the activity, both in 1984 at initiation, and today. A further aspect, from an IFAD point of view, is that such a direct national style of assistance would only be possible in an investment project and would not be eligible under a grant for technical assistance.

10. The Mission acknowledges that transdisciplinary cooperation in FSR work is easier said than done. Notwithstanding official concordance with the rhetoric of FSR, individuals involved must be prepared to subjugate their disciplinary pride and their perceived disciplinary peer pressure, to the common good. Of course, for the process to work effectively, all parties must be convinced that the benefits of active joint collaboration outweigh the "costs" of such subjugation. This collaboration happens most effectively and naturally between people well known to each other and who share great professional respect. It can happen in bureaucratically inspired "organised" collaboration such as in national FSR programmes but

requires lots of ideological commitment and goodwill to make it work (where it does). The difficulties are naturally even greater when the "collaborators" are people from different and foreign cultures, thrown together through a process of international recruitment, and cast into a national programme where their national counterparts (in the fortunate but scarce cases where there are some) do not share the same remuneration and benefits. It must be observed that analogous difficulties have plagued FSR work attempted in the IARCs and are to be found in most externally supported technical assistance in Africa and elsewhere.

11. The conceptual-cum-operational model for SAFGRAD included three key components: (a) the generation of technologies through IARCs and national agricultural research systems (NARS), funded by USAID through the IARCs, (b) the adaptation and evaluation of technologies through the IFAD-funded FSR programme, and (c) the diffusion of technologies through accelerated crop production officers (ACPOs), funded by USAID and France.

12. The USAID funding of the SAFGRAD-IARC activities and that of the ACPOs is mostly terminating at the end of 1987. Commodity and FSR networks are to be promoted instead. The three FSR programmes have only been operational for a limited period of time (two to three agricultural seasons) and have confronted a multiplicity of institutional, financial and logistic constraints.

13. Practically speaking, the links between the IARCs and the FSR components have generally been limited to the provision of germplasm by the centers to the FSR teams, and sharing the results on varietal performance back with the centers. This has surely helped the centers to appreciate (a) the limitations of many of their "improved" materials and (b) the robustness of the multipurpose performance of many of the cultivars traditionally used and still generally preferred by farmers in the various semi-arid ecologies of West Africa. These points are elaborated in section III. The relationship between ACPOs and FSR teams, when any, have mostly been distanced by the tendency of national institutions to substitute one for the other. The FSR programme has probably helped SAFGRAD to sensitize national research institutions to the virtues of the FSR approach and to the difficulties of its institutionalisation and implementation, but have only to a very limited extent yet been able to play the gap-filling role that it was expected to play in the overall SAFGRAD strategy.

II SAFGRAD - National Programme Linkages

14. The linkages between SAFGRAD and the three host national programmes were examined, but those with the 23 non-host national programmes were not examined other than through the documents describing the consultative structures of the SAFGRAD Coordination Office (SCO). Involving so many senior research administrators in oversight of programmes is surely important in building institutions and fostering cooperation in Africa but it makes the linkage system rather expensive relative to the size of the budget for the research actually in progress. This high cost may, however, be well justified by the political dimension of SAFGRAD's role, which should not be neglected or in any way downplayed. It is a dimension

that is surely important in any longer term view of technological facilitation in Africa.

15. At the national operational level, all the FSR teams are well appreciated for what is being done. The completeness of the integration in the national research system differs a little between the three cases. In Burkina Faso it is somewhat independent in several aspects of programme formulation, but still well appreciated. In Benin it is well accepted as doing an important needed and otherwise locally neglected activity. In Cameroon, it is warmly received as partially serving an applied research need in an important ecology. In the three countries, the linkages between the FSR teams and the national programmes have been further complicated by the general weakness of available resources for research, and by the overcrowding of potential donors.

16. The extent to which national systems have supported and can support these IFAD (and other)-financed activities is a matter of grave concern to the Mission. The difficulties originate in the project design, wherein the main flow of resources is outside the strict confines of the national system. The national systems, in spite of the pressures and temptations to allocate an appropriate measure of resources, are so strapped for funds that they express their support primarily through rhetoric. Rhetoric is not the design model. Substituting international grants for national allocations of scarce research resources is not the model at the heart of IFAD support. Certainly, it does not lead to a replicable model unless there is an unending source of funds to provide the same sort of support to all national research programmes. Relative to IFAD, such direct support can only be given in the context of a development loan.

17. The multiplicity of donors for FSR-type activities makes it even more difficult for the countries to support adequately the FSR teams as foundations for the national FSR programmes. They are rather tempted to make the optimal use of all the resources available, mostly confining the FSR teams to a sub-regional programme, as for most other donors. The overcrowding of donors, therefore, has the immediate effect of diminishing the pioneering role of SAFGRAD in the encouragement of national attention to FSR ideals. Thus, the mainstay of rationalising IFAD support for something that is unique, precious and novel has been split asunder. In part, this can be counted as a successful spinoff of the SAFGRAD FSR initiative.

18. In short, the linkages between SAFGRAD and the national programmes have mostly been smooth in their political and formal aspects. The host countries have, however, shown their inability to support the FSR teams adequately.

III Links Between Technology Generation at ICRISAT and IITA, SAFGRAD, and the Programme

19. The attempts to generate improved technologies at these two centers have followed many directions ranging from increasing the grain yield potential of the major foodgrains, increasing the resistance to major insect, fungal and viral yield reducers, more latterly changing attributes

such as colour and texture of grains to enhance the acceptability of higher yielding materials, and so on, through to changed resource management practices such as soil cultivation methods and involving trees and shrubs in cropping activities. Mentioning these few directions hardly does justice to the innovativeness and complexity of the now long-running attempts which are well documented in the centers' publications, CGIAR impact studies, etc. Occasional successes have been made but few have thus far had dramatic influence on new farm practices in the semi-arid tropics of West Africa and there has been a growing recognition that greater understanding of farmers' needs and constraints is needed to facilitate the tailoring of genuinely superior technolgies.

20. Such was the thinking in part behind the creation of the IFAD/SAFGRAD FSR programme. SAFGRAD's long and close association with the international centers' crop improvement work and its OAU-umbrella characteristics have given it a natural comparative advantage to undertake both the planning and coordination of this sort of work on a multi-country basis. The SCO established for this purpose has worked reasonably well, as is described and variously praised and criticised at many points in this report. Similarly, but especially in sections 1 and 9 below, detailed commentary on the virtues and limitations of the center-related technologies is provided elsewhere in this report. In summary, however, the linkages themselves and the role of the SCO appear to be in fine working order.

IV Sustainability and SAFGRAD Research

21. While the SAFGRAD FSR teams have thus far made only the slight progress which is to be expected in general research achievement, their orientation to issues of sustainability is implicit in their design and is commendable in the directions taken to date. The teams' agronomic work in each country is exploring ways of increasing the organic matter of soils that are generally very low in this characteristic that is so important to their physical stability and their fertility. The involvement of agroforestry work in each programme ensures that the potentially useful roles for trees and shrubs in bolstering the stability of fragile (especially on slopes) ecosystems are being explored. The attention to livestock in these semi-arid environments is an important design feature that has several dimensions. The animal power aspects alone have great potential significance in ameliorating the labour constraints that inhibit technological progress. In terms of sustainability, however, the incorporation in soils of dung, compost that includes dung, and plant material derived from species intended to have a role in nutritional support of livestock has a vital and otherwise not-substitutable role in enhancing soil stability and fertility.

22. Technical progress in these directions is necessarily slow. Trees are slow to grow. Large ruminants are expensive to buy and produce only so much incorporatable material. Many of the soils, particularly those distant from housing compounds, may never see any significant amounts of animal manure because of the limited numbers of animals in the landscape in a macro sense, the constraints on harvesting manure in a labour-allocation sense, and the rational allocation of a scarce resource

across different elements of a farming system in an economic sense. Sustainability is thus an issue that has great local differentiation and for which generalisations at an aggregate level become difficult and potentially misleading. The issue of soil degradation is certainly a very important one in the West African Semi-Arid Tropics (WASAT) region. The FSR teams have given the attention to it that, within their resources, it deserves. The SCO is similarly cognisant of the issue and its importance, both presently and in the future as pressure on the resources increases and as technologies evolve. Much must be done, and many must do it but it will not be easy.

V The SAFGRAD Coordination Office

i Administrative and Financial Control

23. All three teams have presented as a major constraint the slow financial flow from IFAD to the teams, and the delays encountered in receiving the budgets.

24. The regular process for obtaining the funds is, according to the Mission's understanding, the following: at the beginning of the year, the teams submit the budget proposals to the SCO, which modifies and approves them and submits them to OAU/STRC in Lagos, Nigeria which approves them and submits them to IFAD. After the approval of the grant by IFAD's Executive Board the money is then released on the basis of quarterly installments. The money is made available to the SCO which sends it to the host country's national bank which in turn sends it to the bank of the national research institution which in due course sends it to the regional office, where the money is finally made available to the team. At the end of each month, each team sends the receipts for the expenses incurred to the SCO which sends them on to Lagos with copies to IFAD. A new installment can only be released once the expenses within the previous one are approved by the SCO, Lagos and IFAD.

25. At each step of the process, accounting takes time and the delays progressively accumulate, particularly in the flow of money from one bank to another (the Cameroon budget, sent form Ouagadougou in July, was only available to the team at the end of September). There seems to be only limited scope for simplifying the administrative process between IFAD-OAU and the SCO. The setting up of an imprest account which could make the money available to the team on an advance basis at the beginning of the accounting year, would make the support of the field work smoother, thereby minimising delays in the administrative process.

ii Leadership in Backstopping and Guiding the Work of FSR Teams

26. The SCO has provided the teams with an effective conceptual and scientific backing. The Director of Research takes an active part in the programme reviews and designs, and in the progressive orientation of the work. Yearly meetings were organised in Ouagadougou, gathering the FSR teams of the three countries, in order to facilitate contacts, to exchange experiences, and to foster global coherence within the SAFGRAD FSR programme.

27. Apart from his task of scientific backstopping of the teams, the Director of Research has, however, been heavily involved in the complex of administrative, financial and diplomatic matters related to the articulation between SAFGRAD, the three countries, the other SAFGRAD countries, OAU and IFAD. It is felt that these activities, related as they are to the project's general design and implementation, have consumed a considerable fraction of the energy of the Director of Research.

28. There is a further design difficulty inherent in having an individual with the range of responsibilities of the Director of Research, namely the impossibility to cover all the concerned disciplines involved with the same degree of expertise. The encumbent, for instance, does not have much direct knowledge of the methods of economic analysis, for instance, and thus the use of some further targeted external expertise to backstop the programme could have been helpful in providing other insightful perspectives on directives to the work.

PART THREE

SPECIFIC ISSUES

1 EVALUATION OF THE 1984-1987 WORK PROGRAMME AGAINST THE SET OBJECTIVES AND TARGETS

29. The overall objective of the regional FSR programme is to provide an improved technological basis for increasing food production in the semi-arid regions of the Guinean-Sudano-Sahelian zone. IFAD's interest in the SAFGRAD project was determined by the fact that several supposedly improved technologies are already available in Africa but often not yet locally well adapted to the small-scale farmers' farming systems. Because of the particular conditions in which the target groups live and operate, the set of technologies to be developed should integrate, along with the farm household situation, food production, animal husbandry and agroforestry. In order to achieve the overall objectives and to ensure sustained effects, the aim of the FSR programme is to create and to strengthen the national FSR capacity. To this effect, the IFAD-financed programme foresees the full integration of all SAFGRAD scientists into the national research structures of the host countries, namely Burkina Faso, Benin and Cameroon, to ensure that all activities are carried out as a unified national research effort. The same programme foresees the strengthening of the coordination office of SAFGRAD, training and support for several other minor activites (workshops, consultants, travel, etc.). The experience has shown that these broad objectives are generally appropriate to the situation prevailing within the three countries, and perhaps in Africa in general. The priority given by Burkina Faso, Benin and Cameroon to FSR-type research over other lines of research activities supports this observation. However, the objectives are very ambitious on several grounds. First, they are long-term objectives, which require a large amount of skilled human resources; and they presuppose interdisciplinary work and a systems approach in the design of activities; and supple, responsive and well-financed research institutions. Finally, they presuppose the presence of a well-functioning extension service, and a set of appropriate agricultural policies in order to make possible the adoption of the improved locally-adapted technologies by the farmers (once they are identified as valid by the FSR). Unfortunately, these conditions have not been fully met.

30. The implementation of this programme started with the recruitement of SAFGRAD's Director of Research and its Financial Controller in early 1984, the design of the programme by a team of consultants in February 1984, and the recruitement of the first six scientists between March and August 1985. The recruitement was continued in 1985 and was completed in March 1987 with the posting of the ICRAF-trained agroforesters within the Burkina Faso, Benin and Cameroon teams. The recruitement of the scientists has been slow, and as a consequence the Burkina Faso field operations were carried out over three seasons while those of Benin and Cameroon over only two seasons. When the variability of the agro-climatological conditions over time and space (from season to season, at a given location, and from location to location within the same region)

is taken into account, the Mission believes that the effort of the individual teams has been considerable but the results achieved are still far from fulfilling the stated objectives.

1.1 Burkina Faso

1.1.1 Evaluation of the Past Work

31. The IFAD-supported activities of the first year (1985) were carried out in the three villages where the Purdue University team had already collected considerable socio-economic data and where field infrastructures (including houses for the technicians) were already in place. In 1986 the government of Burkina Faso decided to move the focus of the programme to three new villages in the central region of the Mossi plateau (Kamsi, Yalka and Kamsaoghin) and socio-economic exploratory surveys had to be carried out again. The analysis of this survey led to the reconfirmation of four major constraints, namely, (a) inadequate moisture availability, (b) low and degrading soil fertility, (c) shortages of and low productivity of labour, and (d) inadequate availability of feed resources. The Mission believes that these constraints reflect adequately the conditions prevailing at small-scale farm level and that they are an appropriate base for planning future FSR activities.

32. From the review of the programmes made by the Mission, it emerges that all four sub-programmes had a slow start. The activities of 1985 and 1986 were understandably not fully focused on systems research, as the team was gaining experience in the methods, getting acquainted with the region, and was operating under budgetary constraints and difficulties with respect to counterparts and national institutional support. The 1987 FSR Proposal represents a commendable effort in the presentation of the programme according to a structured pattern which includes the hypotheses and justification of the research as well as objectives, design, location, and expected results of the proposed trials. The experience has shown that the 1987 proposal was over-ambitious and that it did not take into account the profound difficulties of the research environment. It is understandable that not all of the 1987 programme could be implemented (some 60-80 percent according to an overall Mission estimate).

33. Of the four research areas, the animal husbandry and agroforestry components seem to respond better to the stated objectives, are more systems-oriented, and are more thoroughly implemented than the others. Soil science, agronomy and agricultural economics are still rather discipline-oriented and tend to lack depth.

34. Animal Husbandry. The choice of nutrition as one of the most important constraints to animal husbandry development seems appropriate. The development of forage production within the farm is conducive to the integration of livestock and crop production activities. The experiments on forage legumes (including cowpeas) as well as strip planting of leguminous bushes on farmers' fields may be able to identify useful ways of improving both the fertility of the soil and the nutrition of animals. The design of housing for small ruminants by using only local materials as well as the construction of manure pits collecting all farm

wastes seems well done and susceptible to large-scale adoption by the farmers of at least the southern parts of the Mossi plateau region. The degree of implementation of the 1987 proposal is about 80 - 90 percent of what was planned.

35. Agroforestry. The Mission's analysis of the report[2/] on Kamsi village (one of the villages in which the activities of the SAFGRAD/INERA team are concentrated) indicates that the agroforester has taken full advantage of his training at ICRAF and has acquired a good understanding of FSR. His diagnostic work takes into account a multitude of factors and the different economic agents in a village community, including the women. The conclusions of the study seem quite operational. Moreover, the agroforester has established good personal working relations with INERA as well as with IRBET.

36. Soil Science - Agronomy. The activities under this programme were centered on the testing of improved varieties of sorghum, millet, and, to a lesser extent, maize, cowpeas, peanuts, and bambara nuts. Several positive indications about these varieties are emerging from the 1986 report of activities[3/]. However, the same report indicates that the work was conceived largely along standard disciplinary lines. Little account of interactions with other elements of the farming system, especially the farmers themselves, seems to have been taken in planning and implementing the work. With respect to the 1987 proposed research programme, no soil and water conservation experiments were carried out, reportedly due to the absence of project funds in the period (January-April 1987) in which the physical infrastructure, (stone walls, soil bunds) for this type of activity was to be created. By way of contrast, all varietal tests were implemented. In 1987 the rate of achievement of this component was of the order of 40 percent of the proposed activity.

37. The scope of the agronomy programme could usefully be enlarged to aspects other than varietal testing, and more closely associated to the other programmes. Much can be done in this line on soil fertility maintenance and crop-legume associations. Additionally, a more appropriate evaluation of the technologies tested is necessary, which does not only refer to grain yields, but rather refers to farmers' actual evaluation criteria: straw production, grain color and taste, yield performance under low fertility status, stability of yield across varying rainfall, etc.

38. Agricultural Economics. The activities under this programme could also be labelled as discipline-oriented because the research worker seemingly has a tendancy to work in relative isolation. The report on the Reconnaissance Survey of Farming Systems in the Mossi Plateau of Burkina Faso, December 1986 is highly descriptive and does not lead to apparent

2/"Rapport de diagnostic et propositions des recherches agroforestières" by Amadou Ibra Niang, September 1987.

3/ "Agronomic Trials Conducted by National FSR Program", 1986 Technical Report, by Tadesse Kibreab and Adama Sohoro, November 1987.

operational conclusions. In the Crop and Livestock Production Systems in the Mossi Plateau by Yves Coffi Prudentio, October 1987, the constraints seem to be properly identified. The economic activities could more adequately support the overall team's activities, in the following two particular areas. More qualitative information could be made available on the farm as a unit of production and as a unit of consumption. More analyses could be made of the socio-economic factors exogenous to the farm (policy, prices, markets, terms of trade, incentives) but which have an important impact on the decision making process. These two sets of activities are necessary both for appropriately evaluating the technologies tested and for planning the team's future activities.

1.1.2 Appropriateness of Methods

39. Considering that SAFGRAD's objective is to help build up the national FSR capacity within Burkina Faso, and thereby bridge the gap between on-station research and farmer's actual problems, it was felt that the FSR team could, in the short term, play an important role in several fields. These include diagnostic activities, producing information on farmers' circumstances, identifying their objectives and constraints, casting the production unit and household consumption unit as a system, and evaluative and feedback activities. The evaluation work includes on-farm testing of innovations proposed for improving the farmer's situation. Such innovations would presumably be developed largely through disciplinary research on-station and elsewhere, perhaps at the international research centers. The results of their activities should help to identify alternative solutions, to bring them to the attention of disciplinary research workers and to have them further refined on-station and/or on-farm.

40. Globally, the Mission found the methods used by the FSR team to be problem-solving oriented, but somewhat lacking in systems perspective. Several factors contribute to the weakness of the systems orientation in the work done. The team is composed of individuals with good professional training but who, for the most part, were not intimately exposed to FSR before taking up the position in SAFGRAD. Most had not received formal FSR training. Additionally, the fact that they come from different countries and different scientific backgrounds does little to facilitate interdisciplinary work. The FSR team is working with rather weak disciplinary support from other INERA departments, due to the general scarcity of human resources within the institution. This lack of disciplinary support has pushed the team itself into more disciplinary-oriented activities.

41. Little attention was given in the past to the approach at the production unit level, the emphasis rather being put on the understanding of the regional agricultural system. It is acknowledged that the 1987 programme, during which farm monitoring was conducted over 70 farms, is heading towards this approach. It is believed that the results of this monitoring should lead to a better understanding of farmers' strategies, and therefore to the evaluation of the proposed technologies on the basis of their compatability with these strategies. This orientation of the work towards the farm level should reinforce the sytems orientation of the proposed further activities.

42. The project has received very limited scientific expertise from outside. It was felt that the relative isolation of the team and the lack of interaction with a high-level scientific environment were making methodological adjustments slower and more difficult than might be the case under more ideal circumstances.

43. The Mission found that, in spite of difficult working conditions, the FSR team had succeded in implementing problem-solving research activities, both on-station and on-farm. It was felt that the methods were progressively being refined and that the results of the 1987 monitoring work would lead to more system-oriented activities starting with the 1988 agricultural season. Additionally, it is expected that the development within SAFGRAD of the WASAT FSR Network starting January 1988 will provide scientific interactions between the team and FSR experience conducted elsewhere, thereby breaking the relative scientific isolation of the team and facilitating more rapid development of research methods.

1.2 Benin

1.2.1 Evaluation of the Past Work

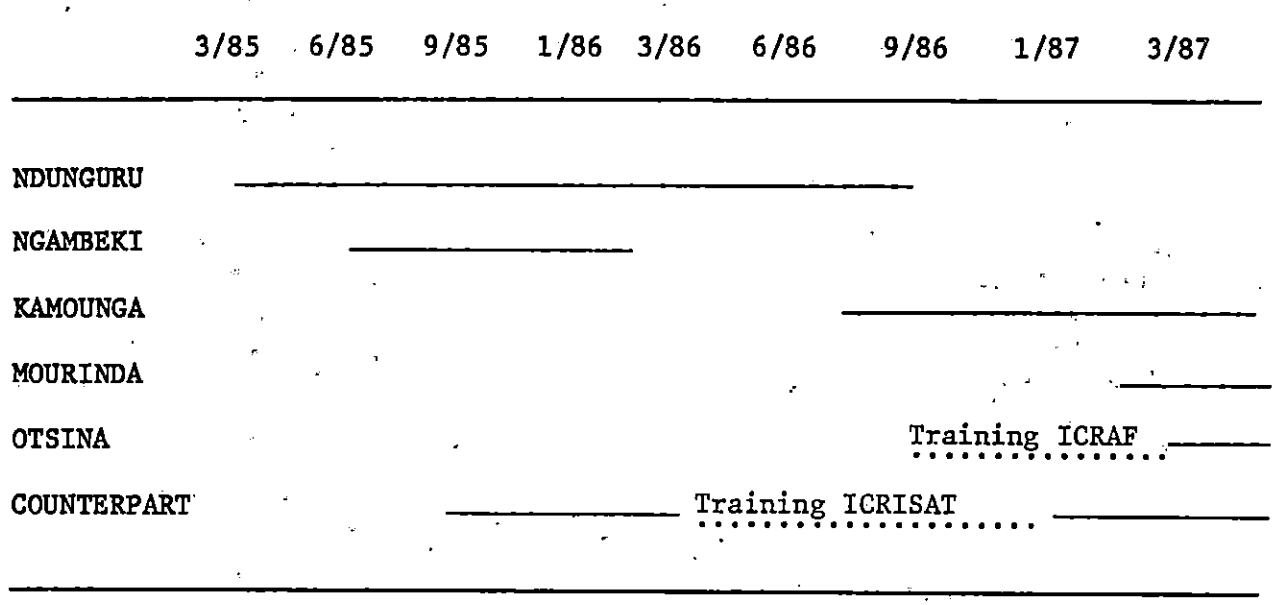
44. An analysis of the 1985-87 programme implemented by the SAFGRAD-DRA FSR team in Northern Benin would be meaningless unless five key factors are taken into account, namely:

- the discontinuity of the presence of the FSR team in the region;
- the very broad scope and objectives of the program;
- the large size of the region;
- the quantity and quality of the DRA institutional support received by the FSR team;
- the professional isolation in which the team was bound to operate.

45. Figure 1 illustrates that the presence of the team in Northern Benin during 1985 and 1986 has been spotty and discontinuous. Only from March 1987 was the team complete and constant in composition. This has certainly affected the development of the programme, obliged the new team members to a rattrapage effort, and induced some waste of effort and resources. However, it became fully operational only in June 1987, when the severe financial constraints initiated in January 1987 (no operational funds were available) came to an end.

Figure 1

Flow of FSR staff in Northern Benin



46. As already indicated, the overall objectives of the programmes are overly ambitious and complex relative to the means allocated for their fulfillment. Moreover, the Borgou and Atakora regions are rather large and diverse, as they cover nearly three-quarters of the total surface of the country and include several agro-climatological zones.

47. The working relations between the DRA and the FSR team are good. However, the institutional and the logistic support provided by the DRA for the implementation of the FSR programme has been scanty, mostly because of the very limited human and financial resources of DRA.

48. Only at the end of the 1985 agricultural season was one national counterpart assigned to work with a departing SAFGRAD agronomist. This counterpart did not participate in the implementation of the 1986 work programme as he left Benin for training at ICRISAT in April 1986. This counterpart is now well trained, motivated and operational, but no new counterparts have been assigned to the programme and there are no immediate plans for further assignments.

49. The conception and the implementation of a FSR programme requires well trained and experienced scientists as well as effective interdisciplinary interactions within a stimulating professional milieu. The Mission believes that the FSR team has good accademic credentials but, perhaps because it is operating out of Parakou, it enjoys minimal professional interactions external to the team.

50. The Mission notes that in the 1985 and 1986 programme, the two agricultural economists (Dr. Ngambeki first and Dr. Kamuanga later) concentrated their efforts on the description of the socio-economic environment of the Northern Benin agricultural sector. The agronomist

addressed his attention to the evaluation of performances of local versus high yielding food and cash crop varieties cropped in isolation, in association, and under different soil preparation and fertilisation practices. Perhaps because of discontinuity in the composition of SAFGRAD staff, little interaction between the economist and agronomist seemingly took place in these two seasons.

51. In 1985 the FSR team carried out an exploratory survey in order to understand the traditional farmers' practices and to get acquainted with the environment in which they were to operate. The preliminary survey had two main consequences. The first is that the agronomist was led to concentrate his research efforts on crop associations, under the hypothesis that this practice reduces risks, and maximises output per unit of land and labour productivity. The second is that the economist launched a baseline survey of over 90 farms near six primary research villages in the three agro-climatological zones of Borgou and Atacora provinces in an attempt to improve the quality and the quantity of information relevant for further development of the FSR work.

52. In the opinion of the Mission, the FSR team gained a good perception of the realities of the two provinces from the preliminary survey. The description of the systems of production (cropping systems, agronomic practices, livestock production, use of farm resources),[4/] is basically systems oriented and well on target. At this stage, however, the descriptions seem in need of more synthesis and refinement. Further analysis and interpretation combined with some polishing of the presentation should make the material more informative for planning further systems work and more illustrative of a balanced systems perspective.

53. The agronomy programme of 1985, 1986 and to a large extent, also of 1987, is aimed at studying improved crop associations, overcoming soil moisture and family-labour constraints, and investigating the influence on yields of "high energy inputs" such as manufactured fertilizers, insecticides and herbicides. In 1985 and 1986 the agronomy programme had a definite disciplinary connotation and seemed only marginally systems-oriented. For example, most of the trials were carried out under researcher-managed conditions and no data on labour inputs or economic variables were presented (or collected), therefore apparently denying any potential appreciation of how the researched technologies may lower the impact of labour constraints.

54. In 1987 the interaction of the agronomist and the economist, working for the first time as a team in the conception of their work programme, led to a more systematic approach in the collection of socio-economic data relevant to the agronomy trials. At the time of the review, 1987 trial data were not yet processed. The Mission was informed that several of the above-noted limitations were about to be overcome and that the needed socio-economic analyses of the trials will be made. However, the Mission noted that labour input data were still not yet taken into account for at least some of the trials.

4/ See for example 1987 FSR Proposal, SAFGRAD, pages 91-94.

55. In 1986 and 1987 the economist concentrated his activities in carrying out 90 baseline and continuing follow-up farm surveys in six villages of Northern Benin. The aspects which were investigated included soils and climate, major production systems, consumption patterns, farmers' priorities and goals, and physical, biological and socio-economic production constraints. In 1987 the survey questionnaire was amplified to describe a farm resource inventory as well as the resource allocations for crops, livestock, and agroforestry.

56. Data collected have yet to be systematically analysed. The indefinite continuation of this activity will most probably result in a mass of data that is difficult to manipulate and exploit. The farm sample is not completely representative of the whole regional population and the conclusions of the analysis would be of an indicative nature with little statistical representativeness. The Mission suggested that the economist first concentrate his limited time on the economic analysis of the trials being carried out by the agronomist and the agroforester. Moreover, the Mission counselled the team on the dangers and possible irrelevance of providing economic information on crop associations, fertilizer applications and land preparation practices based on either patchy local evidence or resulting from the aggregation of data collected in different agro-climatological zones.

57. The agroforestry programme was initiated in March 1987 with the posting of the agroforester to Benin, and at the time of the review the initial agroforestry trials were not yet completed. The SAFGRAD scientist has a PhD in range management, some animal husbandry research experience at ILCA and training in agroforestry at ICRAF. Therefore, he is able to blend several disciplines in his programme definition and implementation. From the oral presentation and from the visits to the trials (at Ina station and those implemented in collaboration with CARDER Borgou) the Mission concluded that the programme is well conceived.

58. In the initial phases of his programme, the agroforester carried out a pre-survey of existing resources and constraints and, in June 1987, began testing available agroforestry/animal nutrition technologies. As animal feed is a major constraint (particularly at the end of the dry season when the maximal effort is requested from draft animals for land preparation) the programme concentrated on leguminous shrub plantation (alley cropping, association trees-crops, etc.) and on testing improved forage varieties. The Mission believes that this programme is well launched and deserves to be continued for several years, especially for the testing of improved forage varieties.

59. In summary, looking to the past, it is extremely difficult to analyse the 1985 and 1986 programme because of the difficulties under which it has been implemented with discontinuous staffing. The review indicates that the FSR team was able to grasp the main concepts of FSR but that they have not yet been able to translate these concepts fully into a meaningful FSR programme in Northern Benin. The result is a work programme, which to a large extent, is still disciplinary oriented. The lack of basic agronomic research in the region and the scarce institutional support may have induced the team to bend toward this type of research. The 1987 programme seems more systems oriented than those implemented in the past. The

Mission recommends that the agroforestry programme be continued on the same track, that the survey work be carried out on a smaller sample and include additional qualitative data on farmers' circumstances, and that both agronomist and economist interact more extensively in both the design and analysis of the trials. Moreover, credit should be given to the team to begin integrating their research concerns with an extension/rural development effort, as evidenced by the cooperative work and the researcher-managed trials undertaken within the context of the Borgou I project[5/].

1.2.2 Appropriateness of methods

60. The Mission found it impossible to evaluate adequately the approach used by the FSR team, due largely to the lack of continuity in project staffing. The absence of a counterpart team has meant that there has been no compensation for the high turnover in the expatriate team - the one counterpart has been operational only since early 1987.

61. Considering these limitations, the Mission could make only a few general comments on the approach used. With the limited resources available to the team, it is commendable to give most attention to economical and cost-effective diagnostic procedures, rather than more costly in-depth inquiries. Particular attention is drawn to the need to complement the quantitative data accumulated through the 1987 farm-monitoring by more qualitative information on the farmers' strategies observed in the monitoring.

62. Greater interaction between the team members is needed in order to allow better tuning of the experimental programme to the information gathered in the diagnostic work, thereby pushing the activities towards a more pronounced systems orientation.

63. It is, however, acknowledged that the late arrival of the agronomist and of the agroforester, just at the onset of the rainy season, did not allow them to exploit fully the information available on the regional agricultural system, in order to develop more comprehensively their 1987 activities. The 1987 programme was, therefore, mostly a continuation of the 1986 one, conceived by researchers who had by then left the project. The Mission also realises the rather weak disciplinary support offered to the team by the Ina research station. The FSR team represents about half of the station's professional resources. Given this relative professional isolation, it is important for the FSR team to develop and sustain effective links to other international FSR work.

5/ Benin Borgou Province Rural Development, Loan BE061.

1.3 Cameroon

1.3.1 Evaluation of the past work

64. The agreement between Cameroon and SAFGRAD was signed in November 1985. The expatriate economist and agronomist arrived in Maroua early in 1986. The agroforester joined the team after a six-month training course at ICRAF only in March 1987. The evaluation of the past work of the FSR team is based largely on the analysis of two draft documents (Annual Report for 1986, by Dr. D. S. Ngambeki and Dr. L. Singh, and Preliminary Results of Agronomic/Soil Studies for 1987 Crop Season by Dr. L. Singh), as well as on the discussions that the Mission had with the FSR team.

65. The team's operations were complicated by several factors which must be considered in evaluating the work done. When first assigned, the two team members were posted at Maroua. They only remained there for two months and then were moved by the Agronomic Research Institute (IRA) to Garoua, in April, i.e., just at the beginning of the rainy season. In March 1987, discussions between IFAD, SCO and IRA addressed the point that the zone of operation was not strictly semi-arid, and it was decided to restrict further work to the drier region north of Garoua. When the agroforester came in 1987, IRA wished to settle her in Maroua, from where the main forestry activities are conducted, and therefore to separate her from the other FSR team members. After discussions between the SCO and IRA, she was eventually assigned to Garoua. There has been considerable indecision as to where the team should work and this has served as a predictable disincentive to the team. This indecision on the part of IRA, seems related to the management policy concerning external research assistance. Fifty of the 150 researchers at IRA are foreigners and, like their Cameroonian colleagues, occupy frontline positions, which actually makes it difficult for young national scientists to gain experience and training from the expatriate staff. A clear result of this policy is that, despite the committment of IRA to hire three counterparts and three technicians for the FSR activities, only one counterpart has so far been successfully appointed.

66. The institutional setting of agricultural research in Cameroon has not made the FSR work easier. The scientific research in Cameroon is carried out by six individual institutes, among which IRA is in charge of crop sciences, IRZ is in charge of animal sciences, IRH is in charge of human sciences, and so on. The FSR team is attached to IRA. It is, therefore, institutionally confined in the first instance to the area of crop production.

67. Within IRA, the FSR team is considered as but one Technical Liaison Unit (TLU) among others. Its responsibility is defined primarily in reference to a geographical zone, presently the region north of Garoua. Within the zone, the FSR team is expected to test, under various agroecological environments, the crop production technologies developed on-station by IRA. This institutional setting therefore results in a general disincentive for the team to work in a systems oriented manner.

68. Other factors too, like the late delivery of cars (six months after the arrival of the team, i.e., after the first cropping season was initiated), the irregular flow of financial resources, the distance from

the centers of decision (Maroua, Yaounde, Ouagadougou) have contributed to a whole set of administrative and logistic difficulties that the team has had to face, thus limiting the potential achievement. Additionally, these constraints have contributed to the building up of a general feeling of frustration within the team which has inevitably damaged its productivity.

69. In spite of all this, an important volume of activities has taken place. The results reviewed include a description of the project zone, from both the analysis of secondary data and surveys, some analysis of the 1986 and 1987 agronomic trials, and the launching of the agroforestry activities in 1987. The 1986 progress report provides a useful picture of the regional agriculture, including climate, demography, farm structures and labour availability, main crops grown, crop management practices and crop rotations, an overview of the animal husbandry practices, and identification of the main constraints to increased food production.

70. The criticism that can be made on this part of the work mostly relates to the survey methods chosen. There is a misfit between the large size of the sample, the informal sampling method adopted, and the statistical analyses produced. The representativeness of the sample is questionable and, therefore, the results produced are only indicative. They should therefore be presented as such, avoiding pretentious precision.

71. The interviews conducted allowed for badly needed documentation of farmers' practices and circumstances. However, some of the interview procedures involving rather subjective open-ended questions, such as the ranking of production constraints, seem not to be very reliable or informative.

72. The Mission feels that the surveys could have been structured around clearer hypotheses concerning the key factors influencing the agricultural practices and constraints to increased production. The sample could have been limited to a smaller number of farms, and stratified according to some obviously important factors such as the relative importance of cotton on the farm, the availability of animal draught power, or the total area cultivated. This would have pushed the regional representation in a more analytical direction. It would also have allowed a perception of the regional agriculture in its diversity rather than in its typicality.

73. The Mission feels that some important issues, such as the food crop marketing and storage, have been poorly addressed. The recent good agricultural seasons have shown that, when there is good rainfall and production, the prices tend to collapse, preventing farmers from gaining real benefits from such favourable seasons. Appropriate storage facilities and better marketing services are both necessary to solve this problem, to such an extent, that development agencies, such as SOCECOTON, feel that technical improvement is hardly worthwhile as long as these issues are not properly addressed. The Mission therefore regrets that no work at all was done on these aspects.

74. Concerning the evaluation of the agronomic programme, the Mission has noted the considerable amount, and the good disciplinary quality of the work undertaken in 1986 and 1987, and has appreciated the efforts made to

compile the 1987 data in time for the Mission. The trials conducted include work on techniques of soil fertility maintenance and soil moisture conservation, density trials, and maize, sorghum, groundnut and cowpea variety trials.

75. A few adjustments were made between 1986 and 1987, mostly the introduction, in the soil moisture conservation work, of the alternate tied ridges to avoid waterlogging on Vertisols, and of mulching. The number of trials also had to be reduced from 94 to 59 due to a reduction in SODECOTON's support to the FSR team.

76. Considering that much of the proposed 1988 programme is a continuation of the 1986 and 1987 ones, the evaluation of the past work has been merged with that of the future programme. Specific remarks on each trial are, therefore, included in the evaluation of the 1988-89 programme in section 2.3. Some interesting results were obtained from on-farm experiments and the information was fed back to on-station IRA breeders. The maize variety CMS 8501 was found to perform well under limited rainfall and to be tolerant to streak virus. SODECOTON is now considering multiplying and diffusing this variety through its extension services. Promising results were also obtained on groundnut varieties with varying cycle length adapted to the variable agroecological environments: M 1441-77 with a 100 day cycle for the northern zone, M5 13771 with a 110 day cycle, and variety 28206 with a 120 day cycle for the southern part of the region.

77. As is developed elsewhere the work was, however, found to be very disciplinary in nature and the lack so far of economic analysis such as partial budgeting of alternative technologies is to be regretted.

78. On the basis of this past programme, the Mission feels the economic work could be improved through more appropriate sample size and sampling procedures, and more attention given to the economic analysis of the agronomic trials. The agronomic work was appreciated, but could gain from more attention given to farmers' circumstances in both the design and analysis of the trials. Both the agroforester and the agronomist need to address the important issue of fodder production.

79. The agroforestry activities hardly got started in 1987 with the launching of a demonstration plot for various agroforestry designs, and for tree planting for soil and water conservation. A diagnostic survey is presently being carried out for which results are not yet available. The evaluation of the future programme is here necessarily more informative than that of the past.

1.3.2 Appropriateness of Methods

80. In evaluating the appropriateness of the approach used it is necessary to refer to the institutional insertion of the FSR team in the national framework, within IRA. This insertion results in a disincentive for the team to integrate the different aspects of agricultural production, other than those directly involved in crop production, and thus a difficulty to view their activities in a wider farming systems perspective.

81. As a matter of fact, the team has worked largely on a disciplinary basis. The Mission observes and regrets the low level of effective interaction among the team members and thinks that an appropriate reorientation of the economic activities could considerably favour these interactions and the systems orientation of the work. This may require more concentration by the economist on his economic analysis work and thus a shift of his administrative/team leader responsibilities to another team member. The team can benefit from the IRA disciplinary backing, which is much stronger in North Cameroon than in Benin and Burkina Faso, and which should make it easier for the team to move away from pure disciplinary work into systems-oriented activities, especially if the institutional barriers can be crossed. This can seemingly be done but requires explicit agreements between the Directors of the respective institutes.

2 EVALUATION OF THE WORK PROGRAMME PROPOSED FOR 1988 AND BEYOND

82. The SAFGRAD draft document, FSR Programme Proposal 1988-90 gives the objectives of the research and provides some background information on the work. It highlights the research results achieved in the 1985-87 period, describes the main thrust of the 1988-90 programme proposals, and indicates the preliminary budget estimates.

83. The objectives of the 1988-90 proposal are fundamentally the same as those of the past programme. The draft FSR Programme Proposal is a working document prepared by the SCO on the basis of submissions by the Burkina Faso, Benin and Cameroon teams. It was a background document for the discussions that the Mission had with the teams and the national research officials.

2.1 Burkina Faso

84. The meeting in which the 1988-90 preliminary FSR proposals were discussed was attended by INERA officials, the SAFGRAD Director of Research, and the SAFGRAD-INERA international scientists and counterparts.

85. INERA officials indicated that FSR and Soil and Water Conservation (SWC) are the two priority activities around which the future strengthening of the national agricultural research system (to be financed by a World Bank and others-supported project involving several donors) will be implemented. INERA foresees the creation of a national FSR network and of a second FSR team based at Farako-Ba, Burkina Faso (in addition to that of the present SAFGRAD team based in Kamboinse). INERA believes that the future activities of the SAFGRAD team should be concentrated in the central part of the Mossi Plateau. As a result they should deal with Kamsi and Kamsaoghin villages as primary sites but not further with Yalka, which is situated in the west of the country and will be covered by the Farako-Ba team. INERA officials expressed the desire to be more closely associated than in the past in the drafting of the detailed programme of research activities.

86. The shortage of counterparts continues to be a major issue for the development of the SAFGRAD programme into a full-fledged national FSR

unit. Two counterparts work directly in conjunction with the agricultural economist, the agronomist and the animal husbandry scientists recruited by OAU/STRC. This situation is the result of stringent government budgetary constraints rather than of a shortage of trained personnel In the near future a sociologist will join the counterpart team, but no radical improvements are to be expected in the near and medium term. The immediate counterpart situation may well deteriorate with the implementation of the World Bank and others' programme and the allocation of some 34 post-graduate scholarships for Burkina Faso. The present counterparts qualify for priority scheduling for post-graduate training abroad.

87. The socio-economic programme as presented by the FSR team is both very broad and extremely ambitious. It is more a draft of what could be an "ideal" national programme to be implemented by a larger team of agricultural economists than the work programme of a researcher bound to work in isolation and without a well trained counterpart. The Mission counselled the team to reduce sizeably the scope of this programme, to integrate the activities with the analysis of data emerging from the agronomy, soil science, forestry and animal husbandry programmes and to cast some analytical light on issues such as upstream and downstream aspects of the production process, as well as to take more into account family farm characteristics such as the timing of labour constraints, non-farm income, and also possibilities for supplementary irrigation.

88. The animal husbandry programme is well linked with past activity and its conception indicates a strong sense of realism. It will continue to emphasize animal nutrition, forage production and forage conservation as a means to integrate crop and animal production and soil fertility improvement. The Mission suggested that the FSR team also extend their activities to large ruminants, and to link with ILCA's pool of expertise, particularly those for animal traction.

89. The agronomy, soil and water conservation (SWC) and soil productivity programme is also overly ambitious. The programme, as presented, reflects more of a national long-term objective independent of the resources that Burkina Faso and IFAD/SAFGRAD are able to allocate for the implementation of the programme. The future detailed programme should realistically reflect this situation. A large proportion of this programme is represented by researcher-managed trials, in station as well as in farmers' fields. There are at present about six Burkina Faso researchers located in Kamboinse station who are keen to collaborate with the SAFGRAD-INERA agronomist and his counterpart in the implementation of the FSR agronomy-soil components. The Mission urged the FSR team to present first a detailed programme which could reasonably be implemented in one year, to improve the contacts with IITA and ICRISAT scientists, and to associate designated Burkina Faso researchers for collaboration in its implementation. A particular effort should be made to expand the activities in the field of SWC, particulary in the expectation of being merged into the SWC project to be financed by IFAD for the Mossi Plateau.

90. The agroforestry programme is admirably systems-oriented and well on target. This programme was defined in full coordination with IRBET and

the Ministry of Environment officials. The agroforester does not presently have a direct counterpart due to the lack of available foresters in Burkina Faso. The recruitment of an agronomist for training at ICRAF for six months was suggested as a good alternative for circumventing the existing constraints. The agroforester has already established very good working relations with IRBET and it is most likely that this institution, and in particular its Director, will continue to backstop the agroforestry programme in important disciplinary ways.

91. IRBET, however, has very limited resources. Therefore it would be appropriate for SAFGRAD and Burkina Faso authorities to study ways and provide means for a closer association of ICRAF to the agroforestry activities carried out in the country.

92. Finally, The Mission suggested to SAFGRAD's Director of Research and the FSR team that the whole work programme be recast and presented more from a systems perspective rather than as a set of traditional disciplinary elements. The team has identified four major constraints limiting production and productivity in the Mossi Plateau, namely:

- inadequate moisture availability;
- low and degrading soil quality;
- labour bottlenecks at key periods of the year; and
- inadequate feed resources.

93. Therefore, the future programme should be built around these topics more overtly through a series of research trials, studies and analyses to which all the team should contribute in an interdisciplinary fashion.

2.2 Benin

94. In evaluating the proposed future work of the FSR team, a logical starting point is to look to the immediate past. To quote some of the team members themselves from a draft publication in which they review past agronomic research on food crops in Northern Benin 6/, "The agronomic research on foodcrops conducted in Northern Benin so far has been weak and thematic (disciplinary) in approach. Consequently, limited technologies (a few improved varieties of maize, groundnut and cowpeas) have been developed at Ina, and no achievements have been made with other important foodcrops, particularly sorghum and yam." This harsh self-appraisal is supported by the Mission and the Mission was at pains to point out in the discussion of the proposed (especially agronomic) programme that some of the planned experiments seemed destined to follow the thematic fate of past work.

95. As with the other national programmes, the conceptual setting that introduces the the presentation of the future work programme says all the "right things" and lays out the conventional ideology about "systems"

6/ M. V. Murinda and M. Kamuanga, Agronomy Research on Major Food Crops in Northern Benin, Review and Perspective, Draft, November 1987, pp. 33-34.

research[7]. The SCO's version of this is appended to this report as Attachment 3. The detailed plans in Benin do not perfectly match the refined rhetoric in several ways, however. The holistic systems approach is, seemingly inevitably, translated into largely disciplinary programmes that reflect the interests and perceptions of the disciplinary specialists who otherwise espouse the lofty ambitions of FSR and its transdisciplinary incarnations. To be sure, there is certainly strong interaction between team members in the formulation of proposals and in the execution of agreed tasks. It is in the analysis and interpretation of trials and surveys that people seem mostly to retreat to their disciplinary caves.

96. The FSR team in Benin has been up against all the implicit challenges noted in section I as well as some additional difficulties that include instability and high turnover rates of staffing, weak specialised disciplinary support, rather primative supporting facilities, and an obligation to work over relatively great distances within a large and diverse mandate area.

97. With these cautionary but necessary preliminary remarks, a review of the future programme that is sympathetic to the inherent difficulties can be embarked upon. This is a somewhat frustrating task because the planned programme is very much an extension of the 1987 work which, at the time of the Missions' observation, had not been analysed or interpreted.

98. Work is planned around 12 themes that are largely disciplinary investigations linked to the five identified major constraints, respectively, cropping patterns, soil and water management, fodder scarcity, input inefficiency, and varietal deficiency. The work is outlined in a draft plan of 108 pages.

99. Agronomic work is described in a series of 16 experiments that take up elements of the main themes. Given the recent elimination of extensive subsidies for fertilizer and the problems of access to fertilizer for food crops, the experiment aimed at identifying "optimal" planting densities for sorghum in different zones, but under rather heavy fertilizer use, seems of dubious priority. The adaptation of sorghum/maize association experiments to include ratios commonly used by farmers is a belated step in the right direction. Such past work in Benin has revealed the marginal impact of associations on average total grain yields (forage/straw yields seem largely and unfortunately downplayed) but, as yet, has been unable to throw light on the desired risk- and labour-reducing impacts of associations vs. pure stands. The planned sorghum/cowpea association work seems more promising on all fronts, as is the maize/cowpea relay cropping work.

100. The crop rotation work in Atacora is vital, given the degraded and degrading soil resources there, but is intrinsically long-term and cannot be looked to for early definitive results, which is why it is important to

7/ OAU/STRC/SAFGRAD/URP-Ina, Farming Systems Research Proposal, 1988-1991, and Annexes.

have greater involvement with the national soil science research authority (CENAP) in its planning and execution. Such involvement is indeed intended for the important planned work on forage and dung alternatives to inorganic fertilizers.

101. The work proposed on tied ridges in the Sudan-Sahel zone will be useful if it can reveal labour-efficient methods acceptable to farmers for increasing water-use efficiency. Close collaboration with socio-economic analysis will be critical in successful interpretation. The same will be true for the run-off management work on steep slopes and the contrasting of mounds and ridges for yams. Close collaboration with IITA may maximise the effectiveness of attempts to economise on yam planting materials, although this seems somewhat peripheral to the mainstream of SAFGRAD activities.

102. Work on herbicides for weed control in groundnut and maize culture seems likely to absorb significant scarce FSR team resources yet to be of rather low priority, given the innovative/experimental activities of labour-constrained farmers and the promotional activities of the firms marketing herbicides.

103. The on-going search for varieties of major cereals and grain legumes that perform better than local materials in the various ecological niches is at the heart of the grand conception of the SAFGRAD FSR work and, as such, must continue, in spite of the slow progress to date. Much has been learned thus far and, with the feedback to ICRISAT and IITA that has occured, a flow of potentially more appropriate materials for testing can be anticipated. Again, nothing very dramatic is in prospect and assessors of this slow and uncertain process must be patient.

104. After a late start, the agroforestry programme is up and running strongly. The alley cropping and intercropping with leguminous perennials should prove instructive in both biological and economic terms although the Mission wonders rather at the extent of farmer involvement in the trial conceptions, and at the likely "social" acceptability of some of the new farm practices that are implicit in the work. Certainly this and the other agroforestry work is well appreciated by the main responsible local forestry agency (UNDP supported UNSO). Given the devastating depradations of Leucaena leucocephala elsewhere in the world by psillid attack, the Mission worries that an early evaluation of Leucaena materials known to have some resistance to psillids is not being undertaken. The Mission recognises that there is only so much that one or two agroforestry specialists can do in a busy work programme, including the evaluation of diverse species of ligneous and herbaceous plants, and is comforted again by the close working relationships developed with the UNSO and CARDER authorities with similar concerns.

105. The work on evaluation of fodder legumes for small-scale livestock holders and the related work on production and management of animal manure is ambitious indeed, given the above remarks about the scarce professional resources, but is exciting in that it is very much systems oriented, involving integration of soil, crops, trees, animals and farmers and thus integration of activities by the agronomist, agroforester/livestock specialist and agricultural economist.

106. Planned further monitoring of farm resources represents a revitalisation of the socio-economic dimensions of the project. The redefinition of more usefully defined agro-ecological domains of Northern Benin that is planned is a recognition of the crudity with which this was done in 1985. It is to be hoped that due account of tree and forage resources can also be taken in this appropriately on-going work. The involvement of senior students of the University of Benin sounds useful in several senses, especially if it can be linked to an appropriate formal university course. The proposed permanent panel of farmers should prove worthwhile. Higher priority could usefully be given to economic analysis and interpretation of on-farm and on-station trials, even if some of the pre-1987 work is less than ideal for such purpose. The Mission is not fully convinced at the high priority intended for new work on the economics of animal traction in Northern Benin. Much of this work could perhaps be handled by economists working in CARDER which has considerable institutional concern for the development of animal traction.

2.3 Cameroon

107. The Cameroon FSR team's future programme has been rather too disciplinary-oriented and the proposed interactions among the team members have been and are insufficient. It would seem particularly appropriate to structure the programme on the basis of the key constraints identified, which could also be further elaborated. An interdisciplinary programme tackling each of the identified constraints could then be developed. This way of structuring the activities would force the team into more interdisciplinary interactions, more systems orientation, and more problem-solving types of activities rather than basic disciplinary work. It would also push the team to set priorities, which do not appear clearly in the proposal.

108. The economic activities proposed under the headings of Themes 1 and 2, "Baseline-verification surveys" and "Storage and marketing surveys" are conceived in a way which fits neither the team's present priorities, not its actual analytical and financial resources. It seems particularly unrealistic to plan long-term (say three-year) ambitious aggregate economic analyses on a sample of 120 farms, of questionable representativeness. Some of the objectives of the proposed studies (estimation of elasticity of production, price elasticity of demand and supply, etc.) seem of marginal relevance to the present FSR team's task. Work on storage and marketing is certainly necessary, but can be handled through small targeted surveys as well as through some analysis of both the past season results and of available secondary data.

109. The Mission therefore suggests that the economic programme be kept realistic and more practical, oriented towards the backing-up of the other team members' activities. The economic evaluation of the technologies tested (Theme 3), including those based on the 1986 and 1987 trials, should be the top-priority to be tackled. It should also include the on-farm testing activities presented separately under Theme 7. There is, indeed, no reason for separating on-farm testing from technology evaluation: the essence of the FSR team, as compared with the TLUs, is precisely its capacity to evaluate technology relative to small-scale farmers' needs.

111. This evaluation of technologies requires additional data collection, which can be conducted through informal interviews and the survey of a limited number of appropriately selected farms (according to criteria identified in the preliminary survey: main cash crop, use of animal traction, total area cropped, access to infrastructure, etc.). Such data can also be obtained from secondary sources of information, either in published form, or from other institutions such as SODECOTON or "Chambres d'Agriculture", and could favourably be mobilised on such issues. The agronomic activities would gain much from a stronger economic backing, which would allow a more appropriate evaluation of the tested technologies, more related to the farmers' actual circumstances. Indicative partial budgeting could easily be done.

111. The activities on the evaluation of soil moisture conservation techniques (Theme 4) are justified, considering the low average rainfall and its unreliability in the region. The trial design is appropriate, although it seems of little use to repeat such trials on Vertisols, for which the waterlogging caused by tied ridging is already well documented. The trials should be modified on Vertisols, and designed for dry-season Muskwari sorghum only.

112. The soil fertility management trials are well conceived but would gain from being more closely integrated in a whole-farm context. This theme could well form one of the basic interdisciplinary activities of the team, tackling the availability of the required resources (labour, manure, crop residues, fertilizer) and the possible means to increase fertility. More attention could particularly be given to the farmers' animal husbandry practices, the means and limitations of a closer crop-animal integration. Agroforestry and legume production could clearly be included in the trials, both on soil fertility amendment and fodder production aspects.

113. The study of the land preparation practices (Theme 6), comparing animal traction and hoe cultivation seems a long-term and expensive activity. The theme is already well documented (ILCA, ICRISAT, etc.) and seems to be a low priority for the FSR work. Before launching such experiments, more qualitative information could be gathered from the farmers themselves on the advantages and limitations of the use of animal traction. If, from such interviews, animal feed is found to be the key constraint to the development of animal traction, trials on feed improvements could well be more appropriate than this more general economic evaluation of animal traction.

114. The soil fertility evaluation under different crop rotations seems to be another long-term experiment for which justification and design are questionable. Such an experiment is not likely to lead in the short term to any new practical recommendations to be diffused to farmers. The evaluation of a crop rotation, through a focus on soil chemical analysis, seems a very restricted approach to the question. The effects of crop rotations on soil erosion and on soil physical properties may well be overwhelming the chemical aspect of the evaluation.

115. The agroforestry programme is as yet insufficiently detailed. It mostly involves on-station activities and focuses in several respects on

forestry more than on the possibilities for integrating trees within the farm. The tree species screening according to their adaptability to different agroecological environments is already largely handled by the Forestry Section of IRA.

116. The setting up of a demonstration plot on the different agroforestry designs is a good start. It is, however, extremely limited in scope. More research-oriented work on fodder and fuel wood production techniques could be developed in 1988. Applied soil erosion control techniques, associating tree planting and stone bunds within the gulleys have been launched on a limited scale. Such tasks could probably better be handled by other agencies. The team does not seem to have the necessary resources to make a significant impact on such a large issue.

117. The agroforestry activities would gain from greater interaction with the other components of the programme. The agroforester, given her field of training, could be more extensively involved in work on fodder production and animal husbandry-related activities. The Mission acknowledges however, that the diagnostic survey, which is being conducted in 1987, will provide when completed a better basis for such developments. It is to be regretted that more perspective on agroforestry possibilities and needs did not emerge from the initial baseline survey work.

3 ASSESSMENT OF THE EXTENT TO WHICH THE PROGRAMME HAS BUILT NATIONAL FSR CAPACTIY

3.1 Burkina Faso

118. The SAFGRAD FSR project, first initiated in the Purdue University Farming Systems Units, is one of the programmes through which the FSR approach was introduced and developed in Burkina Faso. Since then, for the past ten years, the programme has extensively interacted with the national institutions, reinforcing the interest of these institutions in the FSR approach, and contributing to the carefully considered position on the roles, methods and possible institutional settings for a FSR program.

119. Presently, the National Programme of Agricultural Research (PNRA) plans the provision of US$ 4 m to develop the national FSR programme, with the launching of 4 additional regional FSR teams. INERA expects that the present SAFGRAD FSR team will play a big role in this development, mostly through providing training and methodological support to the newly formed teams.

120. It is, therefore, believed that the SAFGRAD FSR experience within Burkina Faso has contributed significantly to the building of the national FSR capacity, and that it is expected to contribute even more in the near future.

121. The Mission, however, must note the weakness of the programme achievements in training local counterparts. The lack of stability of the counterpart team, and the failure to implement a systematic training programme within the agreement between INERA and SAFGRAD are two major

factors impeding the appropriate training of a national team. It is recommended that, in order to allow a maximum use of past experience and an appropriate build up of national FSR capacity through PNRA, an explicit training component for national counterparts be activated in whatever form the project may be continued.

3.2 Benin

122. The national capacity for FSR has been fostered by several agencies. The FSR team in Northern Benin has had very limited counterpart support and training. Thus truly national capacity has been little affected. What has been accomplished is a smooth and close working relationship between the FSR team and the professional staff (especially the Director) of the Ina research station which has analogous regional thematic and applied research responsibilities.

123. From a national perspective, the situation is quite complex. There is a Dutch-supported national FSR coordination unit in DRA headquarters in Cotonou. Provincial FSR teams are now at work in four other regions and a donor is being sought for the fifth and final region. The SAFGRAD initiative surely played a part in this national proliferation of FSR activities but only a small part. Benin has been responding to many external pressures to develop a research system more responsive to the development imperatives of resource-poor farmers.

3.3 Cameroon

124. As in so many other nations, the field of FSR sponsors, programmes and activities is somewhat crowded. SAFGRAD is but one participant and so it becomes an awkward problem of attribution to reflect on the SAFGRAD contribution to national FSR capacity.

125. In the short run, and over the past year or so, the FSR team has essentially provided substitutive services for national FSR for the defined geographic and ecological area described in section 1.3. The national authorities have taken particular care that FSR-related activities do not overlap in any significant sense, in the interests of promoting efficiency in the national allocation of resources. In this regard, a rather all-encompassing view of what constitutes FSR has been adopted, including as it does almost any activity that has a research element and that has contacts with either farmers or extension workers. The very minimal national achievement in providing counterpart scientists means that, in a more permanent sense, very little has yet been really attained by way of national FSR capacity.

4 INTERACTIONS BETWEEN THE PROGRAMME TEAMS AND DEVELOPMENT PROJECTS

4.1. Burkina Faso

126. There have been essentially no development projects that would have been vehicles for interaction with the FSR team, although this will surely

change in the future (e.g., the IFAD Soil and Water Conservation project for the Central Plateau). Members of FSR team have been cautious about stretching their scarce resources and activities into such development work in the past and, while understandable, this has led to some tensions within INERA. INERA staff acknowledge a broad institutional responsibility to take on consulting-like tasks for other government units including in other ministries, when their expertise is relevant. Thus Burkina Faso nationals in INERA feel that, as the FSR team is part of INERA, FSR team members must share in such wider development work in the same general way. This has been discussed at length, agreed upon and is encapsulated in the formal request embodied in the 1988-90 draft work programme.

4.2 Benin

127. The main and seemingly only development project with which the team has interacted is the Borgou Province Rural Development Project. This is dealt with in section 7.

4.3 Cameroon

128. The FSR team has developed excellent working relations with SODECOTON and, to a more limited extent, with the Dutch-funded North-East Benoue Development Project.

129. SODECOTON is in charge of all the extension activities for cotton and for the various crops entering into rotation with cotton (maize, sorghum, groundnut, millet, etc.). SODECOTON has been extensively associated with the FSR team activities during the 1986 agricultural season: it took an active part in the programme design, the research site selection and the trial implementation, mostly through the SODECOTON village-level workers.

130. SODECOTON's interest in the FSR team's activities relates to the testing on-farm of proposed innovations (and therefore to a pre-extension type of work), and to the generation of useful information on farmers' circumstances. SODECOTON's involvement has greatly facilitated the FSR team's work (transport, village-level workers, etc.), particularly in 1986 when it had the resources to assist. In 1987, this participation has been dramatically reduced due to the financial difficulties of SODECOTON. It has mostly been limited to an informal involvement of the village-level workers in the research site selection, and to the annual IRA-SAFGRAD-SODECOTON meeting in which results and future programmes are discussed.

131. The Mission feels that the FSR team-SODECOTON interaction is highly beneficial since it allows the team to benefit from the village-level workers' integration in the villages and from their knowledge of the regional agriculture. Moreover, it directly connects the FSR team with extension and therefore pushes the FSR team to work on problem-solving activities. However, it is acknowledged that the cooperation with SODECOTON should not limit the FSR team programme to cotton planters or cotton-related activities.

132. Contacts were also established between the FSR team and the Dutch-funded North-East Benoue Development Project, for the setting up of the 1988 agroforestry project. This project is mostly involved in soil and water conservation and, in more general terms, in the conservation of the agroecosystem. As such, the project is ready to allocate part of its resources to the implementation of the SAFGRAD 1988 agroforestry programme on two of the three sites selected by the FSR team. On these two, the FSR team would be involved mostly in providing technical expertise, seedlings and fences to protect the seedlings. The Mission feels that the cooperation between projects could be very profitable. However, it recommends that, together with the IRA regional director, a formal agreement be reached before the start of the activities, in order to endeavour to avoid future misunderstandings.

5 APPROPRIATENESS OF THE IMPLEMENTED LOCATIONS

5.1 Burkina Faso

133. The location of the programme in Burkina Faso conforms excellently with the overall scope and objectives of the SAFGRAD program. The institutional association, while going through some teething problems of integration and having to cope with a recently-changed, still-evolving and generally still inadequately staffed INERA, is ideal in principle. The focus on applied research in the Central Plateau is appropriate, given the high population density and resulting land scarcity in the region. The region's other characteristics of low erratic rainfall regime, soil erodability and crop mix match well the SAFGRAD concept.

134. It is perhaps going too far to conclude that the SAFGRAD FSR programme (or, indeed, its antecedents such as the ICRISAT FSR programme or the USAID/Purdue University FSU work) has led to investment and development activities such as the upcoming IFAD Central Plateau project or the World Bank and others-assisted enhancement of Burkina Faso agricultural research capacity. Many other factors have contributed to these projects, including all the broad considerations of the Burkina Faso environment and its development imperatives used in the design of the programme itself. It could be said, however, that the programme has been quite consistent with such evolving resource-poor-farmer-oriented investment activities.

5.2 Benin

135. The SAFGRAD programme in Benin has been somewhat out of kilter with the broad objectives of the wider programme in two respects. As noted in the commentary on the proliferation and coordination of national FSR projects and programmes, the SAFGRAD initiative can no longer, if indeed it could at all at any stage, be regarded as the torchbearer of FSR ideology, methodology, technique and implementation in Benin.

136. Second, bearing in mind the "semi-arid" orientation of SAFGRAD as a broad agro-ecologically targeted technological thrust, the reality of

having so much of the Northern Benin work addressed to the Northern Guinean zone of the southern parts of the study area rather stretches the generally agreed concept of semi-arid ecologies. The below-average rainfall experienced in recent years rather "saves" the programme temporarily in this respect but, with the inevitable (eventual?) return of more favorable seasons, the thrust of the Benin work may well be seen as having been set in regions beyond the primary mandate region of the SAFGRAD program.

137. As noted in section 4.2, the FSR team and its achievements have been linked operationally to the Borgou Project I and, albeit in a presently somewhat confusing way, are associated with the Borgou project II. While it may not have directly led to the food crops programme of the second phase, the work and its importance were seemingly appreciated by its Appraisal Mission.

5.3 Cameroon

138. As noted in other sections, the geographic focus of the FSR team has been controversial and changing. The original committment was to base it at Maroua which was clearly in the SAFGRAD mandate area. As a USAID-funded TLU was already operating there (growing out of an earlier SAFGRAD ACPO) the team was obliged instead to set up at Garoua. Activities in 1986 were initiated in all directions from this regional center, but under donor pressure and SAFGRAD coordination, were shifted in 1987 to the north of Garoua thereby eliminating from further attention the sites located in moister areas of greater than 900 mm average annual rainfall. The work is thus presently (just) in line with the agroclimatological scope of the overall programme, at least according to most generally agreed definitions of what constitutes the semi-arid tropics.

139. There is now talk of shifting the team to Maroua, mainly to avoid excessive concentration of FSR activities around Garoua presently being initiated by a GTZ project and a major French enhancement of local agricultural research capacity. Needless to say, this would completely destabilise the team's research programme.

140. Our TOR obliged us to explore possibilities for FSR work in the Mandara Mountains. This could not be effectively run from Garoua but could, at some cost and inconvenience of 100 km commutes, be managed from Maroua. Putting aside problems of residential location of research personnel in the less developed infrastructure of Mokolo, it would possibly best be run from there.

141. In discussing such problems and possibilities, the national authorities with whom we met were quick to see yet another donor possibility for an area for which there is presently no problem of crowding, yet in an area which has been a declared priority zone for some five years awaiting availability of national (or other) resources to initiate research work. Agricultural research, particularly of an FSR orientation, is seen as an essential element of any integrated rural development scheme that may be implemented in the Mandara Mountains.

142. From a SAFGRAD perspective, initiating work in such an elevated area with rainfall averaging 800-900 mm, would take its work into an extreme segment of its mandate area that is probably representative of only relatively small areas of the least favoured natural resources. Here unfortunately, are the worst opportunities for successful technological innovations associated with crop varieties and agronomic practices. The reason for contemplating such difficult work at all should not, however, be forgotten for it is here too that the harsh realities of severe impoverishment of people and degradation of the natural environment are located.

143. In short, the FSR team in Cameroon has not led to any concrete new investment or development activities and has yet to contribute to the improvement of existing farming systems, production or the welfare of small-scale farmers.

6 INTER-AGENCY RELATIONSHIPS IN BURKINA FASO

6.1 Relationships involving the FSR team

144. SAFGRAD-INERA. INERA has shown a high degree of interest in the FSR activities supported by SAFGRAD. The NFSRP is, together with Soil and Water Conservation, one of the two departments which have been given priority in the INERA development plan. The SAFGRAD FSR team is expected to play a key role in development of this department.

145. However, in spite of the fairly complete integration of the FSR team within INERA and of appropriate institutional linkages between INERA and SAFGRAD, the day-to-day working relationships between the FSRT and INERA were rendered difficult by (a) the lack of matching resources for INERA to support the programme appropriately and, (b) the seemingly insufficient efforts made by the team to involve national scientists in their work.

146. Two of three national counterparts had to leave the team, one for futher training abroad, the second one being promoted to Director of a research station. Although the expatriate agroforester was recruited in March 1987, no national counterpart could yet be recruited. The counterpart team is today reduced to one animal scientist. This instability of the national team has been very damaging to the building of proper communication mechanisms between the FSR team and the INERA. Most INERA disciplinary departments are not in a position to support properly the FSR work. They are often understaffed and have very limited resources. This has also contributed to the tendency for the FSR team to work independently from these departments.

147. Both lack of resources on the INERA side and lack of concern to involve national researchers on the FSR team side, have resulted in a relative isolation of the FSR team within INERA. The Mission nevertheless believes that the situation is evolving positively, considering that open discussions between INERA and SAFGRAD have now led to a better definition of the respective responsibilities. The funds are jointly managed by the FSR team leader and the national head of the research station and, as well, the FSR programmes are now being defined in close collaboration with the NFSRP management.

148. Moreover, INERA has committed itself to recruit three counterparts before the beginning of the next agricultural season. The INERA development plan includes the involvement of the FSR team in the setting up and training of three other national FSR teams. This responsibility will push the team to interact more comprehensively with national researchers.

149. SCO - FSR team. The SCO and the FSR team interact mostly at the scientific and administrative levels. The Director of Research is extensively involved in the definition of the orientation of the research programme. He seems to provide generally adequate scientific backing to the team, given the proviso noted in the final paragraph of Section V ii (p. 6).

150. The SCO - FSR team relationships seem to be heavily affected by the administrative problems faced by the team, particularly in terms of budget flow. The delays that the team experiences in getting the budgets make its tasks considerably more difficult. The research programmes are directly affected and a feeling of unrealiability develops within the team, each researcher wondering whether the next budget tranche will come on time or whether his work will have to suffer delays.

151. When delays occur, the team tends to believe that the SCO is responsible, whereas it appeared to the Mission that such delays at the field level seem to be the result of an accumulation of delays in the budget flow between Rome and the FSR team (as discussed in Section V i second paragraph).

152. The Mission, therefore, recommends an increased specification of detail and generally greater transparancy in the budget management at the SCO level, in order to avoid unfounded tensions between the SCO and the FSR team.

6.2 Implications for the FSR Programme of the World Bank-Supported Research Project

153. A significant part (some US$ 4 m) of the World Bank and others-supported strengthening of agricultural research capacity in Burkina Faso (about US$ 19 m over 5 years) is planned to be taken up by USAID to foster FSR in INERA. This will involve a major contract with an American university. This component has yet to be designed (scheduled for January 1988) and approved (possibly April 1988). Implementation could perhaps be initiated around September 1988. It seems likely to involve, inter alia, three resident advisers and about six long-term advanced training fellowships. Clearly, much thought will need to be given by the designers of the USAID component to the role of the present SAFGRAD FSR programme in the overall INERA enhancement.

154. A plan that appeals to the Mission is as follows: (a) Sustain the present FSR team as a Central Plateau focused team, effectively integrated within INERA; (b) Use it as a model for, and an advisory unit to, the proposed FSR units in other regions and ecologies in Burkina Faso. In

this way it may be possible to achieve some of the broad general purpose of demonstrating to other national programmes the effective implementation of a problem-solving applied agricultural research unit. This model recognizes that it has taken considerable time and effort to set up the FSR team, that it is still rather young in its research achievement, and that early and premature closure of the initiative would greatly constrain the opportunity to realize a decent return on the investment in it. The idea of increasing the continuity between successive external initiatives directed at technology-based improvements in the welfare of resource-poor farmers, rather than the stop-go nature of the past, commends itself greatly to the Mission.

155. There are, of course, other possible responses to the still uncertain USAID project and the World Bank-supported strengthening in general. One would be to scuttle the FSR team completely in favor of the new one on grounds of giving a "clean slate" to INERA to develop its own fresh approach based on its past experience with FSR team and the antecedents. This seems quite undesired and unacceptable to the national authorities.

6.3 Implication for the FSR Progamme of the IFAD Soil and Water Conservation and Agroforestry Project in the Mossi Plateau

156. The objective of the SWC and agroforestry (AGR) project is to enhance the target population's on-going efforts for the development of SWC and AGR in order to improve the security of subsistence crop production, the provision of tree-based products, working conditions, income, and living standards in general.

157. In order to achieve these objectives, the project foresees investments in the following components: SWC (US$ 4.51 m); Agroforestry (US$ 0.38 m); Crop Intensification (US$ 0.88 m); Research and Development (US$ 0.29 m); Village Development Fund (US$ 0.66); and Institutional Stregthening (US$ 4.50 m). Cooperation between the FSR team and the SWC and AGR project could be developed for the implementation of the first four components.

158. In fact, the FSR team has some experience and some research capacity which could be very well tapped in the future by the Project and its Central Planning Unit (CPU). The necessary condition for this cooperation to become effective and fruitful is the establishment of good working relations between the FSR team and other relevant elements of INERA, and the CPU, and the adoption by the FSR team (agroforester excluded) of a more dynamic and participatory approach to the development of the Mossi Plateau.

159. The experience of the FSR team that could be useful for the implementation of the SWC-AGR project includes the following:

(a) The presence in the team of an ICRAF trained agroforester, one of the few agroforesters in Burkina Faso and perhaps the only one able to carry out field activities. This agroforester has a good perception of FSR, interdisciplinary work, good contacts with Burkina Faso institutions interested in

agroforestry (INERA, IRBET, Ministry of Environment, etc.). Its "Report on Diagnosis and Agroforestry Proposal for Kamsi Village" in the Mossi Plateau (one of the villages in which SAFGRAD activities are concentrated) is good and it is conceptually and programmatically close to the SWC and AGR project. The activities proposed in this programme to be initiated in early 1988 are alley cropping, intercropping, living fences, introduction of fruit tree species, and identification of simple technologies in order to have effective tree nurseries at the village level.

(b) In the field of agronomy the team has accumulated some experience in the response of improved varieties to improved practices and to local conditions, for example Framida (red sorghum), ICSV 1002 (white sorghum), 82-S-50 (a traditional variety from Mali, reconstituted by ICRISAT, which is showing consistently superior yield performance in farmers' fields).

(c) In the field of animal husbandry, SAFGRAD-INERA preliminary results indicate that the SWC AGR project may usefully consider the following technologies for possible extension: use of varieties of cowpea and other leguminous crops that are dual purpose for production of forage and soil improvement materials; stall feeding of small ruminants; construction of small ruminant sheds with local materials, construction of manure pits, intercropping of D. lablab with sorghum; supplementation of native pasture hay with forage legumes for the feeding of young Djallonke lamb (Mossi Plateau local breed) or larger framed cross-bred lambs.

7 BORGOU PROVINCE RURAL DEVELOPMENT PROJECT II - FSR TEAM RELATIONSHIP

160. The Borgou Province Rural Development Project I has been funded through CARDER-BORGOU by the World Bank and other co-financiers including IFAD, starting from 1982. The project is coming to an end as of 30 June 1988. A second phase, Borgou II, is presently being negotiated between the Government of Benin and several donors (IDA, CCCE, BOAD, IFAD, etc.).

161. The Borgou region represents 45 percent of the national surface and 15 percent of the total population. Its development in the past was mostly based on cotton, in which the Borgou I project played a significant role. Considering the sharp fall in the international cotton price in 1985 and 1986 and the implications it has on regional agriculture, the government of Benin decided to diversify its support policy to the rural sector, giving more importance than in the past to food crops and alternative cash-crop development. In this particular context, a significant food-crop agricultural research component, including both disciplinary on-station and on-farm farming systems research is to be included within Borgou II. After reviewing the Ina station research programme with its SAFGRAD-sponsored component, the Mission feels that the funding of research activities through Borgou II is well justified, as indicated in the Jacques Gillain Study Report, October 1987.

162. Although it was not in its TOR to review this report, the Mission felt it impossible to envisage the relationships between SAFGRAD and Borgou II without referring to it. The Mission feels that some of the conclusions of this report concerning the transition from SAFGRAD to Borgou II should be carefully examined before any definite implementation decisions be taken.

163. The report expresses a view that the team has not been doing FSR at all and thus it imputes little value to the team for any further FSR activities within Borgou II. The SAFGRAD FSR team, although it has faced some difficulties, has accumulated experience and has acquired a good knowledge of the regional agriculture. It has shown its high commitment to the work and has developed valuable relationships with the Ina research station, DRA and CARDER. An appropriate conceptual framework for FSR was developed with the SCO and is a valuable basis for building further FSR activites in the region. The Mission therefore strongly feels that the FSR activities within Borgou II should build on of this experience, and that any disruption in these activities should be avoided.

164. The report also considers the possibility of reducing the team from three members to only one. The Mission feels that this, if possible, should be avoided and that, considering the weak resources of the DRA at the Ina station, one expatriate only would be quite insufficient to implement anything like the proposed FSR activities. It seems very premature to deprive the team, only complete for the past six months, of any of the disciplinary competencies that it now has.

165. Last, but not least, the Mission feels that the report overlooked the problem of transition from SAFGRAD to Borgou II. At present, the SAFGRAD-IFAD funds only ensure the team's functioning until the end of April 1988. The most optimistic outlook is that the coming Borgou II funding could start only in July 1988, without taking into account possible administrative delays. This gap in funding must be addressed by IFAD in order to maintain continuity and, most importantly, morale and productivity. A strong training component should be included within Borgou II in order to allow the building up of a national team in the field of FSR. This national team is the only insurance of continuity of the FSR work that needs to be undertaken. It is a necessary condition for eventual success, with both agricultural research and development being essentially long-term issues.

8 FEASIBILITY OF INITIATING FSR IN THE MANDARA MOUNTAINS

166. In principle, the approach of FSR can be implemented anywhere, anytime. This is not to suggest that the opportunities for success, the costs of implementation and the particularities of the eventual work are in any way uniform, constant or even readily assessable. Indeed, part of the essence of the locational specificity of such work is the intrinsic uniqueness of each of these important matters.

167. The Mandara Mountains area is a well defined geographic region with a high population density of very impoverished rural people challenged by severe scarcity of generally poor resources. Apart from the small areas

of valley bottoms, slopes are steep but well terraced, soils are thin, stoney and severely degraded both physically and chemically. The occupants of this scenic but agriculturally very challenging landscape have been pushed into it through the immigration of other ethnic groups into the more favourable surrounding flatter and more fertile lands. They thus represent a relatively and absolutely extremely disadvantaged group that has thus far been bypassed by the technological advances of modern agricultural science, not to mention other important infrastructural enhancement such as health, education, physical infrastructures and, most especially, water supply.

168. The scene is thus set for a potential FSR intervention. Parallels for this exist in other analogous ecologies in densely-populated elevated semi-arid areas of Benin (Atakora region), Ethiopia, Mali (Dongon Region), Nepal, Peru and Pakistan, to mention just a few. The general experience is, predictably, that progress is at best slow and uncertain. Without associated (and very often uneconomic) investment in irrigation facilities, the opportunities for agricultural improvement are very confined. Introduction of modern varieties of, say, sorghum and millet can increase both potential and actual yields of foodgrains but invariably at the cost of reduced productivity in terms of stalks (vital for housing and construction) and forage (valuable and critical in supporting the generally malnutritioned livestock). To put it bluntly in colloquial economic language, "there is simply no free lunch to be had." Some small gains can probably be made but they will indeed be small.

169. Notwithstanding this pessimistic introduction, the early harvest from the diagnostic phase of an FSR programme would surely prove rewarding in clarifying and quantifying the structure of rural society, its aspirations and constraints. Further up-to-date data on these matters will be important in planning for development that must surely involve significant out-migration to reduce the pressure on the fragile resource base.

170. Defining and testing technological innovations intended to reduce the confining consequences of identified constraints will be slow and frustrating because there has been very little locally relevant research experience from which an applied FSR programme could benefit. The main significant previous activity was the documentation of the prevailing resource situation in the early 1980s by a USAID-sponsored team contracted through Michigan State University. Research workers, including the plant breeders and agronomists, at the closest IRA research station at Maroua have not had the resources to take their materials and techniques to the Mountains. They have devoted their scarce resources to the plains, which they have perceived as having greater productive potential as well as economic importance. This situation is unfortunate indeed and, whatever may be decided about FSR for the Mountains, IRA should make a start on agronomic field work there as soon as is possible.

171. The foregoing cautionary remarks are intended to avoid the emergence of unrealistic expectations about what could be done in a new local FSR programme. Such a programme could be handled in many different ways and on different scales. Given the marginal economic worth of the activity, any programme seems destined to be small. Suppose, for the purpose of a more concrete discussion, that three professionals (technically

backstopped by six technicians) are to be assigned to the task for an initial phase of, say, three years. It should be immediately noted that any signifiant impact of a programme would take rather longer than this initial phase to become apparent.

172. The composition of the team would probably evolve over time but initially could well be as follows: (a) Anthropologist, preferably female, to come to grips with the prevailing social attitudes to resources and to change; (b Agronomist, preferably male, to examine local agronomic practice and to explore innovative materials and techniques, including forages and trees; (c) Agricultural Economist, either sex, to document the resource base, the economic structure of farms and the region generally, and to evaluate the economic performance and acceptability of alternative practices and strategies. This person should ideally have cogent experience with both the economics of livestock and the analysis of risk in agricultural decision making.

173. Assembling such a team will not be easy. For a start, it will not be easy to recruit any good professional to live in the Mandara Mountains for a sustained period, remote as it is from the facilities and comforts of more favoured parts of Cameroon. For some, the limitations of local schooling will be a serious impediment. Second, there is a severe shortage of well trained and willing national professional research personnel. This is especially the case in social anthropology and agricultural economics. The situation is not much better internationally, and an international recruitment would make the enterprise much more expensive and probably much less effective in implementation than a national model. As these difficulties are noted, it becomes clearer why the national authorities have had the Mandara Mountains as a priority concern for several years yet thus far have failed to take action.

174. To summarize, a FSR component of a regional development thrust is a necessary one but it is no panacea. It will be difficult to implement and, while intrinsically useful, will be quite bounded in achievement and potential.

9 INTERACTIONS BETWEEN IARCS AND THE FSR TEAMS

9.1 Burkina Faso

175. The history of international center and team interactions has necessarily been as brief as the existence of the FSR team concerned. The centers have readily supplied their plant materials and other technological elements but, despite the physical proximity of their base offices at the Burkina Faso National Agricultural Research Institute, Kamboinse, have seemingly not been very active in the FSR team work programme. Relatedly, there seems to have been some feedback of information from the FSR team to the centers. Certainly this has been a feature of the work of the antecedent teams (particularly vis-a-vis ICRISAT and IITA) but perhaps, for the moment, the major lessons have been learned.

176. The early lessons concerned primarily the lack of acceptability of cultivars that variously featured inadequate disease resistance (some cowpeas and sorghums) and drought tolerance (some maize and sorghum materials) or poor taste/quality attributes (some cowpeas and sorghums). The centers have gradually developed materials that are more acceptable in these respects and farmers have correspondingly taken them up, particularly in the more favoured circumstances of the "coumpound fields" near the homesteads. As new materials and technologies become available, the teams can potentially continue to play a very useful two-way role in their refinement and application.

177. Beyond the major relevant plant breeding centers, two others have played useful roles in the team's work. ILCA has performed (on a commercial basis judged by the team to be quite expensive) chemical analysis for the animal nutrition work. It has also provided its much-appreciated Selective Dissemination of Information service on references, reprints of recent articles, etc. Otherwise there has been little contact and both parties could seemingly gain through more formal association.

178. The second additional center involved is ICRAF, and it has played a critical role in launching the agroforestry thrust. The training programme has clearly had a major influence on the direction that that part of the programme is taking.

9.2 Benin

179. Most of the IARC's have had only modest links with Benin. The major exception is IITA but it, in turn, has had its major contacts in the more humid zones than the region of most concern to SAFGRAD. The presence of ICRISAT is remarkably strong, however, and through the effective links with the Ina station, its advanced materials are readily available (although sadly not remarkably superior) to the team and others. The links are fine - it's the materials that are "lacking" in some important respect, whether it be disease reaction, grain quality, straw quantity and quality, length of the crop cycle, etc. Needless to say, IITA has had similarly effective provision of materials to the DRA Ina station. Feedback on the performance to the centers has been handled in an admirable manner. The difficulty in all this has been the centers' ability to provide materials that are remarkably superior to local cultivars in a comprehensive overall sense. Multi-objective plant breeding is intrinsically slower and more difficult than breeding for relatively simple (but potentially irrelevant) single objectives. ICRISAT and IITA are now, as a result of this "national" feedback, along with others, giving much greater attention to wider breeding objectives, and also to African cultivars, in their programmes.

180. The few links to other centers such as ICRAF and ILCA are much the same as those noted below for Cameroon.

9.3 Cameroon

181. The new agroforester, trained most recently at ICRAF, has that link well established. From her prior experience with ILCA, linkage with the forage and nutrition programme at ILCA should also develop smoothly.

182. The agronomist and economist both have prior experience with IITA headquarters and accordingly are very well tapped into that center's programmes. Locally, that is, at Maroua, links to the crop improvement work of ICRISAT and IITA, sponsored by USAID and managed by IITA outposted staff in collaboration with local scientists, are strong. So-called improved external-varieties of maize, sorghum, millet and cowpeas are readily available, although not dramatically superior in overall performance to locally selected materials.

183. The interactions between the team members and the international centers can thus be said to be strong, effective, continuing and evolving, in spite of the youth of the programme. This happy circumstance has arisen from both the personal backgrounds of the team members and the very strong center presence in Cameroon.

10 NETWORKING

184. The concept of networking, as that of farming systems research itself, means different things to different people. Much of the conceptual development and most of the experience with it can be traced through the commodity-based crop improvement programmes of the IARCs. The central ideas are that not all nations have the resources to handle all aspects of a research programme, and that nations facing broadly similar challenges in research have much to profit from shared experience, successes and failures. These ideas are combined in a model of cooperative effort whereby, through a process of discussion and consensus, different national programmes take on responsibility for different aspects of a more widely agreed upon research programme. Implementation is facilitated through well-supported regular contact between the participants, and the free and early sharing of successful research products, whether these be improved cultivars, modified research techniques and farm practices, or changed research priorities.

185. There have been several major programmmes of networking FSR work, usually regionally based and (especially when supported through an IARC) commodity oriented (in spite of the inherent inconsistency of such orientation with the rhetoric of wider systems concepts in FSR). The newly reactivated programme of the West African FSR network being managed through SAFGRAD's Coordination Office, now largely financed by IDRC and supported by France seems to be well conceived from such prior experiences. It should have a very useful role in integrating the sometimes differing francophone and anglophone experiences. More especially, it seems to be totally consistent with OAU ambitions and the SAFGRAD concept and ideals. Accordingly, the Mission is strongly supportive of this initiative within SAFGRAD. The inefficiencies of "rediscovering the wheel" can be, potentially, very effectively avoided through a mechanism such as this.

186. A note of caution must, however, be sounded. As the essential features of FSR include transdisciplinary cooperation at the local level and a presumably high degree of location specificity (in terms of physical, natural, social and economic dimensions of the environment) of research findings, the extent to which effective networking of discrete elements of FSR can be achieved is quite confined. Clearly it can work best where many important aspects of the environment are very similar across the countries participating in a network. Needless to say, the more such uniformity prevails, the less is the need and rationale for locationally decentralised and locally targeted FSR. These tradeoffs need careful contemplation prior to an efficient implementaton of a networking endeavour.

187. Such considerations fortunately do not intefere with the virtues of other networking activities addressed variously to (a) conceptual issues, such as systems thinking and systems approaches, (b) implementation issues, such as how best to organise, encourage and reward interdisciplinary work on farming systems and (c) training activities, including monitoring visits by participating research workers to particular field programmes as well as more formal educational experiences.

PART FOUR

SUMMARY AND CONCLUSION

188. The rationale of this research programme is to be found in the recurrent problems that in the early 1980s plagued rural Africa - particularly its semi-arid regions - the most important of which were a high degree of food insecurity, production based on the use of traditional know-how, lack of adequate investment in agricultural research, lack of proven locally-adapted improved technology, and a generally very low level of economic development. IFAD's Technical Assistance Grant 110 was conceived in order to cope with this environment, with the perception that somethings new must be tried.

A. The project was focused on disadvantaged areas characterised by extremely impoverished, agriculturally-dependent populations living in areas of rather low (less than 1000 mm) but strongly seasonal and highly variable rainfall. These circumstances made for a natural marriage of IFAD and SAFGRAD.

B. The project was also focused on bridging a perceived and surely prevalent gap between technology generation institutions (including the IARCs) and the resource-poor farmers, using the methods of what has become known (if not universally agreed upon) as FSR. The most special feature of the project in getting this work under way was the recruitment of the technical assistance primarily from Africa.

C. Finally, the project was intended to develop national capacity for this sort of research and thus, through the three case-study country programmes, show the other 23 SAFGRAD Countries how such research work can and should be done.

189. The project has been fairly appropriately targeted in terms of A. There are surely more impoverished, more arid, and more variable environments in which the initial three programmes could have been placed, but those chosen are not inappropriate. The villages and households which are the main cooperators with the FSR teams are rather far from being the poorest and weakest in the research domains but are not too far.

190. The gap-bridging role B was definitely needed, especially since it does not fit well the operational mandates of the IARCs, and there is clearly a need for a much better two-way flow of materials and ideas between the farmers and the research centers. There has been no green revolution in the semi-arid tropics and it is not in prospect. Progress, if made at all, will be slow, but even small gains will be of profound importance to the households concerned. Plant breeding for multiple stress resistance and multi-purpose cultivars is intrinsically complex and slow. Measures relating to resource management, especially of soils and trees, depend crucially on custom, ownership or tenure, and attitudes of

farmers - none of which is very amenable to technological innovation and intervention, especially if it involves coordinated group action. The FSR teams in the field thus had a broad if not overwhelming research challenge to face.

191. The "Africanisation" of the technical assistance was a worthy experiment to have included in this project since previous experiences with non-African technical assistance have demonstrated that there are typically many difficulties of implementation and effectiveness with such assistance. The present project seems to suggest that much of the same sort of difficulties are experienced with the African "variety", suggesting to the Mission that such difficulties (as noted in section I) are not ethnically related but are inherent in external technical assistance. On the positive side, the African specialists involved now represent a new pool of talent and experience that must be useful for addressing Africa's problems. In a similar vein, the support of OAU and SAFGRAD in the implemented manner has been helpful to the continuing process of wider institution building in Africa.

192. On role C, the capacity building (and related demonstration effect) aspect of the project, the Mission must record some disappointment. The potential achievement and the reality of what has happened depend overtly on the degree to which support, especially through counterparts, has come from the national host agency. In all three cases this has amounted to a very small committment in absolute terms, although perhaps still a significant one in the context of a resource-starved national system of agricultural research. The national research directors, constrained as they are in access to both funds and personnel, have accepted the IFAD/SAFGRAD teams warmly but have used them in essentially substitutive modes. The short period of implementation combined with the scarce resources devoted to training has, of course, severely limited the possibilities for building the national research capacities.

193. The teams, meantime, have tried to get on with their work as best they could. Always under the umbrella of FSR rhetoric, but not always as well integrated and "systems oriented" as may be the ideal, they have launched a wide range of demanding and mostly highly relevant research activities. Their analyses of all the data so far collected still has a long way to go, but shows promise of being very instructive as to the constraints on and opportunities for technology development and transfer in the WASAT. Sharing of the emerging information with national bodies, regional authorities and IARCs is well institutionalised and functional. Given the "youth" of most of their work programmes, at least a further season of more-or-less their current activities seems worthy in order to yield a decent harvest of research findings from the initial investment. Gaps in continuity of support occasioned by alternative sources of funds must be quickly addressed in order to maintain continuity of the research activities.

194. The pioneering FSR projects can have a natural evolution into the agricultural technology supporting elements of integrated rural development projects when these eventuate, in that way evolving research programmes into a wider development process and using effectively the continuation of funding that goes with it. It is to be hoped that all

this can still take place essentially within the scope of the national research and extension system, so that even longer institutional life and contribution is facilitated.

195. A key question is how best to sponsor this sort of targeted research, and its sustained contribution to development. The present project has been rather fortunate in this regard, at least in Burkina Faso and Benin, whereby development/investment projects can take over the FSR work as part of the on-going technological underpinning of rural development initiatives. This sort of match may, however, not always be possible - unless exploratory FSR projects are deliberately sited and selected with a view to the likely future creation of an investment project. Rather than chance such happy confluences, IFAD may often best target its FSR support within the context of loan activities in which a research/technology creation function is important. Given the leads and lags that are unavoidable in research of any kind, but that attach especially to FSR in the WASAT, IFAD must be prepared to take a long-term view and seek to avoid "stop-go" discontinuities in supporting research projects that are inherently long-term in nature.

196. The networking idea of pooling national capabilities for wider regional benefits is an increasingly popular form of supporting research and development work. It works well where research resources in participating countries are scarce but where ecological similarity is such that things that "work" are applicable across a region.

197. The essence of FSR is its tuning of technologies etc. to the specifics of particular locations or domains. To the important extent that results/findings/superior technolgies/etc. are indeed rather specific to locations, FSR is not a natural candidate for networking (section 10). What is, however, very nicely amenable to networking is the training dimension of FSR, including the sharing of experiences of how to do or not do FSR. This latter role is important, particularly in sparing expenditures on "rediscovery of the wheel" and is deserving of considerable donor support including by IFAD.

Attachment 1.

TERMS OF REFERENCE

JOINT IFAD AND MINISTRY OF COOPERTION (FRANCE) REVIEW MISSION OF THE OAU/STRC/SAFGRAD FARMING SYSTEMS RESEARCH PROGRAMME (IFAD T.A. GRANT NO. 110)

INTRODUCTION

SAFGRAD is a regional research coordinating programme implemented by the Coordination Office of the Scientific, Technical and Research Commission of the Organization of African Unity (OAU/STRC). The SAFGRAD project works in cooperation with 28 Sub-Saharan member countries with the Coordination Office located in Ougadougou, Burkina Faso. The principal objective of the SAFGRAD project is to coordinate and strengthen national programmes in the semi-arid regions of Sub-Saharan Africa that are involved in improving sorghum, maize, millet, cowpea and groundnut yields.

In the West African Semi-Arid Tropics (WASAT), SAFGRAD coordinates a research and pre-extension programme. The regional on-station component research is headquartered at the Central Experiement Station at Kamboinse, in Burkina Faso and undertaken by IITA and ICRISAT. Another component of SAFGRAD is the Accelerated Crop Production Officers (ACPO) programme, which conducts regional pre-extension and demonstration trials. These programmes are financed by USAID.

An integral part of the overall SAFGRAD activities in the region is the farming systems research programme which provide linkages between on-station research, the ACPO/extension programmes and the farmers. The FSR teams are located in Burkina Faso, Benin and Cameroon, meet yearly with other staff of SAFGRAD, and submit an annual report to SAFGRAD's Technical Advisory Committee (TAC). The TAC reviews the research programmes and submits the findings and recommendations to the Consultative Committee (CC), which is a management and policy committee for SAFGRAD. The research results are passed on to research and extension institutions of the host country.

Within the SAFGRAD framework, the FSR programme for Burkina Faso, Benin and Cameroon was established under funding by IFAD. This research programme builds on earlier FSR implemented by Purdue University for seven years up to June 1986, which developed methodological guidelines for FSR. The specific objectives of the research are:

1. to identify the main constraints to increased food production by small farmers in WASAT;

2. to identify technologies appropriate for farmers which could overcome the production constraints;

3. to develop and implement a multidipsciplinary research programme which leads to production technologies capable of sustaining

the farming system under the existing environment, including livestock and agroforestry;

4. to identify elements of the problem solving-oriented research which could be implemented in national FSR programmes and development projects;

5. to train host country personnel to assume increasing responsibility in their contribution to research;

The IFAD-financed research programme has been under implementation over the past four years.

The Strategic Issues

The Review Mission is expected to evaluate the performances of the programme and identify its potential strengths and weaknesses. In particular the Mission should take into consideration the following strategic issues:

I The Mission is expected to review the progress of the programme within the overall strategy of SAFGRAD in relation to the other components of SAGRAD financed by USAID. The approach of FSR by SAFGRAD through provision of TA teams to support national programmes needs to be assessed in relation to alternative approaches for provision of support to national research and extension services.

II The linkage between SAFGRAD and national programmes is crucial to its success and the Mission is expected to appraise these linkages with a view to pointing out the constraints and advising ways to address them.

III The technology generation component implemented by IITA and ICRISAT is crucial to provide improved technologies to be tested under FSR by SAFGRAD. The linkage between the two programmes and the role the Coordination Office assumes in this regard are crucial and need to be assessed.

IV The issue of sustainability is crucial to successful introduction of new FSR in the WASAT region. The extent to which the research programmes of SAFGRAD address this issue requires careful consideration.

V. The administrative and financial control of the programme as well the leadership of the coordination office in backstopping and guiding the work of the FSR teams needs to be assessed.

Specific Issues

1. Evaluate the 1984-1987 work programme implemented by SAFGRAD in the three countries (against set objectives and targets, as a whole and in its components), including an assesment of the appropriateness of the research methodology, as well as whether the research has a systems rather than a discipline approach.

2. Evaluate the 1988-90 work programme to be proposed by SAFGRAD as a whole, and its components.

3. Assess the extent to which the programme was able to build FSR capacity in the three countries.

4. Review and assess the interactions which have taken place, country by country, between the programme and development projects (i.e. CARDERs in Borgou and Atacora Provinces in Benin; Sodecoton in Cameroon, etc.)

5. Assess whether the location in which the SAFGRAD FSR programme is implemented:

   a. is in line with the overall scope and objectives of the programme;
   b. led to investment opportunities and possible development activities in view of improving existing FS, production and small farmers' welfare.

6. With particular reference to Burkina Faso, assess the relations existing between the FSR team, the SAFGRAD Coordination Office and INERA, and what are/would be the implications for the programme of

   a. the World Bank-financed project for the strengthening of the country's research capacity;
   b. the IFAD project proposed for Soil and Water Conservation and Agroforestry in the Central Plateau.

7. With particular reference to Benin assess the relations that have been/should be established with the Borgou Province Rural Development Project II.

8. With particular reference to Northern Cameroon, assess the feasibility of initiating FSR studies in the Mandara mountains.

9. Assess the interactions between IARCs (IITA, ICRISAT, ILCA, ICRAF etc.) and the SAFGRAD teams, in terms of amount and adequacy of the technologies generated by these centers and to be adapted by SAFGRAD to local conditions as well as of the feedback of information from the SAFGRAD teams to IARCs and national research organisations in order to make the design of new research problem-solving oriented.

10. Assess the potential impact of FSR networking on the improvement of national research programmes and evaluate whether the "network" concept could be an alternative appropriate channel to support the development of National FSR capacity within SAFGRAD member countries.

Composition of the Mission

Prof. Jock R. Anderson, Head, Department of Agricultural Economics and Business Management, University of New England, Australia - IFAD consultant (Mission Leader)

Mr. Hervé Wibaux, GRET, Paris, France; Ministry of Cooperation (France) consultant (Mission Member)

Dr. Piero Bronzi, Technical Advisor, IFAD (Mission Member)

In Burkina Faso the Mission will be accompanied by Mr. C. Sourang, Project Controller, IFAD. In Cameroon, the Mission will be accompanied by Ms. H. Trupke, Project Controller, IFAD. In Benin the Mission will be accompanied by Mr. A. Jazayeri, Project Controller, IFAD.

Details of the Tentative Schedule

Drs. Anderson and Wibaux: expected arrival in Rome 23.11.87

23.11	Monday	AM Arrival of Mission in Rome. PM Briefing of the Mission at IFAD
24.11	Tuesday	AM Briefing of the Mission at IFAD PM Rome-Paris (AF635 19:30 - 21:30)
25.11	Wednesday	Paris-Ouagadougou (UT831 09:50 - 15:35)
26.11	Thursday	Ouagadougou: Meeting with National Research Authorities, SAFGRAD officials. Programme Review Meeting
27.11	Friday	AM Field Trip - Animal Husbandry, Agroforestry PM Program Review Meeting
28.11	Saturday	Program Review Meeting Review Proposed Programme 1988-1990 Ouagadougou-Cotonou (RK300 12:30-20:25)
29.11	Sunday	Field trop to Mossi Plateau: Soil and Water Conservation, Continuous Survey, Agroforestry
30.11	Monday	AM Debriefing with SAFGRAD Management PM Ouagadougou-Lomé (RK102 12:15 - 16:00) Lomé-Cotonou by car. Overnight in Cotonou.
01.12	Tuesday	AM Cotonou-Parakou by car. PM General briefing by SAFGRAD researchers
02.12	Wednesday	INA Meeting with Research Authorities and Cader Bourgou Officials Program Review Meeting
03.12	Thursday	Program Review Meeting; Review Proposed Program (1988-1990)
04.12	Friday	AM Parakou-Cotonou by car PM Cotonou-Douala (RK108 17:50 - 19:15)
05.12	Saturday	Douala-Maroua (UY796 8:00-11:20) Maroua PM Meeting with National Research Authorities
06.12	Sunday	Field Trip
07.12	Monday	Maroua: Program Review Meeting
08.12	Tuesday	Maroua: AM Program Review Meeting PM visit of Mandoura Mountain
09.12	Wednesday	Maroua: Review of Proposed Program
10.12	Thursday	Maroua-Yaounde (UY787 15:00-18:00)
11.12	Friday	Yaounde AM: Meeting with National Research Authority PM Yaounde-Douala (UY789 16:00-16:30)
12.12	Saturday	Douala-Paris (UT706 10:30-16:15) Paris-Rome (AZ634 16:45-18:35)

List of Background Materials

1. Farming Systems Research in the SAFGRAD Project in West Africa, by F. Couprie, D. Gibbon and F. Nweke, January 1984.

2. President's Report and Recommendation for T.A. Grant 110, 18th Session, April 1983.

3. President's Report and Recommendation for T.A. Grant 110, 22nd Session, September 1984.

4. President's Report and Recommendation for T.A. Grant 110, 26th Session, December 1985.

5. President's Report and Recommendation for T.A. Grant 110, 30th Session, April 1987.

6. BTO Report by P. Bronzi to A. Kesseba, 10 March 1986.

7. BTO Report by P. Bronzi to A. Kesseba, 27 March 1987.

8. 1985 Burkina Faso, FSR Report.

9. 1985 Benin, FSR Report.

10. 1986 Benin, Preliminary FSR Report.

11. 1986 Cameroon, Preliminary FSR Report.

12. 1986 Burkina Faso, Preliminary FSR Report (with 3 annexes).

13. Reconnaissance Survey of FSR in the Mossi Plateau.

14. 1987 FSR Proposed Programme.

15. USAID SAFGRAD Project Data Sheet (1987-1988).

16. FSR Project Proposal (1988-1990) Draft.

Report Writing

Upon their return to IFAD, Rome, on or about 12 December 1987, the Mission should submit a Back-to-Office Report summarizing the Mission's findings, outstanding issues, and recommended follow-up actions. Then, the members of the Mission will write their respective Working Papers (Annexes) to be summarized, under the guidance of the head of the Mission. The final draft of the Review Mission's report will be submitted not later than 22 December 1987.

Attachment 2.

Officials and Scientists Contacted During the IFAD Review Mission

A. BURKINA FASO

OAU/STRC/SAFGRAD

Dr. Papa Daouda Fall	Assistant Executive Secretary OAU/STRC Lagos
Dr. Joseph Menyonga	International Coordinator, SAFGRAD
Dr. Taye Bezuneh	Director of Research, SAFGRAD
Dr. Gerbrand Kigma	Senior Project Officer, SAFGRAD-USAID
Dr. Leopold Farambi	Chairman, Oversight Committee, SAFGRAD
Dr. Tadesse Kibreab	Team Leader, Agronomist, SAFGRAD
Dr. Kassu Yilala	Livestock Specialist, SAFGRAD
Dr. Yves C. Prudentio	Agricultural Economist SAFGRAD
Mr. Amadou S. Niang	Agroforester, SAFGRAD
Mr. Ouedrago Saidu	SAFGRAD Senior Technician, Kamsi
Mr. François Kabore	SAFGRAD Senior Technician, Kamsi
Mr. Charles Karambiri	SAFGRAD Senior Technician, Kamsi

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

H.E. Clement Ouedrago	Minister
Mr. Youssoufou Millogo	Secretary General
Dr. Guissa Konate	Director, INERA
Mr. P. Celestin Belem	Head, Agronomy FSR, INERA
Mr. Hamidou Tamboura	Head of Station, Kamboinse
Mr. Adama Sottoro	FSR
Mr. Sibiri Zoundi	FSR
Mr. Leopold Some	ESFIMA
Mr. Clementine Dabire	Head of Programme, OLAG
Mr. Roger Zangre	Somina Kambiouse
Dr. G. Edouard Bonkoungou	Researcher, IRBET
Mr. Jean Marie Ouadba	Researcher, IRBET
Mr. Xavier Pesme	IRBET - CTFT

USAID

Mr. Herbert Miller	Mission Director
Mr. Michael Sullivan	Project Officer

IITA KAMBIONSE

Dr. J. Suh	
Enthomologist	
Dr. H. Hilantha	Soil Scientist
Dr. V. Aggraval	Cowpea Breeder
Dr. M. Rodriquez	Maize Agronomist
Dr. A. O. Diallo	Maize Breeder

ICRISAT KAMBIONSE

Dr. C.M. Pattanyak	Team Leader

WORD BANK

Mr. Dirk Van Der Sluigs	Research-Extension
Mr. Dawit Deguefu	Training

B. BENIN

SAFGRAD FSR Team

Dr. Mulumba Kamuanga	Team Leader, Agricultural Economist
Dr. Robert M. Otsyma	Range Management - Agroforestry
Dr. Venuste Mr. Murinda	Agronomist

DRA

Mr. Benjamin K. Soude	Director
Mr. Jerome Ahouanmenou	Deputy Director
Mr. Emile Assan	Chef Service Etudes et Programmation
Mr. Mustapha Adomou	Chef de Station, INA
Mr. Sigisbert Dossou Yovo	URI, INA
Mr. Moutaharou Amidou	URI, INA
Mr. Abou O. Sauni	URI, INA
Mr. Barnabi Glele Mellou	URI, INA
Mr. Bidossessi Assan	URI, INA

CARDER BORGOU

Mr. Louis B. Dagan	Director General
Mr. Eugene Glele	Division Recherche Development
Mr. Lawin Victor	Directeur de la Production
Mr. Dovonou Roger	Directeur Suivi et Evaluation Interne

C. CAMEROON

SAFGRAD, FSR TEAM

	Team Leader
Dr. Dezi S. Ngambeke	Agricultural Economist
Dr. Lallan Singh	Soil Scientist
Dr. Wangoi Migongo-Bake	Agro-forester
Mr. Gregoire Mgongo	FSR/IRA-SAFGRAD

IRA

Dr. Ayok Take	Acting Director, IRA
Mr. Boli B. Zachee	Chef de Station, IRA Maroun
Mr. Joseph Martin	Cotton Agronomist, IRA
Mr. Alain Renou	Chief Textile Plant Programme, CIRAD
Mr. Indian Rao Meka	Sorghum and Millet Agronomist NCRA/IRA
Mr. Jacques Lançon	Cotton Program CIRD/IRCT/IRA
Mr. Jean Luc Chanselme	Cotton Producer CIRD/IRCT/IRA
Mr. Abba Adamou	Irrigated Rice, IRA
Mr. Terry Johnson	On Farm Testing IRA-USAID
Mr. Moffi Taama	IRA-Cowpeas USAID TOGA
Mr. Eyog Matig Oscar	Forestry Program, IRA
Mr. Mekontchou	Peanut Breeder, IRA

CIRAD FRANCE

Mr. René Billaz	Scientific Director.

SODECOTOM GAROUA

Mr. Gaudard	Director, Rural Development
Mr. Astom	Chief, Agricultural Research Section

Programme of the IFAD Review Mission, November - December 1987

Monday, 23 November
Mission assembled in Rome
Meeting with Dr. A. Kesseba

Tuesday, 24 November
Briefing by TRC
Departure of the Mission for Paris

Wednesday, 25 November
Arrival of the Mission in Ouagadougou
Meeting with the SAFGRAD officials

Thursday, 26 November
Meeting with SAFGRAD officials
Meeting with the Director of INERA
Review of the 1985-87 work programme with the FSRT
Meeting with the Director if IRBET

Friday, 27 November
Field visit to Kamsi village, one of the FSR primary sites
Meeting with the Director of the USAID mission in Burkina Faso.

SAturday, 28 November
Visit to Kambiouse station
Meeting with the Director of ICRISAT programme
Meeting with IITA regional staff
Review of the 1988-90 programme proposal
Informal meeting with World Bank officials with reference to the future Agricultural Research Project

Sunday, 29 November
Report writing

Monday, 30 November
Meeting with H.E. the Minister of Higher Eduction and Scientific Research
Debriefing of the Mission with SAFGRAD officials. Present to the meeting: Dr. Papa Daouda Fall, Assistant Executive Secretary OAU/STRC and Prof. L. Farakambi, Chairman of the Oversight Committee, SAFGRAD.
Departure of the Mission for Cotonou.

Tuesday, 1 December
Meeting with the Deputy Director of DRA
Departure by car for Parakou
Preliminary meeting with FSRT

Wednesday, 2 December
Visit of the Ina Station
Review of the 1986-87 work programme with FSRT

Thursday, 3 December
Meeting with the Director General of CARDER-Borgou
Review of the 1988-90 programme proposal

Friday, 4 December
Depart for Cotonou
Meeting with the director of DRA

Saturday, 5 December
Report writing
Departure for Douala

Sunday, 6 December 1987
Departure for Maroua
Preliminary meeting with FSRT and the Director of Research, SAFGRAD
Informal meeting with Mr. R. Billaz, Scientific Director of CIRAD

Monday, 7 December
Presentation to IFAD Review and CIRAD Misssions of the activities of IRA in Northern Cameroon
Departure for GAroua
Field visits of agronomic trials

Tuesday, 8 December
Field visit of agroforestry trials and demonstration
Review of the 1986-87 work programme

Wednesday, 9 December
Visit of Mandara Mountain
Arrival in Maroua

Thursday, 10 December
Debriefing with Director IRA station Maroua
Departure for Yaounde

Friday, 11 December
Debriefing with Acting Director, IRA Cameroon
Departure for Douala
Debriefing with SAFGRAD Director of Research

Saturday, 12 December
Departure for Rome

Monday, 14 December
Report writing in Rome

Tuesday, 22 December
Departure of the non-IFAD members of the mission

Attachment 3.

ORGANIZATION OF AFRICAN UNITY
SCIENTIFIC, TECHNICAL AND RESEARCH COMMISSION
(OAU/STRC)

FARMING SYSTEMS RESEARCH PROGRAMME

CONCEPTUAL FRAMEWORK OF THE IFAD-SUPPORTED FSR ACTIVITIES

The Coordination Office
OAU/STRC/SAFGRAD
BP. 1783 - Ouagadougou, BF

October, 1987

CONCEPTUAL FRAMEWORK OF THE IFAD-SUPPORTED FSR ACTIVITIES

The focus of the Semi-Arid Food Grain Research and Development project SAFGRAD has been to provide the knowledgeable base necessary to achieve significant increases in food grain production in its 27 member countries. FSR programmes are implemented to develop sets of location specific improved farming practices that could sustain high yields under small farm conditions.

The development of FSR varies considerably among countries influenced by previous experiences, prevailing constraints, the availability of research results, manpower, financial resources and institutional environment. A broad analysis of the physical environment in which the application of technology occurs is a prerequisite for the development of the FSR programme. FSR should be based on farmers' goals and preferences, and the social and biological environment within which particular constraints and sub-system of production operates. The FSR conceptual framework brings together on-station scientists and development planners to a closer understanding on the perspectives of total farm interactions. The FSR process allows a "holistic approach" rigourous testing of technological innovations not only to attain increased yield but also to ensure that new practices are adaptable, profitable and sustainable.

The FSR development programme that is being pursued througgh the IFAD support comprises of sub-systems of production (such as cropping, livestock, agroforestry, etc..) and management of available resources (such as labour, land, capital, off-farm activities). FSR is based on systems approach and looks into the interactions, interdependance of the sub-systems of production in order to optimize recycling

of resources and economic complimentarity among FSR components under specific environmental and socio-economic condition. FSR philosophy and methodology is that it places special emphasis in the systems approach in the design and dissemination of improved agricultural technologies based on the farmers' need. An FSR team of multidisciplinary nature work together to identify farmers' constraints so that new technologies and research results from research stations can be adapted more closely to farmers' conditions and needs. Concurrently, the performance of improved technology and farmers' reactions to it, is fedback to thematic researchers and policy makers.

The productivity of a farm is a function of the environment and the management alternatives available. The latter refer to those factors which are subject to modification. These factors are researchable and can optimize agricultural productivity with respect to specified performance criteria. (6)

Approaches to FSR range from those which assumed that factors can be modified, such as public policy, to those which assume that only modest reforms within interventionist approach with marked changes. The second or submissive approach, however, gives rise to the design of technologies with a similar impact on the short term,(11).

FSR process

The objectives of the FSR process under various conditions is to analyse and understand farmers' production systems ; to identify constraints of food production and set out priorities of research ; with farmers' participation, to evaluate technologies to provide solutions so as to alleviate constraints ; to establish functional linkages with development units and to dynamize the national extension system through improved technical interventions ; to provide feedback into the research programme and improve its reorientation and allocation of resources ; and finally to influence agricultural research policy so that farmers would have the incentives to increase food production.

At the meeting of 2 - 3 March, 1987 of the IFAD supported FSR activities, the following definitions and overall conceptual framework was agreed upon(1,6) :

Definitions and clarifications

1. There is a need for a "hoslistic approach" to agricultural research.

The discussions focused about whether FSR should be considered as a methodology, a science, a discipline, a research approach or a methodological approach. It was finally agreed that FSR should be considered a "holistic research approach."

2. Characteristics of FSR

a. It looks at the farm as a whole, including family labour
b. It is an interdisciplinary research.
c. The farm includes subsystems which are :

- cropping subsystems
- livestock subsystems
- trees and shrubs, and
- off-farm activities.

3. FSR output

Expected output from FSR includes :

a. Generation of improved adapted technologies ;
b. Reorientation of agricultural research priorities, and
c. Provision of inputs into agricultural policy.

Institutional framework

It was unanimously agreed that the most appropriate institutional arrangement is an integration of FSR within National Agricultural Research structures (NARS). The question was then asked, "in what form should it be implemented ?". The existing institutional arrangements were reviewed and their advantages and disadvantages were pointed out :

(a) FSR as a department

Advantages

- horizontal connections with other departments ;
- vertical links with policy-making decisions ;

- strong and well defined operating procedures and operational set-up ; and
- could attract more resources.

Disadvantages

- could get too big and become competitive with other research departments ;
- could lead to overlapping of research mandates of different departments ;
- could create frictions and interdepartemental communication problems ; and,
- could tend to look inward rather than opening out, thus leading to "compartimentalisation".

(b) Interdisciplinary research committee

A typical example of such an institutional arrangement exists at Ahmadu Bello University in Nigeria (Faculty of Agriculture and Institute of Agricultural Research). Different programme leaders are requested to contribute their expertise to a common FSR programme. The basic idea is to have individual team members, provided by their respective departments, to work together on an FSR programme.

The advantages of such a committee are that it allows researchers to retain their departmental affiliation and identity, creates less friction between departments, has a better chance of transforming the methodology of agricultural research and of generating a long lasting programme.

As a disadvantage, it may not attract funds because the programme has diffused boundaries and departmental interests.

(c) Project

Acceptable, if established within the National Agricultural Structures.

In conclusion all three institutional arrangements have advantages and disadvantages. In order to choose the appropriate arrangement, each country should begin by studying its own National Agricultural Research structures. The programme should then try to establish research links with the national universities and get senior staff and students involved in FSR work.

FSR Stages

Pre-diagnosis

In the three countries of the IFAD supported FSR activities, a multidisciplinary FSR team untertook reconnaissance survey to identify primary and secondary problems of food production. Global constraints are well known to farmers themselves (i.e drought, soil fertility degradation, shortage of livestock feed during the dry season, etc.,). Critical and indepth literature review were carried out concurrently with field surveys to acquire broad base data on existing farming systems practices and improved technologies. Constraints were ranked according to their importance (although conditions may change). Research objectives and strategy were developed based on exploratory and informal surveys and following inventory of available technologies and resources. Reconnaissance surveys, furthermore, familiarized the FSR team with actual farm situations and farmers perceptions in making adjustments and solutions to specific constraints . (2, 7)

Diagnosis - is a descriptive phase and involves analysis of existing farming system practices inventory data of farm resources, where the total farm environment could be examined. During this stage, attempt was also made to understand farmers' decision-making process, goals, objectives and motivations as determinants that could affect the development of appropriate farming system. In general, the diagnosis phase could be viewed as qauntification of different farming systems variables i.e determination of the existing input/output coefficients and assessment and sequencing of known technologies to alleviate particular food production constraints (. 2, 4, 5).

Design stage

The need was expressed by the farmers for the current FSR programme to be formulated. This entailed broader participation and cooperation of commodity or thematic researchers, extension agents, farmers. A range of strategies are being identified to address constraints delineated in the prediagnosis and diagnosis stage. The designing of the FSR programme also much depends on research results and data base that could be available from experiment stations, through on-farm testing, technical information obtained from development agencies and on technologies that were being utilized by farmers .

Testing and evaluation

There is also a continuous dialogue among thematic researchers and FSR practioners whether initially evaluation of improved technologies should be carried out on experiment stations since conventional researchers test technologies in a disciplinary manner and not through an interdisciplinary research approach. Evaluation of research results through FSR approach takes into account linkages between sub-systems of production in order to exploit the recycling of resources and economic complimentarity among FSR components. Considering the technical and socio-economic determinants that affect the development of suitable farming system an interdisciplinary research team is required under farm conditions. The two approaches that were being employed to test technologies were :

(a) "Researcher-managed trials"
Within SAFGRAD FSR approach, technologies are initially evaluated by an FSR team at primary village sites. Once promising combination of technologies are identified several researcher managed trials are conducted on-farmers' field.

(b) "Farmer-managed trials"
Monitored by an FSR team, but implemented by farmers. Farmers themselves could also be responsible for testing, managing and implementing of trials.

Technology dissemination

Farmers themselves and the national extension or rural development agencies play a key role in the dissemination and application of technologies, as well as the implementation of research strategies. Some of the promising interventions which are technically sensible, financially profitable and socially acceptable to farmers have a good chance for adoption. One of the principal output of the adoption of suitable technology is to narrow the yield gap realized on-station, and that on-farmers' field. Farmers feedback on performance of technologies may also open new research opportunities.

In practice, FSR activities could be initiated at any of the stages mentioned above and much depends on available research results, information of farming practices and related development activites.

In Burkina Faso, during the first year (1985), testing and evaluation was continued on former FSU villages since socio-economic baseline data and technologies were available. The focus of the FSR activities during that year has been to verify various technological options that were recommended. Due to changes of research policy and reorientations, in Burkina Faso, it became necessary to change FSR sites. Diagnosis and design stages of FSR were carried out simultaneously, in order to identify and establish FSR activities at the current primary and secondary village sites in the Mossi Plateau. Testing and evaluation of technologies as well as their economic feasibilities through research and farmer managed trials were established on new sites since 1986.(7, 9, 11).

In northern Benin, FSR information was virtually lacking. Although the programme was initiated in March/may 1985, at the begining of the growing season, quick exploratory surveys were carried out. Concurrently, design and testing and evaluation of researcher managed trials were started in order not to miss the season. At the latter stages of development of FSR in northern Benin, existing farming practice, in the three ecological zones (northern Guinea savana, Sudan and Sahel savana) constraints and research priorities were established based on more refined farm resource surveys..(2, 3, 8)

IFAD-supported FSR activities in northern Cameroon became operational in 1986. Reconnaissance survey, assessment of available technologies, design of soil and water management conservation techniques and the evaluationof improved technologies were carried out simultaneously, since the data base for agronomic research was adequate. Continued resources inventory baseline studies have contributed not only to the identification of constraints but also indicated the need for functional linkages and indepth dialogue of the FSR team with on-station research, development agencies and farmers.(10)

Improvement of national FSR capacity is not an easy task and requires a long process, for the following reasons :

1. Perceptions of FSR vary considerably among researchers, policy makers, development agencies and research administrators.

2. Institutionalization of FSR within a particular NARS is slow and could delay the evolution of relevant farming system.

3. FSR scope was limited to cropping systems in many countries of Africa without concurrent integration of complementary sub-systems of production (i.e livestock, agroforestry, etc..).

4. The efficiency of external technical FSR support is much influenced by particular NARS research capabilities such as institutional setting, linkages, defined research objectives, priorities, and perception of FSR. As a result, the pace for developing relevant farming system is much influenced not only by available resources, environmental and socio-economic factors but also to the interactions of the above mentioned research parameters.

With regard to IFAD-supported FSR activities in the three countries (Benin, Burkina Faso and Cameroon), multidisciplinary research is pursued on FSR principles in order to tune technologies suitable to resource poor farmers "target group", of the project.

The emphasis of the project is to develop technologies that require low-input by optimizing the recycling of resources among FSR sub-systems of production with major emphasis of improving the total farm environment for productive agriculture. For example, the integration of animal production system enhances crop production through traction, incorporation of manure, construction of soil and water conservation structures and also provides economic incentives : meat, milk, labour, etc. Concurrently, crop residues, if properly utilized, not only can be used as livestock feed but also as mulch to improve the soil fertility, its texture and water holding capacity.

Through collaborative activities of ICRAF/SAFGRAD, the agroforestry sub-systems

of FSR was initiated in the three (in 1987) countries through IFAD support. This component of FSR , although an old practice, is a new research approach. Its integration to food production system contributes not only to the production of fuel wood, for construction, but also increase crop production by improving the fertility of the soil, water and soil conservation. Useful trees also serve as livestock feed. Forage legumes link crop and livestock production sub-systems (as source of feed and improvement of soil fertility through nitrogen fixation).

The IFAD-supported FSR programme is unique, in that, for the first time, (within national framework) it is evaluating the resource and economic complementarity of the above mentioned sub-systems of food production. Given adequate gestation period, for FSR development, it is expected that stable and sustainable systems of food production could be realized.

References

1. Collinson, M.P, 1982 — Farming Systems Research in Eastern Africa. The experience of CIMMYT and some national agricultural research surveys. International agriculture development paper n°3, Michigan State University, East Lansing.

2. Mulumba Kamuanga, 1987 — Concepts and Implementation of Farming Systems Research: Mimeo- A contribution to SAFGRAD FSR Unity Paper.

3. Ngambeki, D.S and B.J.Ndunguru 1986. An approach to increasing crop productivity under drought. A case of Northern Benin (In) Proceedings of the International Drought Symposium on Production of Food Grains (Editors, J.M Menyonga, Taye Bezuneh and Anthony Youdeowei). An OAU/STRC/SAFGRAD Publication (in press).

4. Norman, D.W etal, 1981 — Farm and village production systems in semi-arid tropics of West Africa 2 volumes, Hyderabad, India, ICRISAT.

6. Norman and D.C Baker, 1986 - Components of Farming Systems Research, FSR Credibility and Experiences in Botswana (In) Understanding Africa's Rural Households and Farming Systems 36-56 (Editors, Joyce Lewinger Moock) Westview Special Studies on Africa.

7. OAU/STRC/SAFGRAD — Programme Review of the IFAD FSR Grant Support n° 110, 2-6 March, 1987.

8. Prudencio, Y.C, 1986 — Reconnaissance Survey of Farming Systems in the Mossi Plateau of Burkina Faso.

9. SAFGRAD/Benin Annual FSR Reports , 1985 - 1986 .

10. SAFGRAD/Burkina Faso Annual Report 1985 - 1986.

11. SAFGRAD/Cameroon Annual Reports 1985 - 1986.

12. Tadesse Kibreab, etal FSR Conceptual Framework, consolidated paper 1987. Contribution to SAFGRAD FSR Conceptual Unity Meeting (Mimeo)

Attachment 4.

Chronicle of Events of IFAD-Supported FSR Projects (from SCO)

Activitités	Approximate date of execution
1. Establishment of Project Management Committee (PMC)	10 January 1984
2. Fielding of consultants	6 to 29 January 1984
3. Reports of consultants was received	21 February 1984
4. Second meeting of the Project Management	9 - 10 April 1984
5. Initiation of recruitment of FSR scientists	May - September 1984
6. FSR protocol of agreement with Burkina Faso was ready to be signed by July 1984 but delay to	October 1984
7. Interviews of FSR scientists	3 December 1984
8. Third meeting of PMC	4 December 1984
9. Acceptance of FSR positions by four scientists	March 1985
10. Start of Burkina Faso FSR	March 1985
11. Signing of FSR protocol with Benin	March 1985
12. Start of Benin FSR activities	April/May 1985
13. Recruitment of Agricultural Economist for Burkina	September 1985
14. Signing of FSR protocol with Cameroon	November 1985
15. Fourth meeting PMC	January 1986
16. Start of Cameroon FSR	February 1986
17. In-House Review Meeting	21 January 1986
18. Meeting of FSR team leaders & Director of Research	23 June 1986
19. FSR Monitoring tours	September/october 1986
20. FSR training for technicians	March/Avril 1986
21. Collaboration with ICRAF was initiated and recruitment of three Agroforesters	July/September 1986
22. Training of SAFGRAD Agroforesters	September/March 1987
23. Initiation of Agroforestry FSR component in the three countries	March 1987
24. In-House Review meeting	5 - 6 March 1987
25. Project Management Committee Meeting	7 March 1987
26. FSR workshop	May/June 1988

List of Publications Consulted by the Mission[1/]

General

OAU/STRC/SAFGRAD, Report on IFAD-Supported Research Coordination and FSR, by Director of Research, SAFGRAD, May 1984.

ICRAF, Agroforestry Research for Development in the Drylands of West Africa, A Project Proposal, June 1987.

OAU/STRC/SAFGRAD, Programme Review of the IFAD FSR Grant 110, 2-6 March 1987, Ouagadougou, Burkina Faso.

OAU/STRC/SAFGRAD, FSR Programme, Conceptual Framework of IFAD-Supported Activities, October 1987.

Burkina Faso

Protocol d'accord entre OAU/STRC et le Gouvernement du Burkina Faso pour le Project Conjoint 31 (SAFGRAD), October 1984.

Yves Coffi Prudentio, Crop and Livestock Production Systems in the Mossi Plateau, INERA/OAU/STRC/SAFGRAD, October 1987.

T. Kibreab, K. Yilala, C. Prudentio, A. I. Niang, Phase I: 1985-1987 Synthesis; Phase II: 1988-1991 Proposals, INERA/SAFGRAD, August 1987.

Amadou Ibra Niang, Village de Kamsi, rapport de diagnostic et propositions de recherches agroforestiers, INERA/SAFGRAD, September 1987.

USAID, Project Identification Document to Institutionalize FSR in Burkina Faso, 1987.

K. Yilala, S. Zoundi, Feed Resources and Animal Production Trials, 1986 Technical Report, INERA/SAFGRAD, October 1987.

T. Kibreab and A. Sohoro, Agronomic Trials Conducted by the National FSRP, Kamboinse Team, 1986 Technical Report, INERA/SAFGRAD, November 1987.

Ibrahim F. Ouali, Burkina Faso and the CGIAR Centers, The World Bank, Washington, 1987.

Benin

Protocol d'accord entre la OAU/STRC et la Republique Populaire du Benin pour le Projet Conjoint 31, (SAFGRAD), 12 Mars 1985.

1/ In addition to documents listed on page 5 of the TOR.

Ministère du développement rural et de l'action cooperative, DRA/OAU/STRC/SAFGRAD, Farming Systems Research in Northern Benin, Annual Report, 1986.

DRA/SAFGRAD Benin, FSR/Agronomy Trials 1985-1986 (Tables), 1987.

J. Gillain (IFAD consultant), Mission d'étude complementaire du projet Borgou II, Benin, 30 October 1987.

Ministère du développement rural et de l'action cooperative, DRA/OAU/STRC/SAFGRAD, FSR Project Proposal 1988-1991, and Annexes, October 1987.

M. V. Murinda and M. Kamuauga, Agronomy Research on Major Food Crops in Northern Benin: Review and Perspectives, Ministère du développement rural et de l'action cooperative, DRA/OAU/STRC/SAFGRAD, Draft, November 1987, and Annexes.

Ministère du développement rural et de l'action cooperative, DRA/OAU/STRC/SAFGRAD, FSR, Rapport de preparation de la Phase II, 1988-1991,

R. M. Otsyna, Livestock and its Integration into Traditional Farming Systems in Northern Benin, Ministère du développement rural et de l'action cooperative, DRA/OAU/STRC/SAFGRAD, Draft, October 1987.

R. M. Otsyna, M. Kamuanga, R. Dovonou, Potential of Agroforestry in Northern Benin, Ministère du développement rural et de l'action cooperative, DRA/OAU/STRC/SAFGRAD, Draft, Octover 1987.

Cameroon

Protocol d'accord entre la OAU/STRC et la République du Cameroon pour le Projet Conjoint 31 (SAFGRAD) du 12.11.85.

D. S. Ngambeki and L. Singh, FSR in Northern Cameroon, Annual Report for 1987, OAU/SAFGRAD, Cameroon, January 1987.

L. Singh, Preliminary Results of Agronomic/Soil Studies for the 1987 Crop Season, OAU/STRC/SAFGRAD, Cameroon, December 1987.

SAFGRAD, Proposal of SAFGRAD FSR Cameroon, 1988-1991, December 1987.

D. J. Campbell and D. D. Trechter, Strategies for Coping with Food Consumption Shortage in the Mandara Mountains Region of North Cameroon, Social Science Medicine, Vol 16, pp. 2117 to 2127, Great Britain, 1982.

T. Zalla, D. J. Campbell, J. Holtzman, L. Lev and D. Trechter, Agricultural Production Potential in the Mandara Mountains in Northern Cameroon, Working Paper No. 18, MSU Rural Development Series, Michigan State University, Michigan, 1981.

L. Lev, Some Departing Observations on the Mandara Mountains, Report No. 16, MSU/USAID, Michigan, April 1981.

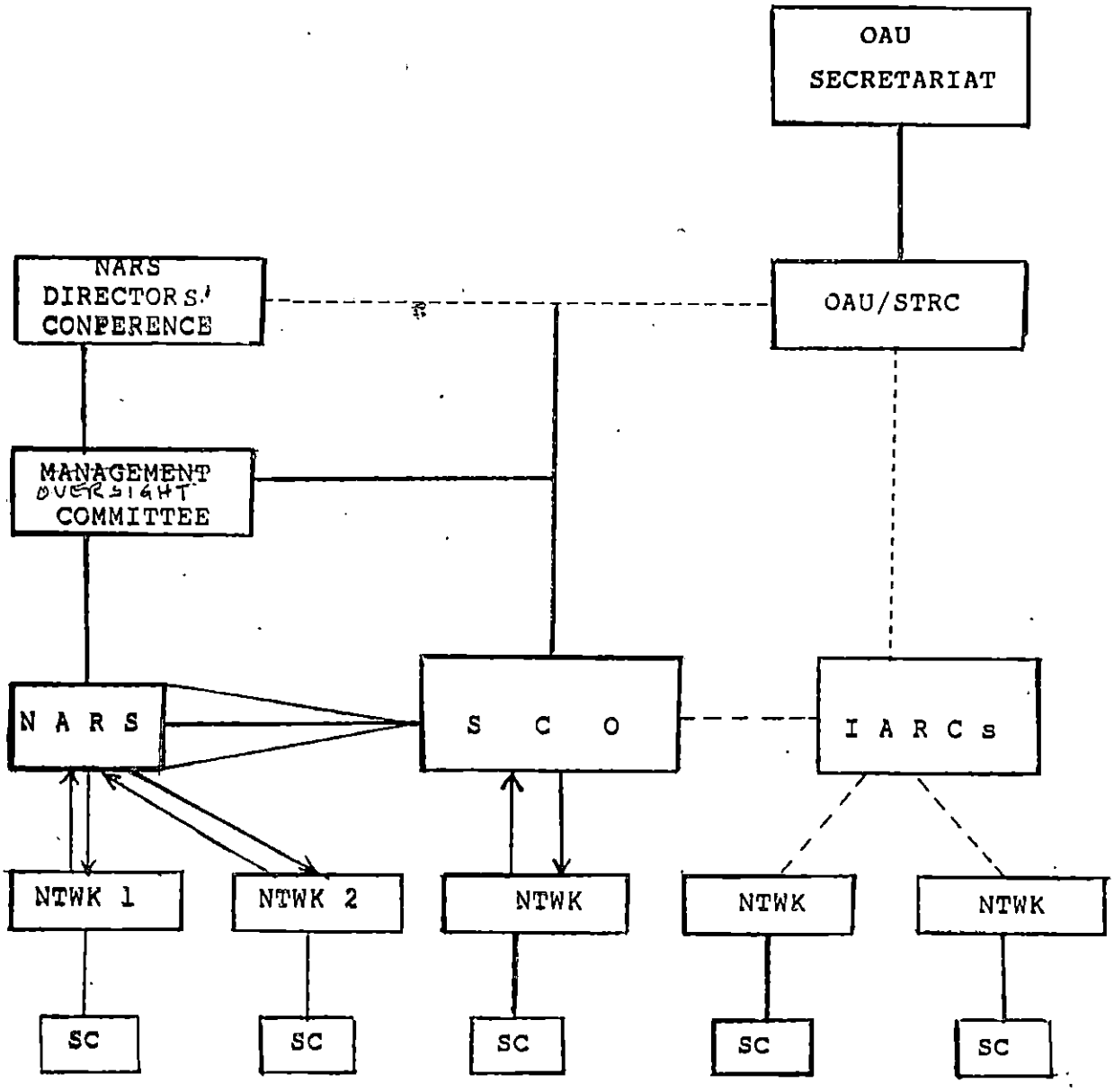
D. J. Campbell and L. Lev, Results of a Socio-Economic Survey in the Department of Margui-Wandala and the Arrondissement of Meri in North Cameroon, Report No. 11, MSU/USAID, Michigan, December 1980.

T. Zalla, Sampling Procedure for Selecting Extensive Survey Sample Elements for the Mandara Mountain Research Project, Report No. 1, MSU/USAID, Michigan, March 1980.

J. Holtzman, Stall Feeding of Cattle in the Mandara Mountains of Northern Cameroon, Paper 24a, Overseas Development Institute, London, August 1987.

J. Holtzman, A Socio-Economic Analysis of Stall-Fed Cattle Prodcution and Marketing in the Mandara Mountains Region of Northern Cameroon, Dissertation, Department of Agricultural Economics, Michigan State University, Michigan, 1982.

Fig. 1: SAFGRAD ORGANIZATIONAL (MANAGEMENT) CHART



OAU - Organization of African Unity
STRC - Scientific, Technical and Research Commission
NARS - National Agricultural Research Systems
SCO - SAFGRAD Coordination Office
IARCs - International Agricultural Research Centres
NTWK - Network
SC - Steering Committee

1987-12

REPORT OF THE JOINT IFAD AND MINISTRY OF CO-OPERATION (FRANCE) REVIEW MISSION OF THE OAU/STRC/SAFGRAD FARMING SYSTEMS RESEARCH PROGRAMM

OUA/CSTR-SAFGRAD

IFAD