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TENTH MEETING  
HELD AT THE CLUB MAKOKOLA,  
MANGOCHI, MALAWI  
ON 4-5 MARCH, 1991

CIAT  
BIBLIOTECA  
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Southern Africa Development Coordination Conference  
SACCAR Private Bag 00108  
Gaborone Botswana



Centro Internacional de Agricultura Tropical

Apartado Aéreo 6713  
Cali - Colombia

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Regional Programme on Beans in Southern Africa

Selian Research Centre  
P.O. Box 2704, Tel. 057-2268  
Telex 42106 CANWHEAT TZ  
Arusha, Tanzania

Arusha, July 18th., 1991

Dear Dr. Laing,

Please find attached draft Minutes of the Tenth Meeting of the Steering Committee of the SADCC/CIAT Regional Programme on Beans in Southern Africa, held at Club Makokola, Mangochi, Malawi on 4-5 March, 1991.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'D. J. Allen'.

DAVID J. ALLEN  
Regional Coordinator

MINUTES OF THE TENTH MEETING OF THE STEERING COMMITTEE OF THE <sup>10.</sup> SADCC/CIAT REGIONAL PROGRAMME ON BEANS IN SOUTHERN AFRICA, HELD AT CLUB MAKOKOLA, MANGOCHI, MALAWI ON 4-5 MARCH, 1991

**Those present :**

- Dr. Jesus Arias, FAO, c/o INIA, P.O. Box 3658, Mavalane, Maputo, Mozambique.
- Mr. Castro Camarada, Faculdade de Ciencias Agrarias, C.P. 236, Huambo, Angola.
- Dr. Coy Hachiwa, Msekera Research Station, P.O. Box 510089, Chipata, Zambia.
- Miss Zodwa Mamba, Malkerns Research Station, P.O. Box 4, Malkerns, Swaziland.
- Dr. A.B.C. Mkandawire, Bunda College of Agriculture, P.O. Box 219, Lilongwe, Malawi (Acting Chairman, 4th March).
- Dr. C.S. Mushi, Agricultural Research Institute, Lyamungu, P.O. Box 3004, Moshi, Tanzania (Chairman, 5th March).
- Mr. Chris Nkwanyana, Programme Officer, SACCAR, P.B. 00108, Gaborone, Botswana.
- Mr. Trevor Sykes, CIDA/SADCC Programme, P.O. Box 2619, Harare, Zimbabwe, (Observer).
- Mr. Jeffreyson Mutimba, Training Officer, CIAT, P.O. Box 67, Debre Zeit, Ethiopia (by invitation, 5th March only).
- Dr. David J. Allen, SADCC/CIAT Regional Programme, P.O. Box 2704, Arusha, Tanzania (Regional Coordinator).

**Absent :**

- Mrs. Olivia Mukoko, Crop Breeding Institute, Department of Research and Specialist Services, P.O. Box 8100, Causeway, Harare, Zimbabwe.
- Mr. E. Mosarwe, Sebele Research Station, P.O. Box 0033, Gaborone, Botswana.
- Dr. E. M. Pomela, Maseru Research Station, P.O. Box 829, Maseru 100, Lesotho.

Representative from Namibia.

## 1. Introduction

The Regional Coordinator read out a letter from Dr. C.S. Mushi who apologised to the Committee for his unavoidable absence during the first day of the meeting which he was to chair. Dr. A.B.C. Mkandawire kindly agreed to act on Dr. Mushi's behalf in his absence.

The meeting was duly opened by the Acting Chairman who introduced those present. A warm welcome was extended to Mr. Camarada, whom it was noted had recently returned home after successfully completing an MSc at Reading University. Dr. Coy Hacia was welcomed as the new National Coordinator from Zambia, and Dr. Jesus Arias was welcomed as acting coordinator from Mozambique, now that Manuel Amame had gone for training. Mr. Chris Nkwanyana was also given a warm welcome and congratulations as a newly appointed representative of SACCAR. Mr. Nkwanyana added that from now on, it was his responsibility to attend all SC meetings on behalf of SACCAR.

## 2. Agenda

The Acting Chairman brought to the attention of the SC a request from Dr. Mushi that the order of business proposed in the tentative agenda be altered (Appendix 1). This was ACCEPTED.

## 3. Minutes of the 9th SC Meeting

It was PROPOSED by Zodwa Mamba that the Minutes be accepted as a true and accurate record of that meeting, and this was SECONDED by Trevor Sykes. The Minutes were duly ADOPTED.

## 4. Matters arising from those Minutes

(i) p.2. The Regional Coordinator confirmed that a representative from Namibia had again been invited to participate in the SC (and in the planning Workshop to follow).

(ii) p.3. Allen confirmed that Dr. Vas Aggarwal had at last received clearance to take up the position of Regional Bean Breeder at Bunda where he is now becoming established. Zodwa Mamba asked for how long was his contract. Allen replied that all CIAT staff on the regional programme had firm contracts until the end of Phase I (31.3.92). Extension beyond that date was dependent upon CIDA support of a Phase II.

(iii) pp. 9-10. Coy Hacia drew attention to the application for an extension to the aphid sub-project on which no response had been received from the RP. Allen was asked to chase up. Hacia confirmed that an order for the air conditioner had been placed but requested information on the status of mesh for the repair of a screenhouse, as previously approved. Mkandawire added that he had still not received any response from Kantiki concerning Malawi expenditure on the aphid sub-project.

(iv) p.10. Dr. Arias informed the SC that the cultivar Carioca had been introduced into Mozambique for large scale multiplication but its susceptibility to common bacterial blight (coupled with heavy damage by rats) had reversed the decision. Arias confirmed that the moisture metre had been received, but that seed requested from Tanzania, from Dr. Mushi, has not been received. Confirmation that the consignment had been dispatched was requested.

(v) p.11. Miss Mamba drew attention to the request for an advisory visit to be made by Dr. Spider Mughogho to Swaziland. Clearance should be sought to visit early in April. Allen asked that plans for the visit be discussed also with the Regional Agronomist. It was noted that the Regional Entomologist had not yet made a visit to Swaziland, as had been requested. Zodwa Mamba confirmed that the moisture meter, altimeters and boom sprayer had been received. There is still a need for a seed drier, and an oven would be suitable (specifications had already been relayed to the regional programme who should proceed).

(vi) pp. 11-12. Dr. Mkandawire showed the SC a more complete annual report from the Malawi programme, copies of which he will try to circulate to all members. The team has been strengthened by the return of Drs. Lupwayi and M. Ngwira, as microbiologist and food scientist, respectively. Mkandawire said that Lupwayi is interested in picking up the regional sub-project on biological nitrogen fixation, and Allen added that the BNF working group meeting planned for later in 1991 would be an appropriate forum for working out technical details.

(vii) p.12. Allen said that sub-project agreements had not been concluded, because it seemed more appropriate to do so at the outset of Phase II. This should be discussed further under Sub-projects.

(viii) p.12. In response to a question about the status of the Crop Management Research Training (CMRT) course at Egerton University, the Regional Coordinator confirmed that three participants were supported by SADCC/CIAT; these are : J.S. Basiao (MO), C. Kapunda (MW) and F.I. Thindwa (TZ). J. Musanya (ZA) had been accepted but did not get clearance in time to take part. Arias added that J.D. Dominguez from Mozambique, with FAO maize programme support, is also a participant.

(ix) p.12. Trevor Sykes asked if past trainees were evaluated. Allen confirmed that they were, and suggested that Jeff Mutimba, CIAT's Training Officer, be asked to provide details under discussion on training.

(x) p.14. Allen summarized the status of short-term training at CIAT-Headquarters during 1991 : Gongolo and Bias were presently in Colombia. Hachiwa, Mukoko and Nchimbi had been invited together for a 3 1/2 week period in May/June; but CIAT headquarters had had to postpone making offers to Zubeda Mduruma (note spelling), Zodwa Mamba and A. Gubba until 1992.

Mkandawire confirmed that he had withdrawn the nomination of Spider Mughogho, and Arias thanked CIAT for agreeing to extend the period of training of Antonieta Bias.

(xi) p.14. Arias informed the meeting that Manuel Amame had gone to the University of Vicoso, not to Guelph for his MSc. He requested that Amame be encouraged to do his thesis research at CIAT, to which the Committee responded by REQUESTING the submission of a proposal, including clarification of financial implications.

(xii) p.15. Allen told the SC that the proposal for a nematology working group meeting had not progressed because of the imminent departure of the proposer. The importance of this subject requires reappraisal.

(xiii) p.18. It was NOTED that further consideration was to be given to the proposed Pan African Consultative Committee (PACC) under 'Any Other Business', further noting that the SC had earlier discouraged the establishment of a Pan African Steering Committee, which was seen as inappropriate. However, a scientific committee at the Pan Africa level was deemed valuable.

(xiv) p.18. With regard to the expressed need for the development of a food science network for bean seed quality, acceptability and cooking time issues, Allen confirmed he was to visit ICRISAT-Matopos the following week.

(xv) p.20. The Regional Coordinator indicated that the original period of 'at least 3 days' allocated to the SC meeting and planning workshop had had to be extended to a 5 day period, once consideration had been given to what needed to be accomplished in the time.

(xvi) p.20. Corporate membership of all NPs, under the name of the national coordinator, of the Bean Improvement Cooperative was confirmed, as was the receipt of coupons for the purchase of CIAT publications by the Zambia team.

## 5. Regional Programme Workplan and Budget

The Acting Chairman asked the Regional Coordinator to present the RP Workplan and Budget. Allen did so, drawing attention to the adoption of the fiscal year for the period 01 April 1991 - 31 March 1992. The budget provides full details of all network activities over which the SC has responsibility. Sykes confirmed that this was a step forward since the plan now corresponds with CIDA's fiscal year. He said that he was delighted by the news that Dr. Aggarwal was now in position as Regional Bean Breeder in Malawi, adding his congratulations. He noted that the Senior Administrative Officer post had now been advertised. Finally, Trevor Sykes asked that the germplasm introductions described under 'Programme Objective 1' be quantified.

Mr. Nkwanyana said that although SACCAR followed the calendar year so that the RP's workplan no longer conformed to SACCAR norms, there were unlikely to be any serious objections.

Dr. Arias asked why the Workplan made no reference to the introduction of the International Bean Yield and Adaptation Nurseries (IBYAN) which he believes are important nurseries. The breeding programme in Mozambique is asking for IBYANs of large mottled, cream and red-seeded types. Recent experience has shown that about half the entries in IBYANs outyield local types. Allen replied that the RP had been giving greater emphasis to widening the genetic base of introductions through focusing more on the VEF, but he recognized that some NPs lacked the capacity to handle large nurseries and might want to look first at finished lines as available through the IBYAN and AFBYAN. He asked that the RP be kept informed of whatever materials were requested direct from CIAT-HQ. Dr. Hacia asked about the status of the zonal trials and nurseries. Allen replied that although good progress was being made with sets for eastern Africa and the Great Lakes, very little progress had been made with sets for the central and southern zones. One of the first tasks of the new breeder at Bunda would be to stimulate their establishment.

Zodwa Mamba asked whether the RP was over-emphasizing graduate training. Did the opportunities provided graduates really reflect training needs? Allen replied that at the outset of the RP, research technicians (diploma level and below) were the targets of all training courses. Now some courses were being aimed at university graduates as well. Arias said that he believed training of technicians was crucial and Allen added that so too was effective deployment of them after training.

Dr. Mkandawire, as Chairman, summarized the discussion and proposed that the Committee **CONDITIONALLY ACCEPTED** the budget and workplan subject to the satisfactory inclusion of NP needs as well as a calendar of activities, to ensure that the timing of visits was appropriate and efficiently synchronized. This was **AGREED**. The revised workplan, budget and calendar of activities is attached as Appendix 2.

## 6. National Programme Needs

The Acting Chairman asked National Coordinators to present their programme's needs, in terms of germplasm, technical visits by RP scientists, and items of research equipment.

(1) Swaziland. Zodwa Mamba reported that nurseries requested at the 8th SC (AFBYAN II from CIAT-Ethiopia, IBNHB from Tanzania NP : see P.13 those Minutes) had not been received, although a replacement ABDREN had been dispatched by Dr. Mkandawire. Allen to chase up.

Mamba said she could not handle a nursery as large as the VEF so would prefer the IBYAN. Allen argued that such a step

would be retrogressive, in that a range of IBYANs had been tested in Swaziland in the early 1980s. The much wider diversity of the VEF was worth evaluating, and now that there was a regional breeder in Malawi, he could assist Miss Mamba with the evaluation. This was ACCEPTED, and Dr. Aggarwal's visit to Swaziland should be scheduled for early March 92.

Mamba mentioned that she was conducting a survey of farmers' needs and preferences, and she would welcome assistance from the regional agronomist in on-farm research. It was AGREED such a visit be scheduled in the Workplan. Meanwhile, the line AFR 244 had proved very promising. Multiplication had proved a failure (apparently attributable to heat stress at Big Bend, in the lowveld) and Allen was asked to devise a way of getting 20 kg of AFR 244 to Swaziland by Nov 91.

With regard to equipment, Zodwa Mamba asked the RP to proceed with the purchase of a drying oven, the specifications of which had been sent to SADCC/CIAT-Arusha. This was AGREED. There remains a need to improve seed storage. Mamba confirmed that what is needed are facilities for short-term bulk storage. From discussion that followed, Sykes agreed to follow-up with Prof. Eric Roberts, an expert on seed storage, to advise on methods, while Miss Mamba would determine the volume of the facilities sought. Nkwanyana stressed the need to consider the long-term implications of installations for the NPs, and the latter was ENDORSED by the Committee. A thresher is en route, it was noted.

(ii) Zambia. Dr. Coy Haciwa listed the germplasm requested for the breeding and pathology (but not entomology) sections of his programme, and these are summarized among other germplasm needs of NPs in Appendix 3. For technical visits, Haciwa wanted the regional breeder to visit Msekera as soon as possible (before end March 91), and the dates for the visit of the regional coordinator, breeder and entomologist to Mbala district would also be fixed soon. With regard to equipment needs, Haciwa told the SC that various laboratory supplies were needed, and that the additional support of the aphid sub-project that had been conditionally approved at the 9th SC had not yet been received. Information on the status of the greenhouse mesh order was requested, and payment is awaited for rehabilitation of the seed store (ref. Appendix 2, 9th SC).

The latter point led to the suggestion that facilities and equipment needed for seed handling and storage be standardized across NPs, whose needs are approximately equivalent, except in scale. Whereas no firm conclusion was reached, it was agreed this point warranted greater consideration.

(iii) Angola. Castro Camarada asked for two sets of the AFBYAN, which he considers much more useful than the IBYAN. He wants a VEF, provided assistance can be given by the RF with its evaluation at the end of Dec, or early Jan 92. The pathologist wants a set of the anthracnose nursery (IBAT), and these seed



requests are summarized in Appendix 3. As there is no NP entomologist, a visit by the regional entomologist is requested.

The position of equipment needs is given in Appendix 4. In view of great difficulty in communications, Camarada asked that all consignments of seed and equipment be dispatched to :

Mr. Manuel Nunes Barata  
Programa Nacional de Sementes  
Minagri  
Caixa Postal 527  
Luanda, Angola  
(telex 3322 MINAGRI AN)

DHL to Luanda also can work (e.g. for bills of lading). The planter is not of the type expected. Camarada finds the hand planter primitive; it has a seed belt and not a hopper. RP to check specifications of order.

(iv) Mozambique. Jesus Arias expressed his deep appreciation to the RP for most valuable help. He then asked for several sets of the AFBYAN (details in Appendix 3). As a result of recent introductions, the NP has been able to establish 9 new nurseries, from which 14 promising materials (mean yield 1114 kg/ha) have been selected over 15 local types (mean yield 824 kg/ha). Visits from regional scientists have already been scheduled. Beyond the need for supplementary operational funds (which the RP cannot provide), Arias asked for seed envelopes, staplers and asked of the status of storage jars order. Specifications of all items are needed.

(v) Malawi. Alex Mkandawire requested several sets of the AFBYAN and international disease nurseries (Appendix 3) to reach him by October 91. He has sets of the drought nursery (ABDREN) on offer to NPs.

The Regional agronomist is asked to visit to help shape the on-farm research programme. New requests for equipment were for a computer and for 2 knapsack sprayers (Appendix 4), both of which were approved.

(vi) Tanzania. Dr. Mushi presented his equipment needs under item II (AOB) of the Agenda. They are inserted here for easier reference. Mushi asked the SC to consider approving the purchase of two electronic balances (Mettler PK 4800 Delta, top loading), while stressing the importance of increased precision in measurement of small quantities of seed. He also requested that his NP be provided with 2 Mattson Cookers, hot plates and laboratory ware. These purchases were approved, and the labware given the ceiling value of USD 5,000.

## 7. Workshops, Working Groups and Travelling Workshops (Monitoring Tours)

(i) Status of publication of proceedings. The Acting Chairman asked the Regional Coordinator to summarize the position. Allen told the Committee that progress in editing and publication was satisfactory, 8 sets of proceedings have now appeared (Appendix 5); others are at an advanced stage of production. Sykes asked what numbers of each were circulated. Allen replied that about 250 copies were distributed, almost exclusively within the bean network in Africa, including SAUCAR. Sykes advised that a wider circulation be contemplated (including FAO, IBPGR, Libraries, UN reps), helping to give greater credit and publicity to the RP.

(ii) Status of nematology working group. In view of the postponement of the proposed working group meeting (see p.4, these Minutes), Allen suggested that the position be put before the SC for the Eastern Africa Region wherein there were more nematologists. Mkandawire confirmed the interest of Dr. Vincent Saka (Bunda) in being part of a nematology network. It was AGREED that a proposal was needed. (Nematodes were mentioned only by one national coordinator as a constraint, being ranked 46th amongst constraints to bean production as a result of the Planning Workshop : DJA).

(iii) Proposal for working group meeting on biological nitrogen fixation. The Proposal (Appendix 6), which was presented by Allen, was considered by the SC. Attention was drawn to the involvement of Dr. Judy Kipe-Nolt, microbiologist on the Bean Program at CIAT headquarters, in addition to the Regional Agronomist, Dr. O.T. Edje, and the Senior Research Fellow, Dr. Godfried Msumali, from SUA, Morogoro. It was AGREED that the proposal was acceptable in its present form, provided Mr. Edgar Nxumalo (Swaziland) was added to the invitees, and that resuscitation of the existing regional sub-project on BNF was an important objective. (Subsequent to the SC, events in Ethiopia have necessitated a change of venue, to Malawi. Appendix 6 presents the proposal in revised form : DJA).

(iv) Proposals for travelling workshops. A proposal for an 'On-farm research and soil fertility travelling workshop' was presented by the RP (Appendix 7). If accepted in principle by the SC, then Mr. Godfrey Mitti (in his capacity as leader of the cropping systems sub-project) would be invited to help further develop the proposal, so ensuring the activity's linkage with the sub-project.

Noting the Pan African nature of the proposed travelling workshop, Nkwanyana asked whether the SADCC programme was to pay. Allen confirmed that payment would be on a proportional basis, shared between CIAT's RPs in Africa. Sykes said he liked the fact that recommendations are to emerge from the tour, as well as the proposal's emphasis on on-farm seed production. The Committee recommended participation as follows : AN (1), LO (1),

MW (1), TZ (1), WD (1) and ZA (2: Mitti and Siame). Noting that a budget was required to be submitted to the 11th SC, the proposal was TENTATIVELY APPROVED. (The proposed dates have subsequently been revised, to sometime early in 1992 : DJA).

A second proposal for a monitoring tour was submitted by the national programme of Tanzania (under AOB, but inserted here for convenience), to tour the southern, eastern, northern and lake zones of the country (Appendix 8). Much discussion followed this submission. Haciawa noted from the proposed itinerary that the tour was to be quite a marathon; it would be improved by making the tour shorter and more regional, he suggested. Arias wondered if what was proposed was repetitive. Nkwanyana said that there was no denying such a tour was important, but that it was important too to distinguish between national and regional activities. Allen drew attention to the budget estimate (nearly USD 22,000), and expressed concern that the balance in the RP line item for monitoring tours (USD 24,100) could not cover both the travelling workshops now proposed. Nkwanyana suggested that Mushi sought bilateral rather than regional funds for this national initiative, and this was AGREED by the Committee.

(v) Other presentations. Coy Haciawa presented a report on the Eastern Africa working group meeting on bean anthracnose that he (and Mrs. F. Mwalyego from Tz) had attended in Ethiopia recently. Haciawa confirmed that this had been a very productive meeting that had led to the drafting of a Pan Africa sub-project on anthracnose, to be presented to the SC.

## 8. Training

This section began with the arrival of the Chairman, Dr. C.S. Mushi, who apologized for his unavoidable absence and thanked Dr. A.B.C. Mkandawire for acting on his behalf. The Chairman then opened the session on training by introducing Mr. Jeff Mutimba, CIAT's Training Officer, who had been invited to lead discussion of a document (Appendix 9) that had been circulated.

(i) Evaluation of training and training needs. Points that were made during Mutimba's presentation included the fact that past courses on research methods were considered to give insufficient attention to pests and diseases; this area needs intensified effort. Some doubts were expressed whether agrometeorology and irrigation really should be included as subjects in agronomy. Overall, it was considered gratifying that our training is seen as valuable.

In discussion of training needs, it was noted that among the needs not identified were extension training and the training of trainers. Sykes added that getting the results of research translated into on-farm progress was crucial, and often a bottleneck. CIDA must be convinced that investment in research does pay. Zodwa Mamba suggested that food science and technology was another unidentified gap. Allen made two observations : that

some topics are not commodity specific so presenting opportunities for joint activities; and that the sustainability of training activities was centrally important. The training of trainers is one such means of sustenance. Nkwanyana said that SACCAR was increasingly aware of the importance of extension, although it was not part of their mandate. Nkwanyana's own terms of reference do include forging research-extension linkages, and he urged us all to look for opportunities to assist in technology transfer.

(ii) Coordination of training activities. Mutimba drew attention to a recent workshop held among trainers in the international agricultural research centres which he was unable to attend personally, but did present a paper. There are obvious opportunities for more effective sharing of information (e.g. IITA's data base on collaborative group training in Africa) as well as joint training courses through formalized inter-centre collaboration. Mutimba reiterated that NPs need to make clear their needs for human resource development and Allen added that it was vitally important to avoid distorting national priorities through disproportionate training. Training programmes must really address needs and not merely flaunt opportunities. CIAT has rather a good track record here, both in running joint courses and in evaluating training needs. Mutimba said he believed there is a need for induction courses for new graduate recruits, and Mkandawire said that some extension training was already under way in Malawi.

(iii) Status of training at CIAT headquarters. Mutimba drew the Committee's attention to the restructuring of CIAT-HQ training, and the advantages implicit in block training. These changes were NOTED and ACCEPTED.

Allen summarized the status of training at CIAT (see pp. 3-4, these Minutes). Dr. Nchimbi had requested that the dates of her visit be altered, but rescheduling had proved impossible. She should be re-invited in 1992. Mkandawire asked that Dr. Lupwayi and Dr. M. Ngwira (microbiologist and food scientist, respectively) be offered short-term training at CIAT in July-August, 1991. Whereas their support was APPROVED by the SC, Allen said that the next block at a suitable level was scheduled for 13 May - 08 June, 91. He would attempt to get Drs. Lupwayi and Ngwira accepted for that period. Mushi requested that Dr. Emil Mmbaga be considered for a short (3 1/2 week) period in 1992, and that Mr. Dunstan Msuya receives training in pathological methods sometime in 92. These are summarized in Appendix 10.

(iv) Scholarship Committee. It was NOTED that the terms of reference for the new committee had been accepted previously (9th SC). In discussion on composition, Dr. Mkandawire was elected unanimously to join the committee, noting that he was well-equipped to do so in view of his university status coupled with being the commodity coordinator for his country. CIDA, as the donor, should be given observer status, it was AGREED. Other

members would be Dr. Dennis Wanchinga from SACCAR, Dr. Roger Kirkby as CIAT's Pan-Africa Coordinator, and Jeff Mutimba. The committee's status as a sub-committee to the regional SC was ACCEPTED. Mutimba was ASKED to convene the first pilot meeting, before the end of May 91, with an annual meeting thereafter, before the SC meeting.

Some discussion centred on the area of operation of the scholarship committee, whether SADCC regional or Pan African in scope. Nkwanyana expressed some concern over the wider Pan African coverage and Sykes said that a Pan African scope would open up wider opportunities. Allen suggested that the committee could confine its activities to SADCC in a financial sense, and this view was endorsed by Sykes. Finally, it was agreed to leave the question of scope to the scholarship committee itself to advise the SC.

(v) Training materials. Mutimba drew attention to recent progress in producing new audiotutorial units, as outlined in his paper (Appendix 9). Arias said that there is a need also for a unit on small scale on-farm seed production. This was NOTED.

(vi) Academic scholarships. Mutimba told the SC that Wye College of the University of London is offering post-graduate opportunities in agricultural development for external students, open to candidates who may continue in full-time employment. Mamba asked if such opportunities were open also to agronomists. Allen suggested that this kind of information was the sort that could be asked from the Scholarship Committee. It would be useful to have more information about scholarships awarded at the MSc level through SACCAR/GTZ, especially at the University of Zambia. Sykes told members that CIDA has funds also for strengthening of agricultural faculties, as for example in Swaziland, hopefully from 1993. Support for food science will be directed to the University of Zambia.

In discussion of academic scholars supported by the RP, Allen was asked to check with Victoria Sutherland concerning implications of commitments beyond the end of Phase I.

(vii) Status of participants in CMRT and QFR/ESP courses: Participants in the crop management research training course have been named above (p.3). The regional agronomist will be going to Egerton University in July to present lectures and give practicals for the course. The two participants (Mrs. M. Mkuchu and Mrs. L.C. Mushi), who attended the diagnostic phase of the on-farm research/farming systems perspective workshop in Harare in February 1991, were accepted for support at the experimental phase workshop, to be held in the period 30 Sept-11 Oct 91.

(viii) Submission of revised proposal on graduate course in breeding. Dr. Mushi presented a paper on the status of this course (Appendix 11). He pointed out that very few participants had been proposed for the course which was no longer Pan African, because the Eastern Africa Region had indicated its preference to

send such trainees to CIAT headquarters. Camarada said that the few participants indicated little interest. He would prefer to send lusophones to CIAT, in any case. Mushi and Arias agreed that the paucity of participants might merely reflect the lack of plant breeders, not little interest. Allen said that the course addresses an important topic and that the proposal was a good initiative, but the participants are too few to justify the very high costs (budget estimate approx. USD 62,300). He suggested the Committee looks at the underlying reasons for the scarcity of candidates. Could there be higher training priorities? Perhaps the proposal should be shelved? This suggestion was heartily seconded by Mkandawire, and Mushi agreed to shelve the initiative. Mkandawire pointed out that if the candidates were sent to CIAT-HQ instead, then the need for the course would dwindle. Arias thought the course outline was too theoretical: such a training should focus on local, practical and real problems. Allen added that the SC might look at other possibilities, including provision of "hands-on" breeding experience in other NPs, perhaps taking advantage of differences in season.

(ix) Status of bean stem maggot screening methods course. The Chairman then asked the Regional Coordinator to brief the SC on the status of planning for this course, the proposal for which had been approved in principle (to a budget level of USD 5,600) at the 9th SC. Allen presented a memorandum (Appendix 12) from the regional entomologist summarizing the position. (Owing to events in Ethiopia subsequent to the SC meeting, the venue has been changed to Bujumbura and the course rescheduled for the period 1-8 Nov. 1991: DJA). The SC AGREED to support five participants from SADCC, as follows: MW x 1 (Mrs. Y. Tembo), MO x 1 (Jose Sancho), ZA x 1 (Mr. P. Sohati), ZW x 1, TZ x 1. If no participant was named from ZW, then TZ x 2.

(x) Submission of revised proposal for farmer participatory research training. The Chairman asked Allen to present the revised proposal (Appendix 13) which gives suggested dates, estimated budget and course details. Discussion on participants generally endorsed the suggested allotment of places, to a total of 15 from SADCC. Mkandawire said that the Chief Agricultural Research Officer would send nominations from Malawi; Mushi said he hoped to include an extensionist among nominees from Tanzania; Mamba said that participants from Swaziland would be M. Mkhonta, and hopefully another; Haciwa said that Zambian nominations would be confirmed by the Director, but would probably be G. Mitti, C. Kawimbe and Lungu. Mutimba was asked to notify MO, WD if additional slots were forthcoming from cancellations.

Some discussion centred on the most appropriate type of participant for the course. Was it best to include senior PhD scientists, including the national coordinator, with the rationale that they are best informed? The feeling was expressed that this is only justifiable if those senior scientists had strong teaching commitment.

Camarada and Arias indicated that it was time again for another course in Portuguese. This FPR training course is interesting but attendance by lusophones is strongly restricted by language. A proposal was invited for the 11th SC.

Mutimba reported that he had been facing difficulties over invitations to specific individuals when invitations should be channelled through Directors. Nkwanyana said that he believed SC members ought to be responsible for briefing their Directors. Much discussion followed. The main points to emerge were that it was vital to be sensitive to national procedure : in many countries, it is best to send invitations to Directors, copied to the national coordinator. It was agreed that vertical communications instigated by the National Coordinator was critically important.

(xi) Proposal for on-farm bean research and production course. Mushi submitted a proposal for an in-country course, to be held at Lyamungu near Moshi. The proposal met with keen support, and the initiative was deemed a good one. Mutimba said that it was fully appropriate that national scientists initiate and run their own training courses. Mkandawire suggested that diploma-holders act as future trainers, and Allen reiterated that the training of trainers was imperative.

Mamba said she liked the proposal : could 2 or 3 participants from Swaziland be included ? This triggered similar requests from Malawi, Mozambique and Zambia. The principle of expanding the course was ACCEPTED, subject to revision of the proposal. It was suggested by Mutimba that the budget was much too high : it was important to make better use of resources, and this was AGREED. The SC ASKED that the title be amended to reflect OFR, to "On-farm bean research and production", that the budget be revised, and the programme be developed with Mutimba's input.

## 9. Regional Collaborative Research Sub-projects

(i) Submission of revised proposal on phosphorus. Dr. Mushi submitted the proposal prepared by Kullaya and Mmbaga by whom it had been revised, according to suggestions so far received. The Committee NOTED that reports from two further referees were still awaited. It was suggested and AGREED that the P sub-project develops close links with Dr. Charles Wortmann (CIAT-Uganda) and member of the soil fertility working group. Hachiwa asked why Misamfu had been chosen as a site, where low pH and Al toxicity occurs; Allen said he understood that the site was indeed appropriate also for low P screening. Hachiwa then drew attention to the budget. Was US\$ 3,000 an excessive figure for labour for the single trial planned for 1991 ? Local travel and transport also seem high, he thought. Mkandawire commented that the topic addressed an important area : in view of budget queries and the need to incorporate further reviewers' comments, let us give the proposal conditional approval and award it US\$ 5,000. This was AGREED by the SC.

(ii) Submission of revised proposal for survey in Tanzania on drought/intercropping. Mushi then submitted a paper entitled "Intercropping questionnaires survey workplan" (Appendix 16) for discussion by the Committee. Mkandawire said that a budget of US\$ 17,000 was way out of proportion, and this was echoed by Haciwa who asked why it was necessary to have five enumerators altogether. Perhaps they should be split up to work in different areas ? It was noted that 2-3 people carried out similar surveys in both Zambia and Malawi. Mkandawire added that he was surprised the survey had not already been conducted in Tanzania : surely this had been the reason for Godfrey Mitti's visit ? Zodwa Mamba suggested that Tanzania be awarded some funds so that a start could be made. Allen said that he believed it was vital that surveys be made of the lesser known areas, and these should be targeted in particular, and Camarada said this seemed sensible : surely areas like Kilimanjaro and Kagera are well known ? The SC AGREED to award the sum of USD 5,500 so that a start could be made to survey, targeted at lesser known areas of Tanzania.

(iii) Submission of financial reports from Malawi. The Chairman asked Dr. Mkandawire to submit such reports as were now available. Mkandawire began by pointed out that these reports (Appendix 17) had been submitted previously, but their format had been revised to fit SC requirements. The angular leaf spot (ALS) sub-project is now overspent by MKw 2,740.81, it was NOTED. Mkandawire told the Committee that the sub-project leader (Dr. Wilson Msuku) had requested for an extension, and Mkandawire had advised him to draft another proposal. Allen said this was fully appropriate. It was important that the SC be convinced that the ALS sub-project is demonstrating value for money, and that a new proposal should demarcate its scope from the Malawi CRSP research on ALS. Mkandawire suggested that an ALS working group meeting be held.

The drought sub-project remains narrowly in credit (MKw 373.22), for Malawi only. More funds are needed for next dry season, and expenditure reports from Zambia and Tanzania. A further US\$ 3,000 was AWARDED, and it was AGREED that another drought working group should be scheduled to coincide with Dr. Jeff White's visit in 1992.

Dr. Mkandawire reported that he had made little progress in extracting a technical report from Dr. L. Kantiki on the aphid sub-project, under Zambia leadership. There remains a balance of MKw 2,840.34 after expenditures incurred during the aphid training course. It was AGREED that horizontal transfer of these funds be made in favour of the drought sub-project in Malawi, and that the reverse be done between the drought and aphid sub-projects in Zambia.

(iv) Status of sub-project agreements. The Chairman asked the Regional Coordinator to report. Allen confirmed that the draft agreement had now reached a format acceptable to all parties (Appendix 18). He requested the SC's permission not to



proceed in putting the agreements into effect until the start of Phase II, and this was ACCEPTED.

(v) Submission of report on BCMV sub-project. The leader of this sub-project, Prof. A. F. Lana, had written to the Chairman of the SC (Appendix 19) to report on progress, submit a financial statement, and to apply for an extension to the current sub-project to become Pan African. The Committee noted that the sub-project was currently overspent by TzSh. 63,000/=.

Much discussion centred on the budget for the proposed extension from which it was noted there was much "padding". It was agreed that items like greenhouse repair should be supported from other sources, and that with judicious "pruning" of the budget to delete items like fringe benefits, the sum of USD 11,600 was reached. In view of the proposal that the sub-project become Pan African in scope, the SC AGREED to award \$ 7,000, in the expectation that the sum of \$ 4,600 would be provided by the Eastern Africa Region.

(vi) New sub-project proposals. The Chairman asked members if there were any further proposals for new collaborative research. Dr. Haciawa then presented a proposal (Appendix 20) entitled 'Studies on importance, pathogenic variation and management of anthracnose in the SADCC region' which had been based on discussion held at the anthracnose working group meeting (see page 9 these Minutes). Dr. Haciawa himself would be leader, with Mrs. F. Mwalyego of Tanzania as the other principal investigator. Allen said that the proposal clearly addresses a high priority problem that merits research. Haciawa added that he wanted to make a start with work in April. The budget makes allowance for monitoring tours and visits to collaborators, with the intention of covering also working group meetings, and this initiative was WELCOMED by the committee. Dr. Mkandawire proposed that the sub-project be granted enough to get it started, and it was AGREED that USD 6,000, to be divided equally between Tanzania and Zambia, be awarded for the first year, while Allen proceeds in seeking independent referees of the proposal. The title, it was AGREED should be "Studies on importance, pathogenic variation and management of bean anthracnose in the SADCC region".

A second new proposal from Zambia was received, entitled "Screening of bean genotypes for tolerance to low available P and high Al saturation", by Mr. Sam Phiri (Appendix 21). It was AGREED that its receipt should be acknowledged and copies forwarded for independent review, noting the existence of a sub-project on the same topic led from Tanzania.

### 10. Venue and Elections

Discussions led to the UNANIMOUS AGREEMENT that the 11th meeting be held in Zambia, at a location set at the discretion of Dr. Haciawa, in the period 9-11 September 1991, noting that the third day was intended for a field visit, if deemed appropriate.

and that Dr. A.B.C. Mkandawire was elected new Chairman.

#### 11. Any Other Business

Owing to the unavoidable late arrival of Dr. Mushi, he raised several items under AOB and these have been inserted in their appropriate position earlier in these Minutes. The only further item was :

(i) The Pan Africa Consultative Committee. Allen presented draft notes that had been prepared by Dr. Roger Kirkby (Appendix 22), noting that it reflects a recommendation made by the CIDA/SACCAR Mid-term review report. Little discussion ensued. Nkwanyana suggested that the proposal to establish a PACC be brought to the attention of the SACCAR Board, and this was ACCEPTED.

The 10th Meeting of the Steering Committee was duly declared closed by the Chairman.



D.J. Allen  
Regional Coordinator  
SADCC/CIAT

C.S. Mushi  
Chairman  
Steering Committee

## APPENDIX 1 : 10th SC AGENDA

1. Introduction
2. Agenda 10th SC
3. Minutes 9th SC
4. Matters arising
5. Submission of RP Workplan and Budget
6. National Programme Needs  
(Germplasm, nurseries, technical visits, status of equipment orders)
7. Workshops, Working Groups and Travelling Workshops  
(Monitoring Tours)
  - (i) Status of publication of proceedings
  - (ii) Status of nematology working group
  - (iii) Proposal for BNF working group
  - (iv) Proposals for travelling workshops
  - (v) Other presentations
8. Training
  - (i) Evaluation of training and training needs
  - (ii) Coordination of training activities
  - (iii) Status of training at CIAT headquarters
  - (iv) Scholarship Committee
  - (v) Training materials
  - (vi) Academic scholarships
  - (vii) Status of participants in CMRT and OFR/FSP courses
  - (viii) Submission of revised proposal on graduate course in breeding
  - (ix) Status of bean stem maggot screening methods course
  - (x) Submission of revised proposal for farmer participatory research training
  - (xi) Proposal for on-farm bean research and production course
9. Regional Collaborative Research Sub-projects
  - (i) Submission of revised proposal on phosphorus
  - (ii) Submission of revised proposal for survey in TZ on drought/intercropping
  - (iii) Submission of financial reports from MW
  - (iv) Status of sub-project agreements
  - (v) Submission of report on BCMV sub-project
  - (vi) New sub-project proposals
10. Venue and Elections, 11th SC
11. A.O.B
  - (1) Pan African Consultative Committee

## APPENDIX 2.

### SADCC/CIAT REGIONAL BEAN PROGRAMME ON BEANS IN SOUTHERN AFRICA

#### WORK PLAN FOR THE PERIOD 01 APRIL 1991 TO 31 MARCH 1992

**PROGRAMME OBJECTIVE 1 :** *To develop improved cultivars of the common bean, in collaboration with national programmes.*

##### 1.1. *Evaluation of new introductions of germplasm*

National bean programmes in the SADCC region differ substantially in size, stage of development and consequently in capacity to handle large collections of germplasm. The Regional Programme will continue to respond to different national needs by ensuring that a wide range of material is made available, both from CIAT headquarters in Colombia, where the World Collection of *Phaseolus* germplasm is held, and from the region.

a) Introductions from CIAT will range from a core collection of germplasm, representing the full range of genetic diversity, and the bean team nursery ("Vivero del Equipo de Frijol", VEF), to smaller and more specialized nurseries. The latter will comprise the large kidney and sugar bean nurseries; disease nurseries including the Bean Angular Leaf Spot International Trial (BALSIT), the International Bean Anthracnose Trial (IBAT), the International Bean Rust Nursery (IBRN), the International Bean Ascochyta Blight Nursery (IBABN), the international common bacterial blight nursery ("Vivero Internacional de Bacteriosis", VIB), the International Bean Nursery for Halo Blight (IBNHB) and the International Bean Common Mosaic and Black Root Nursery (IBCMBRN). Certain of the smaller national programmes will continue to make use of the International Bean Yield and Adaptation Nurseries (IBYAN series).

b) Introductions from the region, including Pan African nurseries, will include the third set of bush types in the African Bean Yield and Adaptation Nursery (AFBYAN III), as well as the climbing AFBYAN. Both the Central and Southern African sets of Zonal Bean Nurseries and Yield Trials (CAZBEN, CAZBYT, SAZBEN, SAZBYT) will be constituted, and managed from Msekera, Zambia and Bunda, Malawi, respectively. More specialized nurseries include the African Bean Drought Resistance Nursery (ABDREN), the African Network for Screening against Edaphic Stresses (ANSES), the Bean Stem Maggot Reconfirmatory Nursery (BSMRN), the Pan African Disease Nursery (PADN) and the Eastern Africa Regional Common Bacterial Blight Nursery (EARCBBN).

1.2. *Advancing of previous introductions within national programmes*

Activities will include making selections from both introduced and local germplasm, as well as among the VEF and the international disease nurseries, these selections proceeding into national evaluation systems. Selections

similarly will be made among Pan African, regional and zonal nurseries for entry into national breeding programmes.

Attention to bean stem maggot (bean fly) will be intensified. Evaluation of screening nurseries and segregating populations will continue, and promising materials as putative sources of BSM tolerance will be further evaluated in reconfirmatory nurseries from which selections will be advanced as entries in an African Bean Stem Maggot Nursery (ABSMN).

1.3 *Strengthening of national systems for cultivar development*

Review priorities among sites for national cultivar trials on an agro-ecological basis, and catalyze linkages between separate institutions comprising national agricultural research and development systems.

1.4 *Specialist input given to techniques of field evaluation of germplasm*

Regional breeders for CIAT bases at Selian and Bunda to be identified, become established and become familiar with needs and opportunities for bean improvement in the SADCC region. Technical visits will be made to national breeding programmes in response to requests for assistance.

Attention will be given in particular to means of improving the precision of insect pest and disease resistance screening nurseries as well as to support in the analysis and management of trial data, including systems for the combined analysis of data across sites, seasons, zones and regions, and the interpretation of interactions.

1.5 *Specialist input given to systems for the evaluation and diffusion of promising cultivars on farm*

Activities will vary according to the needs and stage of development of on-farm research in a given country. The on-farm evaluation of promising materials will be stimulated in national programmes where this is not yet common practice. Where on-farm cultivar trials are well-established, steps will be taken to institutionalize such trials, especially through strengthening linkages between national bean commodity teams, farming systems research teams, and extension. Pilot schemes for small scale seed production

will be developed and evaluated, in conjunction with other agencies.

1.6 *Technical contribution to the SADCC region by the LIAT anthropologist based in Rwanda*

Methodology for farmer participatory research developed in Tanzania will be extended to other SADCC countries, beginning with Malawi, so as to improve the precision of breeder selection for farmers' needs.

1.7 *Technical contribution to the SADCC region by the LIAT economist based in Uganda.*

Activities will include :

- Survey of bean cultivars across countries of SADCC region.
- Investigate association between seed type and market prices.
- Investigate, test and evaluate methods for the distribution of newly released cultivars across the region.
- Study the economics of bean breeding.
- Assess potential demand for beans in Lesotho and investigate seed distribution methods for new cultivars.
- Investigate consumer acceptability of Carioca in Zimbabwe.
- Continue bean cultivar study in Zambia and assess consumer preferences for grain characteristics.

1.8 *Technical contribution to network research conducted through regional collaborative research sub-projects and post-graduate research*

Technical input will be intensified on the following research topics :

- Bean stem maggot resistance screening to identify parents for use in a breeding programme; development of systems for evaluating progenies (Tanzania, Mozambique, Zambia).
- Biology of aphids, especially with regard to their role as virus vectors (Zambia, Tanzania).
- Development of BCMV resistance screening methods and breeding for resistance to black root (Tanzania, Zimbabwe, Zambia; links to Uganda).
- Biology and management of bruchids on beans in storage, including incorporation of genetic resistance into acceptable backgrounds (Zimbabwe, Tanzania).
- Biology of pod-sucking bugs (Lesotho)
- Host-pathogen relationships in anthracnose (Zambia, Tanzania).
- Development of methods for handling the common bacterial blight pathogen; the investigation of pathogenic variability and host resistance; identification of parents for a CBB breeding programme (Uganda; links to Tanzania).
- Resuscitation of research on angular leaf spot (Malawi, Zambia, Tanzania; links to Zaire).

**PROGRAMME OBJECTIVE 2 :** *To develop improved cropping systems and agronomic practices for bean production, in collaboration with national programmes.*

2.1 *Conduct diagnostic surveys and exploratory trials in important bean producing areas not yet covered adequately*

- Diagnostic surveys of Monduli District, Arusha and the Pare Mountains, Kilimanjaro, Tanzania.
- Continuation of exploratory trials in Arusha and Kilimanjaro Regions, Tanzania, and initiate them in Mbala District, Zambia.
- Continuation of diagnostic on-farm fertilizer trials in Tanzania and Zambia.
- Conduct systematic survey of "Problem Y" in northern Tanzania.
- Conduct on-farm bean stem maggot control trial.
- Initiate on-farm research with beans in Embu and Machakos, Eastern Province, Kenya.

2.2 *Technical contribution to KAPLL region by CIM cropping systems agronomist based in Uganda*

- Diagnostic and remedial research on soil infertility problems in banana-bean systems in Kagera Region, Tanzania.
- Assemble entries for an African Network for Screening against Edaphic Stresses (ANSES), guide the identification of appropriate sites and systems of evaluation, and distribute the nursery.

2.3 *Technical contribution to SAVCC region by CIAI economist in Uganda, to :*

- Develop and evaluate methods to analyze impact of pests and diseases on bean yield.
- Conduct economic analysis of fertilizer use on-farm (Tanzania).

2.4 *Assist national programmes in setting research priorities and planning trials on agronomic topics in response to farmers' needs.*

2.5 *Collaboration with national programmes in conduct and evaluation of agronomic trials on-station*

- Nutrient budget in maize-bean association.
- Nutrient budget and erosion control in agroforestry systems with beans (Lushoto, Tanzania).
- Temporal and spatial arrangement of maize and climbing beans.
- Strip intercropping studies.

2.6 *Collaboration with national programmes in development and evaluation of on-farm research*

- Catalyze OFR programmes with Malawi, Mozambique and Swaziland.

2.7 *Technical contribution to network research conducted through regional collaborative research sub-projects*

Technical input will be intensified on the following research topics :

- Screening for drought tolerance and investigation of the underlying mechanisms; validation of tolerance possessed by entries in the ABDREN; identification of parents for use in breeding, and development of a crossing programme to incorporate drought tolerance into appropriate backgrounds (Malawi, Zambia).
- Screening for tolerance to specific nutrient stresses, including the management of the ANSES and the phosphorus sub-project (Tanzania, Zambia). Investigate feasibility of extension to other countries, perhaps including Angola and Lesotho.
- Reactivate research on biological nitrogen fixation and strengthen regional network, in part through the Senior Research Fellowship (Malawi, Zambia, Tanzania, Zimbabwe).
- Reorientate the research network on cropping systems (Zambia et al.).

**PROGRAMME OBJECTIVE 3 :To strengthen national programmes, especially through training**

3.1 *Technical contribution to SADCA region by CIAT training officer in Ethiopia*

- Evaluation of CIAT training for African scientists.
- Production of a training manual on bean research methods.
- Initiation of a scholarship committee, if ratified by Steering Committee.
- Implementation of training programme with particular emphasis on short courses in region, as indicated below.
- Assistance to development of more effective information exchange through the conduct of regional workshops and working group meetings.

3.2 *Pan-Africa, Regional and in-country courses*

- Pan-Africa training course on farmer participatory research, Arusha, Tanzania, May 1991.
- Crop management research training (CMRT), Egerton University, Kenya (March) April-Oct, 1991.
- Pan-Africa bean stem maggot resistance screening methods training course, Bujumbura, Burundi, Nov, 1991.



- In-country training course on on-farm research and production, Lyamungu, Tanzania, June 1991.
- Pan-Africa training course on pathogen inoculation methods, Butare, Rwanda, Oct. 1991.
- On-farm research/farming systems perspective workshops : experimental phase training course, University of Zimbabwe, Sept-Oct, 1991.

### 3.3 *Individual training on short courses at CIAT*

- Two lusophone scientists (one each from Angola and Mozambique) to take part in multidisciplinary course (in Spanish) followed by individual training, (Feb-) Apr-Jul 1991. Mozambique participant in part supported by SEMOC.
- Three senior scientists (from Zambia, Zimbabwe and Tanzania) to visit CIAT-HQ en bloc, May-June, 1991.
- A group of three NP scientists (from Swaziland, Tanzania and Zimbabwe) to take part in multidisciplinary course (in English) followed by individual training, March (onwards), 1992.

### 3.4 *Academic scholarships for higher degrees*

- Seven post-graduates from the region are currently on training. Five are at the PhD level and two at Masters level. Two of the PhD students are conducting research in-region. (Two further Masters students have completed their degrees successfully).

### 3.5 *Supervision of post-graduate thesis research conducted in-region*

- Pathologist/Coordinator co-supervisor of Mukoko's thesis.
- Entomologist co-supervisor of Pomela's thesis.
- Travel to region by outside supervisors (Drs. Galwey and Kish).

### 3.6 *Training materials*

- Production of additional audiotutorial units, including field pests, field experimentation and on-farm research methods.
- Manual on pests and diseases.

### 3.7 *Stimulate exchange of information throughout broad research network and provide fora for setting research priorities and presenting results*

- Pan-Africa working group meeting on biological nitrogen fixation. Lilongwe, Malawi, Oct./Nov. 1991.
- Publication of proceedings of workshops and working group meetings held previously.
- Distribution of sources of information, including audiotutorial units, publications in the CIAT Pan-Africa series, CIAT's pages of contents; up-date mailing lists and

identify new recipients at national institutions, incl. universities.

3.8 *Strengthen network research through provision of small items of research equipment to national programmes*

**PROGRAMME OBJECTIVE 4 : *To improve the efficiency of programme management.***

- Recruit a Senior Administrative Officer for Arusha.
- Set-up an office at Bunda College in Malawi, and recruit local support staff.

APPENDIX 3. SUMMARY OF REQUESTS FOR GERMPLASM

COUNTRY	MATERIAL	SOURCE	STATUS
WD	AFBYAN III (One set)	CIAT-E.Af.	AFBYAN II ordered at 8th SC
	IBNHB (One set)	CIAT-HQ	IBNHB ordered from Tz at 8th SC; both repeat requests
	VEF	CIAT-HQ	New request
	AFR 244	CIAT- ?	Bulk (20 kg) needed by Nov 91
ZA	AFBYAN III (2 sets)	CIAT-E.Af.	All new requests
	AFBYAN Climbers (2 sets)	CIAT-Rwanda	"
	VEF (large seeded, protected I gene)	CIAT-HQ	"
	F2 populations (large seed, protected I gene)	CIAT-HQ	"
	Acid tolerant lines (eg. ANSES)	CIAT-E.Af.	"
	IBCMERN (one set)	CIAT-HQ	"
	Differential sets for BCMV, ANT, ALS (more seed than normally sent, because viability usually poor)	CIAT-HQ	"
	Regional CBB Nursery	Uganda (Opio)	"
	Regional Rust Nursery	Ethiopia (Habtu)	"
	Regional ALS Nursery	Malawi (Msuku)	"
AN	IBYAN (group to be given; 3 sets)	CIAT-HQ	All new requests, by August 91 consign to Manuel Barata, National Seeds Prog., Luanda
	AFBYAN III (2 sets)	CIAT-E.Af.	
	VEF (max 300 entries, but wide diversity in size and colour except black)	CIAT-HQ	
	IBAT (one set)	CIAT-HQ	

APPENDIX 3. SUMMARY OF REQUESTS FOR GERMPLOSM (Cont.)

MO	AFBYAN III (2 sets)	CIAT-E.Af	New requests
	AFBYAN climbers (one set)	CIAT-Rwanda	"
	Local germplasm	Malawi	"

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MW	AFBYAN III (one set)	CIAT-E.Af.	New requests
	AFBYAN climbers (one set)	CIAT-Rwanda	(by Oct 91)
	IBAT (one set)	CIAT-HQ	"
	BALSIT (one set)	CIAT-HQ	"
	VIB (one set)	CIAT-HQ	"
	IBNHB (one set)	CIAT-HQ	"

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**APPENDIX 4:**

**STATUS OF ORDERS OF EQUIPMENT FOR NATIONAL PROGRAMMES**

Country Item	Qty	Date Ordered	Cost USD	Suppliers/ Agents	Shipped	Status/ Action
<b>ANGOLA</b>						
Projector	1	18/6/88	\$ 1180.00	ICC	10/12/88	Received
Small bundle thresher	1	9/7/88	\$ 3547.00	Almaco/ICC	30/11/88	Received; satisfactory
Planter with ribbed V-belt	2	9/7/88	\$ 5370.00	Almaco/ICC	30/11/88	Received; not satisfactory. RP to investigate specifications. (No detailed specifications received).
Sprayers	4	29/8/88	\$ 619.00	ICC	20/9/88	Received
Precision balance	1	28/11/88	\$ 733.50	Salter, UK	17/1/89	Received
Portable type- writer 'Azerty'	1	11/4/89	\$ 294.00	ICC	5/8/89	Lost in transit. Replacement approved.
Altimetres	3	5/6/89	\$ 495.00	ICC	7/2/90	Received - 10/2/91
Motorcycles	2	4/9/90	\$ 9633.57	ICC	9/11/90	Received in Luanda - 28/2/91 (bill of lading delayed by 2 months).
Landrover spares						List of spares requested
Culture media (PDA)						Information on quantity and type requested.
<b>BOTSWANA</b>						
Sound/Slide Projector	1	16/9/87	\$ 1100.00	Dukane/CIAT	20/2/88	Received
<b>LESOTHO</b>						
Projector	1	18/6/88	\$ 1180.00	Dev. Corp/ ICC	19/7/89	Received
Small bundle thresher	1	15/8/88	\$ 3182.00	Almaco/ICC	-	Received
Altimeter	1	14/9/88	\$ 163.00	ICC, Nbo	5/10/89	Received
Telex Caramate Autofocus	1	25/3/89	\$ 1455.00	ICC, Nbo	30/5/89	Received
Digital Protometer	1	12/11/90	\$ 589	Protometer U.K.	12/11/90	Received

Country Item	Qty	Date Ordered	Cost USD	Suppliers/ Agents	Shipped	Status/ Action
<b>MAJAWI</b>						
Sound/Slide Projector	1	16/9/87	\$ 1110.00	Dukane/CIAT	9/2/89	Received
Motorcycles	3	10/11/88	\$ 6150.00	Jackys Dubai	27/12/88	Received
Altimeter	1	14/9/89	\$ 163.00	ICC, Nbo	5/10/89	Received
Spares for Land Rover	1	Apr/90	\$ 1497.47	Local purchase	1/4/90	Received
Small bundle thresher	1	19/11/90	\$ 3363.65	Almaco	5/6/91	Received
Soft sterilizer	-					Approved at 6th SC. Payment confirmed by us to local suppliers (scientific & Technical Services) on receipt of invoice apparently lost in transit Arusha.
Computer, IBM P/S 2 model 30	-					Quotation sent to Arusha but not received.
Knapsack sprayers 2 CP5, 151						Approved. Payment of \$2300 made for local purchase on 8/3/91
Typewriter, Olivetti Et 2500	1					
Moisture Metre						
Humidifier (for inoculation)	1					Locally available.
<b>MOZAMBIQUE</b>						
Precision Balance	2	17/8/88	\$ 1440.00	Salter UK	18/10/88	Received
Motorcycles	2	17/8/88	\$ 4460.00	Jackys Dubai	24/9/88	Received
Tapes	4	2/9/88	\$ 813.00	ICC Nbo	20/9/88	Received
Clothing	4	2/9/88	\$ 582.00	ICC Nbo	20/9/88	Received
Gumboots	6	2/9/88	\$ 304.00	ICC Nbo	20/9/88	Received
Sound Slide Projector	1	8/12/88	\$ 1180.00	ICC Nbo	22/3/89	Received
Projector lamps	2	29/3/89	\$ 69.70	ICC Nbo	30/5/89	Received
Altimeters	2	5/6/89	\$ 330.00	ICC Nbo	8/6/89	Received
Digital Protometer	1	12/11/90	\$ 589	Protometer U.K.	12/11/90	Received
Storage Jars		21/11/90				} Specs sought from NP.
Seed envelopes						} Local purchase ?
Staplers						

Country Item	Qty	Date Ordered	Cost USD	Suppliers/ Agents	Shipped	Status/ Action
<b>SWAZILAND</b>						
Knapsack Sprayers	3	23.3.90	\$ 417.69	Ngwane scale	23/3/90	Received
Lab. Scale	1	23.3.90	\$ 2229.23	-do-	-do-	Received
Precision Balance	1	23.3.90	\$ 1945.00	-do-	-do-	Received
Glass Jars	500	23.3.90	\$ 491.77	Jumbo Discounters	24/5/90	Received
Boom sprayer	1		\$ 2043.93	Agromech	8/10/90	Received
Digital Protometer	1	12/11/90	\$ 589	Protometer U.K.	12/11/90	Received
Altimeters	2		\$ 326.00	ICC	4/3/91	Received
Bulk thresher	1		\$ 3500.00	Almaco	4/5/91	Awaiting confirmation of receipt.
Seed drying oven	1					Specifications given to RP. SC approval given to proceed with order.
Short-term seed store for bulks						Specifications sought.
<b>TANZANIA</b>						
Small bundle thresher	1	9/7/88	\$ 3342.00	Almaco/ICC	31/10/88	Received
Precision Balance	1	17/8/88	\$ 742.00	Salter UK	23/10/88	Received
Knapsack Sprayers	2	25/4/89	\$ 1339.90	ICC Nbo	17/5/89	Received
Altimeters	4	14/9/89	\$ 654.00	ICC Nbo	5/10/89	Received
Moisture Meter	1	1/11/89	\$ 426.00	Protometer	18/12/89	Received
Photocopier	1	23/1/90	\$ 3000.00	ICC Nbo	23/2/90	Received
Typewriter	1	23/1/90	\$ 750.00	ICC Nbo	"	Received
Motocycles	2	15/1/90	\$ 4485.00	Jackys, Dubai	3/2/90	Received
Developer & Toner	1	15/3/90	\$ 131.22	ICC Nbo	23/2/90	Received
Precision balance	1	26/11/90	\$ 765.00	Salter U.K.	31/1/91	Received
Mattson cookers and hot plates	2	13/6/91		CIAT Co		In process
Laboratory ware	-	3/7/91				Quotation costs sent to Dr. Mushi on 3/7/91. (USD 5,000 ceiling).

Country Item	Qty	Date Ordered	Cost USD	Suppliers/ Agents	Shipped	Status/ Action
<b>ZAMBIA</b>						
Altimeters	1	14/9/89	\$ 163.00	ICC Nbo	5/10/89	Received
Seed Storage Jars	4000	29/3/89	\$ 3923.11	ICC Nbo	26/4/89	Received
Agfa slide film	1		\$ 8.16	ICC Nbo	Aug. 89	Received
<b>Screenhouse renovation</b>						
: mesh	1	14/5/91	\$ 1262.35	Nicofence U.K.	10/6/91	Awaiting confirmation of receipt.
: Nicofence sheet UV1 polthene	2	14/5/91	\$ 325.00	Nicofence U.K.	10/6/91	-do-
<b>Seed store rehabilitation</b>						
: AC units	3		\$ 3000.00	ICC Nbo	4/5/91	-do-
: Dehumidifier						On hold, pending RP testing of model in Arusha.
: Insulation and shelves						) Payments to be made to
: Renovation of rooms						) NP for local work.

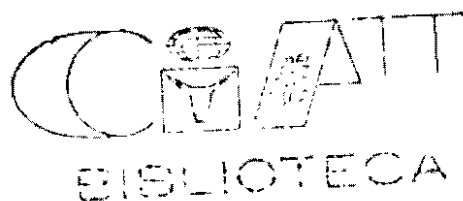
**ZIMBABWE**

Altimeter	1	14/9/89	\$ 163.00	ICC Nbo	5/10/89	Received
Balance	1	25/3/88	\$ 1211.00	Salter/ Lambourns	20/4/88	Received
Small bundle thresher	1	9/7/88	\$ 2853.75	Almaco/ICC	18/10/88	Received
Mattson drop cooker	1		\$ 100.00	CIAT Co.	16/1/91	Received



## APPENDIX 5 : PUBLICATIONS OF THE CIAT PAN-AFRICA WORKSHOP SERIES

- No. 1 Bean fly Workshop, Arusha, Tanzania, 16-20 November, 1986.
- No. 2 Bean Research in Eastern Africa, Mukono, Uganda, 22-25 June, 1986.
- No. 3 Soil Fertility Research for Bean Cropping Systems in Africa, Addis Ababa, Ethiopia, 5-9 September, 1988.
- No. 4 Bean Improvement in Africa, Maseru, Lesotho, 30 January - 2 February 1989.
- No. 5 L'Amelioratiuon du Haricot dans la Region des Grands Lacs, Kigali, Rwanda, 18-21 Novembre 1987.
- No. 6 First SADCC Regional Bean Research Workshop, Mbabane, Swaziland, 4-7 October 1989.
- No. 7 Second Workshop .on Bean Research in Eastern Africa, Nairobi, 5-8 March 1990.
- No. 8 Workshop on Biological Nitrogen Fixation of Beans in Africa, Rubona, Rwanda, 27-29 October 1988.



APPENDIX 6. A REVISED PROPOSAL FOR A WORKING GROUP MEETING ON  
IMPROVEMENT OF BIOLOGICAL NITROGEN FIXATION IN  
*Phaseolus* BEANS

Nature : Pan-African

Dates : 28 Oct - 01 Nov., 1991, Malawi

Introduction and Objectives

Nitrogen deficiency limits production in many bean growing areas and different cropping systems. Research directed toward overcoming this constraint by increasing biological nitrogen fixation (BNF) requires a multidisciplinary effort to improve both the plant genotype and *Rhizobium* strain of the symbiosis.

This working group meeting aims to bring together agronomists, soil scientists, microbiologists and plant breeders. It will combine lectures, a review of recent BNF literature, practicals for standardizing methods and discussions of future research plans. Important objectives will be the resuscitation of a collaborative sub-project for the SADCC region, led by Malawi, and its more effective linkage with sub-projects on BNF elsewhere in Africa.

Programme and Activities

COUNTRY REPORTS AND REGIONAL ACTIVITIES

Each participant should bring to the meeting a 4-page paper that summarizes the following : past BNF research on all legumes; present status with information on people, institutions and facilities available for BNF research; results of research on bean BNF in the last 2 1/2 years (tables of data); and problems encountered.

REVIEW OF BNF IMPROVEMENT STRATEGY

- Stage 1. Determination of N as a limiting factor; trial designs, OFR results.
- Stage 1. *Rhizobium* management; inoculant and preparation for trials.
- Stage 2. Breeding beans for improved BNF; criteria for varietal selection.
- Stage 2. *Rhizobium* strain selection; problems of competition.
- Stage 3. On-farm (OF) evaluation of factors limiting expression of an improved symbiosis.
- Stage 4. Extension, inoculant and seed production.

## APPENDIX 6. Cont.

### FIELD WORK

- Sow a *Rhizobium* strain screening trial
- Evaluate bean genotypes in the AFBYAN for early nodulation
- Sow an OF inoculation trial; bean-sorghum intercrop

### INDIVIDUAL AND REGIONAL PLAN PREPARATION AND DISCUSSION

Bring along cultures of any *Rhizobium phaseoli* strains that can be recommended for testing throughout the network.

### PARTICIPANTS (from SADCC Region)

Malawi	(3)
Swaziland	(1)
Tanzania	(1)
Zambia	(2)
Zimbabwe	(1)

### BUDGET ESTIMATE

Approx US\$ 9,850

## APPENDIX 7. A REVISED PROPOSAL FOR AN ON-FARM RESEARCH AND SOIL FERTILITY TRAVELLING WORKSHOP

NATURE : Pan-African

DATES : Early 1992.

PARTICIPANTS :

12-14 Agronomists/Soil Scientists conducting on-farm research and soil fertility trials in Eastern Africa, Great Lakes and SADCC/CIAT Regional Bean Programmes. Seven places for SADCC Region assigned as follows : AN (1), LO (1), MW (1), TZ (1), WD (1), ZA (2).

OBJECTIVES :

1. To bring together national and regional scientists concerned with on-farm research and soil fertility trials in cropping systems with beans to tour main bean growing areas and contrasting cropping systems.

2. To discuss and devise strategies appropriate to other areas for improving on-farm research, farmer seed production on-farm and the productivity of beans in a low input and sustainable manner.

RATIONALE :

The Mid-term Review's Draft Report drew attention to the rather meagre use made by SADCC/CIAT of regional monitoring tours, and it was minuted at the 9th Steering Committee meeting that there was indeed value in such monitoring tours (which might be better referred to as 'field - or travelling - workshops') for both breeding and cropping systems, particularly if more closely linked to network research, especially to regional collaborative sub-projects.

What is proposed here is a travelling workshop linked to the cropping systems sub-project in an area wherein on-farm research with beans is active and where soil fertility management is crucial, albeit across a wide range of farming systems, and so providing valuable contrasts.

PROPOSED ITINERARY :

- 20/10 Arrival in Bukoba, Tanzania. Night at Bukoba.
- 21-22/10 Visit OFR programme in Bukoba District. Discussions on 22/10 from 3-7:00 pm. Nights at Bukoba.
- 23/10 Depart Bukoba at 8:30 am to go to Uganda. Visit on-farm trials in Rakai district. Night in Masaka.

- 24/10 Depart Masaka. Visit local OFR programme (10:30-3:00). Proceed to Kabale. Night at Kabale.
- 25-26/10 Visit trials of National Bean Programme, Cooperative American Relief Everywhere (CARE) and Agroforestry Research Network for Africa (AFRFUA). Discussions the afternoon of 26/10. Night at Kabale.
- 27/10 Depart Kabale for Butare, Rwanda. Night at Butare.
- 28-29/10 Visit on-station bean research and soil fertility work at Rubona. Observe "farmer seed experts" evaluating varieties on-station. Visit on-farm research of bean programmes and German Agency for Technical Cooperation (GTZ) project. Nights at Butare (28-30/10).
- 30/10 Discussion; participants then draft recommendations for on-farm and soil fertility research in their own countries.
- 31/10 Departure.

#### BUDGET ESTIMATE

Pending.

## APPENDIX 8.

### BEAN MONITORING TOUR SOUTHERN, EASTERN, NORTHERN AND LAKE ZONES OF TANZANIA.

#### Objectives:

- (1) To visit and assess bean trials in various trial sites and farmers' fields in Morogoro, Iringa, Mbeya, Rukwa, Ruvuma, Tanga, Kilimanjaro, Arusha and Kagera regions.
- (2) To assess newly released varieties in Foundation Seed Farms.
- (3) To identify current bean production constraints on farmers' fields.
- (4) To establish the existing variability of beans in markets and on farmers' fields.

DATE: 14th - 30th April 1991

ITINERARY: (all by road)

14th April	Lyamungu - Morogoro
15th April	Morogoro - Mbeya
16th April	at UAC
17th April	Mbeya - Mbimba (Visit trials at Mbimba) Mbimba - Sumbawanga (Night in Sumbawanga)
18th April	Sumbawanga - Nkundi (Visit trials at Nkundi - Night in Sumbawanga)
19th April	Sumbawanga - Mbeya
20th April	Mbeya - Songea (Visit trials at Ndengo - Night in Songea)
21st April	Songea - Suluti (Visit trials at Suluti) Suluti - Songea - Iringa (Night in Iringa)
22nd April	Iringa - Ismani (Visit trials) Ismani - Dabaga (Inspect Uyole 90 and Ilomba varieties).
23rd April	Iringa - Ilonga (Visit trial at Ilonga) Ilonga - Gairo (Visit trials at Gairo) Gairo - Morogoro (Night in Morogoro)
24th April	Morogoro - SUA and Morningside (Visit trials at SUA and on-farm).

25th April Morogoro - Lushoto (Visit trials in Lushoto - Night in Lushoto)

26th April Lushoto - Moshi (Night in Moshi)

27th April Moshi - Lyamungu, Miwaleni and on-farm (Visit trials)  
Moshi - Arusha (Night in Arusha)

28th April Visit trials at Selian  
Inspect Lyamungu 85 and Lyamungu 90 at Arusha seed farm.

29th April Visit on-farm trials in Arusha.

30th April Participants depart for their respective stations.

#### **LAKE ZONE**

**DATE:** 23rd November - 1st December 1991.

**ITINERARY:** (All by road)

23rd November Moshi - Kahama

24th November Kahama - Bukoba

25th November Bukoba - Maruku (Visit trials at Maruku and on-farm trials in Bukoba District).

26th November Bukoba - Muleba (Visit trials in Muleba Districts and interview farmers).

27th November Bukoba - Kagera (Visit trials in Karagwe District and farmers' fields).

28th November Karagwe - Kituntu (Visit trials at Kituntu and farmers' fields).

29th November Karagwe - Ngara (Visit farmers' fields and interview them in their cropping system).

30th November Ngara - Bukoba

31st November Bukoba - Singida

1st December Singida - Arusha and Moshi.

#### **PARTICIPANTS.**

Are Breeders, Pathologists, Entomologists, Agronomists and Social Scientists from SUA, Selian, Lyamungu, UAC and Maruku Institutes.

COSTS.	US\$
(1) Transportation for Southern, Eastern and Northern Zones (Fuel and incidental repairs).	8,933.
(2) Transportation for Lake zone (Fuel and incidental repairs) .	3,765.6
(3) Accommodation and meals	7,575.7
(4) Out-of-pocket allowance	1,680.
TOTAL	<u>21,954.3</u>



**APPENDIX 9.**

**NOTES FOR INFORMATION OF AND  
CONSIDERATION BY STEERING COMMITTEES**

*Jeff Mutimba*  
**February 1991**

## 1. Evaluation of Training and Training Needs

Between March - August 1990, two separate , but complementary exercises were carried out in Eastern and Southern Africa. One was an evaluation of past training, and, the other was a survey of training needs. Each of the above was carried out by means of a questionnaire.

### 1.1. Evaluation of past training

The following conclusions can be made from the training evaluation forms received:

- a) training provided was relevant;
- b) identification of trainees was correctly done;
- c) participants were able to use most of the skills/ knowledge taught on courses;
- d) there was no significant loss of trained personnel through re-assignments.

With regard to 'research methods' courses, there was a strong suggestion that future courses should allow more time for the sessions on insect-pest and disease identification and assessment than in the past. Inclusion of agro-meteorology and irrigation need to be re-examined in future agronomy courses.

The survey gave an indication of where training was successful, what improvement is needed and where further training is required. However, the survey did not answer the 'WHY' and 'WHY NOT' questions. It did not establish the conditions that would have lead either to the successful application of knowledge/skills nor did it answer the question 'WHY' training (or further training) was required.

Subsequent discussions on the issue produced the following recommendations to further improve the quality of training.

- During any training course, each participant develops a field project that allows for application of knowledge and skills taught and at the same time meet national or institutional programme objectives.
- Senior scientists follow-up the participants in the field and guide them through their projects.
- The successful completion should be announced, e.g. through institutional channels, workshops or regular reports.

Some countries might even want to use such 'achievement' reports for the purposes of advancement (in salary increases, promotion etc).

## 1.2 Survey of training needs

Training needs received from fifteen out of sixteen countries surveyed indicate that training is required in the following areas:

- a) Bean research methods (for both technicians and scientists);
- b) On-farm research;
- c) Bean production;
- d) Bean seed production;
- e) Computer applications
- f) Post-graduate training

These should all be considered in drawing up future plans. A table showing the level of demand is attached.

There are however other important needs which for one reason or another, were missed and need consideration.

### a) Bean production training for extension staff

In many national programmes there is serious information gaps between research and extension.

- Extension staff have no access to research results (no joint training courses, meetings, workshops nor publications).
- Extension staff therefore make recommendations they are not sure of themselves.

There is therefore need to consider strategies and mechanisms for technology transfer when preparing future plans. Since research institutions could not possibly train all extension staff, training trainers (senior extension staff) would be an option.

### b) Training skills

Training is essentially an activity of the national programmes. Therefore efforts should be made to strengthen their capacity to carry out this activity.

If this objective is to be achieved, senior scientists will need a range of training skills which include identification of training, preparations of training materials, training methods, communication etc.

## 2. Workshop on Co-ordination of IARCs Training Activities in Africa: Nairobi: 26 - 28 November, 1990

A workshop of IARCs trainers in Africa was held to:

- share information of training programmes and centres research priorities.
- identify potential areas for inter-centre collaboration in training.
- map out strategies and mechanisms for strengthening the existing collaboration.

There was apparent concern about the lack of inter-centre collaboration in training in Africa. The meeting recognised that, between them, IARCs operating in Africa had resources that could enable the centres to achieve much more than each one of them was able to individually.

Several subjects with many similarities across commodities were identified and, in order to strengthen existing collaboration in training in Africa, the meeting made the following recommendations:

- share information on training events on a regular basis (IITA will establish and maintain a data base on IARCs collaborative group training in Africa).
- joint planning and implementation;
- collaboration in development of training materials, including software;
- centres assist each other in managing individual training fellowships.

The meeting observed that national programmes need to articulate their human resource development needs accurately so that Centres can better target their individual or inter-Centre training efforts. Some studies exist in the region. ISNAR was to provide information to other IARCs on human resource development studies from NARS to which it has access.

## 3. Training at CIAT Headquarters

Training at CIAT Headquarters has been restructured.

- a) Long multi-disciplinary training courses for entry-level scientists (junior scientists) will be done every two years (for English speaking candidates) between March-June starting 1992.

- i) 2-3 weeks short course on basics
  - e.g. - morphology
  - introduction to diseases, pests, soils, etc.
  - statistics, computer application
- ii) 2-3 months discipline-specific courses
  - Breeding 6-7 people
  - Entomology 4-6 people
  - Pathology 6-8 people
  - Microbiology 2-3 people
- b) Short specialised training courses for mid-career scientist (senior scientists) would be run every year in May. Dates for the first one under the new system are 13 May - 9 June 1991.
- c) A farmer participatory course will also be run at CIAT, October - November 1991. Up to two participants from Africa may be accepted.

All applications should be in Cali, Colombia, by September 30.

#### 4. Scholarship Committee

Following an earlier proposal approved by the SADCC/CIAT Steering Committee at its Ninth Meeting in Tanzania, the following suggestions are made as a way forward.

- 4.1 The committee should be formed at the earliest opportunity to allow time for it to become operative before any new money becomes available.
- 4.2 The first meeting should examine in detail and agree on:
  - the terms of reference;
  - whether regional or pan-African responsibilities;
  - how the committee will operate;
  - composition of the committee and length of term of office;
  - frequency of meetings.

#### b) Terms of reference

As suggested earlier, the specific functions of the committee would include;

- assessing and consolidating degree level training needs within the region;
- identifying degree level training opportunities within the region;
- soliciting for special support and consideration to regional programme needs by local and other universities;
- establishing collaboration with universities;

- reviewing the terms of scholarship awards;
- receiving, considering and processing applications for scholarships;
- monitoring the progress of the recipients of these scholarships;

**b) Area of operation**

It is suggested that initially the committee will have pan-African responsibilities with a provision to devolving its responsibilities to regional institutions like SACCAR in the SADCC region.

**c) Status of the committee**

The committee will operate as a subcommittee of the regional SCs to which it will submit reports on its findings and recommendations.

**d) Composition of the committee**

The committee will be composed of not more than seven people who will include:

- 1 CIAT Pan-African R.C.
- 1 CIAT T.O.
- 1 Steering Committee member
- 1 SACCAR T.O
- 3 'invited' representatives from universities and research institutions.

The three invited representatives will be chosen on the basis of their;

- familiarity with and interest in bean research in Africa
- familiarity with university training opportunities in Africa.

**e) Term of Service**

The need to stipulate the length of time a member should serve on the committee is debatable since;

- i) CIAT and SACCAR are likely to be represented by the occupants of the positions specified above.
- ii) Other members are invited on the basis of their potential contribution and not necessarily to represent their institutions or regions.
- iii) As we will be working towards devolving the responsibility to the regional institutions, the nature of the committee is likely to change anyway.

In any case, members should serve for not less than four years to allow them to see through at least one group of trainees so their experience can benefit future policy direction.

f) **Frequency of meetings**

Meetings are expensive. The committee will meet once per year to review their programme and allocate tasks. The meeting will coincide (1-2 days before) with one of the SC meetings.

It should always be possible for the committee to be represented at all the other SC meetings by any one of its members. The RC and the SACCAR T.O. are already members of SCs in their respective regions. Communication between the members of the committee will largely be by regular correspondence.

5. **Audio-Tutorial Units**

The following are at various stages of production:

OFR  
Field pests  
Field experimentation  
Soil nutrients diagnostic methods

New topics for ATUs are:

Weeds  
BNF  
Disease

6. **Africa Publication Series**

The following are pending:

a) **Occasional Papers**

<u>Title</u>	<u>Editor/Author</u>
No 3B AFBYAN - 1 Analyses	JBS/BG
No 4 Beans in Sub-Saharan Africa	BG
No 5 Climbing Beans	
No 6 Bean Research Training Manual	JM

b) **Workshop Series**

No 6 Swaziland 1989	With Book Corner
No 7 Nairobi 1990	" " "
No 8 Rubona (BNF) 1988	" " "

Kigali (Pathology) 1987	JBS
Harare (Drought) 1988	OTE
Nairobi (Entomology) 1989	KA
Kampala (Virology) 1990	DJA
Soil Fertility & Cropping System 1990	CW
GLR Workshop 1988	
GLR Workshop 1989	

#### 7. OFR/FS Training: University of Zimbabwe

The next phase (Experimental Phase) will be 30 September - 11 October 1991.

#### 8. Post-graduate training opportunity

The University of London, Wye College, offers an MSc and Postgraduate Diploma in Agricultural Development for External Students.

The course should be considered for economists seeking further training. The costs are reasonable and candidates study while continuing in full-time employment.



Table 11.

## EASTERN AND SOUTHERN AFRICA

## TRAINING NEEDS IDENTIFIED (1990)

Number of people requiring training

	AN	BD	ET	KE	LG	MO	MR	MS	MW	SD	SU	TZ	UG	WD	ZA	ZW	TOTAL
Research methods for certificate holders				1					5	2			8		3	2	21
Research methods for diploma holders		1	23						4		1	12		12	2	2	57
Research methods for degree holders	2	2	3	3			3		4						6	1	24
Project Management									2						3		5
Evaluation of lab methods															1		1
Bean production								2	4						14		20
Bean seed production				2				2	6				4	4	14		32
Bean seed testing & cert.								4						4	21		29
Physiology (drought)			1	4					2		1						8
Agronomy			6	5				2	4		1						18
Breeding	2		3	2			1		4		1					1	14
Pathology	1		4	5			1	2	4		1			1		1	20
Weed Management				5					1		1			1			8
MSTAT			1	5					5						3		14
Data entry for technic.													4				4
Economics			3	4											1		7

Table 11. Continuation

	AN	BD	ET	KE	LO	MO	MR	MS	MW	SO	SU	TZ	UG	WD	ZA	ZW	TOTAL
Agroclimatology			2						2								4
Visit CIAT			1						4								5
Pest Management			3	4			1	1	4	1							14
Farming systems research/ext.													2				2
Soil Science	3		1	4			1		3								12
Farm Management			1														1
Management of research prog.										1						2	3
B.Sc			1	15					6		4						26
M.Sc	2		16	12					4	2	2	3					41
Ph.D	1			4					3	1	3	4			3	4	22

1. LO:

Interested in a range of training courses and workshops but did not indicate level of demand.

2. ZA:

Include returns from Seed Institute, University and the Research Branch.

**Key**

AN = Angola  
BD = Botswana  
ET = Ethiopia  
KE = Kenya  
LO = Lesotho  
MO = Mozambique

MR = Madagascar  
MS = Mauritius  
MW = Malawi  
SO = Somalia  
SU = Sudan

TZ = Tanzania  
UG = Uganda  
WD = Swaziland  
ZA = Zambia  
ZW = Zimbabwe

APPENDIX 10. SHORT-TERM TRAINING AT CIAT-HQ, 1991-92

Name	Country	Sex	Discipline	Period/Status
Antonieta Bias	MO	F	Multidisc/Breed	Feb-July 91
Gregorio Gongolo	AN	M	Multidisc/Agron	Feb-July 91
Dr. Coy Haciwa	ZA	M	Pathol/Breeding	May-June 91
Dr. Susan Nchimbi	TZ	F	Breeding/Entom.	Postponed to 92
Olivia Mukoko	ZW	F	Breeding/Virol.	May-June 91
Zubeda Mduruma	TZ	F	Multidisc/Breed.	1992
Zodwa Mamba	WD	F	Multidisc/Agron.	Postponed to 92
A. Gubba	ZW	M	Multidisc/Virol.	1992
Dr. Spider Mughogho	MW	M	Microbiol.	Withdrawn
Dr. Lupwayi	MW	M	Microbiol.	May-June 91
Dr. M. Ngwira	MW	F	Food Science	May-June 91
Dr. E.M.T. Mmbaga	TZ	M	Agron.	3 1/2 wks in 92 ?
Dunstan Msuya	TZ	M	Multidisc/Pathol.	Sometime in 92 ?

## APPENDIX 11.

### STATUS OF GRADUATE TRAINING COURSE IN BEAN BREEDING

Comments have been received from Dr. Barry Smithson (BS) and Mr. Jeff Mutimba (JM) regarding the course.

BS suggestions on the coverage of the course have been included in the revised proposal. It was felt that there wasn't enough number of participants. I sent telex message to Heads of National Programmes in the three regions and the following was the outcome.

Eastern Region	:	They prefer to attend such a course in CIAT headquarters.	
Great Lakes	:	No response to date.	
SADCC Region	:	Tanzania	3 participants
		Botswana	no suitable candidate
		Namibia	needed more information which has already been sent
		Malawi	2 participants
		Zimbabwe	1 participant
		Lesotho	none
		Swaziland	1 participant
		Mozambique	no response.

In view of the drop out of the Eastern Region, the course is no longer Pan-African and could be conducted in Arusha if ten or more participants can be identified from the remaining two regions.

JM suggestions were for budget proposal and have been included wherever applicable.

# GRADUATE TRAINING COURSE IN BEAN IMPROVEMENT

## Tentative Venues. (Arusha, Bunda, Msekera)

1. Objectives : 1.1. To hasten bean improvement in the continent through a better understanding, by graduates, of the different techniques employed in bean breeding.
- 1.2. To equip graduates in plant breeding with the necessary knowledge required in bean breeding that they might be lacking.
- 1.3. To practically develop long and short term breeding programmes aimed at solving problem at hand.
- 1.4. To form the basis of regional collaborative nurseries through interactions with one another in this course.
2. Participants : Graduates with B.Sc. or M.Sc from the three regional programmes. They should be breeders working on beans.
- The number should not exceed 16 giving each country at least one slot.
3. Disciplines and Time allocated :
- |       |                     |          |
|-------|---------------------|----------|
| A.    | GENETICS            | 19 hrs.  |
| B.    | PLANT BREEDING      | 70 hrs.  |
| C.    | STATISTICS          | 32 hrs.  |
| D.    | COMPUTER OPERATIONS | 16 hrs.  |
| E.    | PRACTICALS          | 23 hrs.  |
|       |                     | -----    |
| Total |                     | 160 hrs. |
|       |                     | -----    |
4. Courses :
- 4.1. GENETICS :
- 4.1.1. Modes of reproduction - 4 hrs.
- (a) Cell processes in reproduction
  - (b) Cell reproduction
  - (c) Assexual reproduction
  - (d) Show ATU on seed development.

## 4.2. PLANT BREEDING :

- 4.2.1. Heritability - 5 hrs.  
(a) Components of heritability  
(b) Types of heritability  
(c) Factors influencing the magnitude of heritability estimates.
- 4.2.2. Inbreeding 4 hrs.  
(a) Consequences of inbreeding  
(b) Purposes of inbreeding  
(c) Inbreeding in diploid species  
(d) Inbreeding in small populations.
- 4.2.3. Genetic resources of beans (*Phaseolus* spp.) 4 hrs.  
(a) Origin  
(b) Collection of germplasm  
(c) Evaluation  
(d) Utilization  
(e) Maintenance  
(f) Consequences of insufficient genetic diversity  
(g) Minimizing genetic vulnerability  
\*\* (h) Show an audio-tutorial on the Bean Germplasm.
- 4.2.4. Hybridization  
(a) Parent selection  
(i) Characters to be improved  
(ii) Inheritance of character to improved  
(iii) Sources of parental germplasm.  
(b) Population formation by hybridization 4 hrs.  
(i) Types of populations  
(ii) Principles in the formation of a complex population  
(iii) Procedures used to form complex populations  
(iv) Planting arrangements for populations formulation by artificial hybridization  
(v) Polycross procedure.  
(c) Techniques for artificial hybridization 2.5 hrs.  
(i) Reproductive structure and development in beans  
(ii) Techniques for artificial hybridization

(iii) Practical - 4.5 hrs.  
\* Audio - tutorial - Crossing beans.

(d) Interspecific hybridization - 1 hr.  
(i) Objectives  
(ii) Techniques for gene transfer.  
\* Audio - tutorial on bean growth and development.

4.2.5. Breeding methods - 8 hrs.  
(a) Bulk method  
(b) Mass selection method  
(c) Single-seed descent method  
(d) Pedigree method  
(e) Backcross method  
(f) Early generation testing  
(g) Recurrent selection.

4.2.6. Breeding for pest resistance - 8 hrs.  
(a) Types of genetic resistance  
(b) Genetic interaction of plant and pest  
(c) Races of pests  
(d) Mechanisms for diseases resistance  
(e) Mechanisms for insect resistance  
(f) Breeding for specific resistance  
(g) Minimizing changes in races  
(h) Minimizing the impact of new races  
(i) Breeding for general resistance.

4.2.7. Multilines 2 hrs.  
(a) Purpose of mixtures  
(b) Development of multilines  
(c) Evaluation of mixtures  
(d) Commercial seed production of mixtures.

4.2.8. Breeding for specific traits - 20 hrs.  
(a) Diseases : e.g.  
(i) Rust  
(ii) Angular leaf spot  
(iii) Anthracnose  
(iv) Bean Common Mosaic Virus  
(v) Halo Blight  
(vi) White Mould  
(vii) Ascochyta Blight  
(viii) Bacterial Blight.  
  
(b) Insects - beanfly, bruchid resistance etc.  
(c) Drought ] less  
(d) Phosphorus and acid soils ] emphasis.

- 4.2.9. Maximizing Genetic Improvement - 8 hrs.  
 (a) Mathematical considerations  
 (b) Obtaining values for the prediction equation  
 (c) Comparison of alternative breeding methods  
 (d) Enhancement of genetic gain per year in plant breeding.
- 4.2.10. Genotypes x Environment interaction 4 hrs.  
 (a) Types of interactions  
 (b) Assessment of genotypes x environment interactions  
 (c) Selection of locations for testing  
 (d) Allocation of resources  
 (e) Stability of genotype performance.
- 4.2.11. (a) Cultivar release  
 (b) Seed multiplication, storage and distribution.

**4.3. STATISTICS 32 HRS.**

- (a) Analysis of variance and covariance  
 (b) Correction and Regression analysis  
 (c) Experimental designs  
 (d) Multivariate analysis

**4.4. COMPUTER 16 HRS.**

- (a) Introduction to computer  
 (b) MSTAT statistical and plant breeding packages  
 (c) SAS statistical package (if package available)  
 (d) SPP - x statistical packages.

**5. RESOURCES PERSONNEL.**

**5.1. Genetics :**

Dr. Joyce Mulila-Mitti  
 Dr. Susan Nchimbi  
 Dr. C. Mushi

**5.2. Plant Breeding :**

Dr. C. Mushi  
 Dr. Peter Hanson  
 Dr. Catherine Madata  
 Dr. Howard Gridley  
 Regional Entomologists  
 Regional Pathologists.



### 5.3. Statistics :

Dr. Barry Smithson  
Dr. Roger Kirkby  
Dr. C.S. Mushi

### 5.4. Computer :

Dr. Barry Smithson  
Mr. T. Chikoti

## 6. COSTS.

### 6.1. Transport for Participants

6.1.1. SADCC  
Botswana ]  
Lesotho ]  
Swaziland ] Round trip ticket US\$ 1,000  
Namibia ] x 10 = 10,000/=  
Malawi ]  
Zambia ]  
Tanzania ]  
Zimbabwe ]  
Mozambique ]  
Angola ]

### 6.1.2. Great Lakes

Burundi ]  
Rwanda ] US\$ 500 x 3 = 1,500/=  
Zaire ]

6.2. STOP-OVER ALLOWANCE : SADCC 10 x US\$ 200 = 2,000/=  
Great Lakes 3 x  
US\$ 200 = 600/=

### 6.3. ACCOMMODATION/MEALS/OUT OF POCKET ALLOWANCE.

6.3.1. Accommodation 16 participants x 30 days x  
US\$ 40 = US\$ 19,200/=

6.3.2. Meals : 16 x 30 x US\$ 15/day = 7,200/=

6.3.3. Out of pocket 16 x 30 x US\$ 20 = 3,600/=

### 6.4. RESOURCE PERSONNEL.

6.4.1. Transportation  
7 people x US\$ 1040 (round trip) = 7,280/=

6.4.2. Per diem  
7 people x US\$ 100 x 7 days (average) =  
4,300/=

### 6.5. STATIONERY.

(1)	Writing pads	16 x 4 @ = 64 x US\$ 2/=	= 128/00
(2)	Pens	16 x 2 @ = 32 x US\$ 1.5/=	= 48/00
(3)	Pencils	16 x 2 @ = 32 x /50	= 16/00
(4)	Rulers	16 x 1 @ = 16 x 3	= 48/00
(5)	Rubber/eraser	16 x 1 @ = 16 x .5	= 8/00
(6)	Pencil Sharpener	16 x 1 @ = 16 x 3/=	= 48/00
(7)	Emasculating kit	16 x 1 @ = 16 x 10/=	= 160/00
(8)	Briefcase	16 x 1 @ = 16 x 10/=	= 160/00
			-----
			616/00
			-----

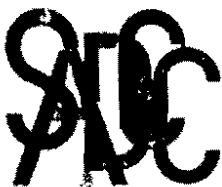
### 6.6 OPENING AND CLOSING RECEPTION.

6.6.1.	Opening, cocktail	US\$	100.00
6.6.2.	Closing, dinner	"	200.00
6.6.3.	Certificates	"	70.00
			-----
	Total	"	56,666.00
	Contingency 10%		5,666.60
			-----
	Grand Total		62,332.60
			-----

### 7.0. Field Tours

- Suggest at least two trips

\* Regional Programme to provide transport.



Centro Internacional de Agricultura Tropical

Apartado A'ereo 6713  
Cali - ColombiaSouthern Africa Development Coordination Conference  
SACCAR Private Bag 00108  
Gaborone Botswana

## Regional Programme on Beans in Southern Africa

Selian Research Centre  
P.O. Box 2704, Tel. 057-2268  
Telex 42106 CANWHEAT TZ  
Arusha, Tanzania

## Memorandum

To : The Chairperson, SADCC/CIAT Regional Programme 10th Steering Committee,  
(through Dr. D.J. Allen, Regional Coordinator, SADCC/CIAT Regional Programme)

From : Dr. J.K.O. Ampofo - Entomologist, SADCC/CIAT.

Date : 27th February, 1991

Ref. : JKA/0275/91

Subject: Pan-African Training Course on Bean Stem Maggot (*Ophiomyia* spp.) Resistance Screening Methods. Awassa, Ethiopia, August, 1991\*

Further to my proposal which was submitted to and approved in principle by the 9th Steering Committee I am attaching a draft programme for the training course.

I would like to request that the Steering Committee nominates not more than 5 persons from the SADCC Region to participate in this course. The dates, 4-10 August, 1991, are tentative and subject to confirmation by Ethiopia National Entomologist who is collaborating in the organization of this course.

Efforts will be made to rely on the Ethiopian National Programme for resource persons whenever possible to cut down on costs. Such persons would include a biometrician to lead the discussion on item 3, Day 1 (Data collection, handling and management) and pathologist to participate in discussions on item 4 on Day 1.

Other resource persons will be Drs. T. Abate, Entomologist, Institute of Agricultural Research, Nazret and J.K.O. Ampofo, Entomologist, CIAT, Arusha. These two shall organize and conduct the course with support from Mr. Jeff Mutimba, CIAT Training Officer, Debre Zeit.

\* Owing to events in Ethiopia subsequent to the date of this memo, the venue has been changed to Bujumbura, 1-8 Nov., 1991 (DJA).

Pan-African Training Course on Bean Stem Margot  
(*Ophiomyia* spp) Resistance Screening Methods Awassa,  
Ethiopia, August 4-10, 1991.

Draft Programme

- Day 1. Sun. Aug. 4. Arrival of participants in Addis Ababa, Ethiopia Hotel.
- Day 2. Mon. Aug. 5. Addis - Awassa + stops on way to observe entomological constraints in farmers fields
- Day 3. Tue. Aug. 6. Discussion + laboratory :
1. Host plant resistance research methods : general - principles and experimental design.
  2. Trial management
    - good seed bed preparation, optimum sowing dates, plant stand, weed control, harvest etc.
    - development of suitable pest infestation levels.
    - BSM rearing techniques.
    - parameters for resistance evaluation
  3. BSM species determination and damage characteristics including determination of damage due to root rots plus other factors that may be confused with BSM damage.
  4. Data collection, handling and management.
    - development of field books and data recording.
- Day 4. Wed. Aug. 7. Trial evaluation (Awassa). Evaluation of BSM resistance.
1. Field rating of damage: - mortality, stunting, lodging.
  2. Assessment of infestation levels
  3. Determination of species composition.

- Day 5. Thu. Aug. 8. Damage assessment in farmers fields  
+ field trip to Areka Research  
Station.
- Day 6. Fri. Aug. 9. AM. 1. Visit other research trials at  
Awassa.  
2. General discussion and  
appraisal of course.  
PM. Depart Awassa for Addis Ababa.
- Day 7. Sat. Aug. 10. End of Course: Departure from Ethiopia.

## APPENDIX 13.

### PROPOSAL FOR A "FARMER PARTICIPATORY RESEARCH COURSE" FOR CONSIDERATION BY THE STEERING COMMITTEE

**VENUE** : Arusha

**DATES** : 13-23 May 1991

**NATURE** : Pan-African (excl. Ethiopia)

**PARTICIPANTS** : Twenty one agronomists and social scientists scientists doing on-farm experimentation and drawn from KE (4), LO (1), MO (1), MW (3), TZ (4), UG (2), (WD) (1), ZA (3), ZW (2). Participants from KE, MW, TZ and ZA will include an extensionist involved in OFR.

**COURSE OBJECTIVE** : Participants will acquire skills to apply the FPR methodology.

**RATIONALE** : The inadequacies of the present approach to OF experimentation are now well understood and the need for, and strengths of, fuller farmer participation in research is appreciated. To realise the full benefit of FPR, on-farm researchers need skills to work with farmers as researchers.

The course would cover the following subject areas :

- Introduction to farmer participatory research
- Evaluation
- Why involve farmers
- Communication techniques
- Evaluation techniques
- Introduction to different types of open-ended questions
- Planning in participatory evaluation
- Evaluation of data collection instrument
- Data selection and recording
- Data analysis
- Report writing.

**DIAGNOSIS**

- Introduction to participatory diagnosis
- Approaches to participatory diagnosis
- Researcher/farmer roles
- Formulating questions
- Handling groups

- Planning for group diagnosis
- Selecting and recording qualitative data
- Data analysis
- Reporting for different audiences
- Strengths and weaknesses of participatory diagnosis

- RESEARCH PLANNING:**
- Farmer participation in
  - Individual (or group) projects for back-home application.

CRSP will participate in both planning (content and treatment) and running (resource personnel) the course.

The proposal is for one Pan-Africa course initially which will be followed by regional courses in subsequent years utilizing former trainees and resource persons.

A proposed budget is attached.

O.T. Edje, L. Sperling and J. Mutimba.

PROPOSAL FOR FPR TRAINING COURSE: 13-24 MAY 1991

BUDGET

ITEM	COSTS (\$)
Participants airfares	
SADCC \$700 x 11	7700.00
EAR \$400 x 6	2400.00
Stop-over allowances + airport tax \$240 x 13	3120.00
Accommodation \$30 x 23 x 14 (incl. 2 resource persons)	9660.00
Meals \$20 x 23 x 14	6440.00
Out-of-pocket allowance \$15 x 21 x 14	4410.00
Stationary	300.00
Conference folders \$10 x 22	220.00
Certificates \$2.50 x 25	62.00
Closing ceremony	200.00
Vehicle hire for field trips (2)	1000.00
Total .....	<u>35,500.00</u>



## APPENDIX 14.

### BEAN RESEARCH AND PRODUCTION TRAINING COURSE LYAMUNGU RESEARCH INSTITUTE

**Venue :** Lyamungu Research and Training Institute.

**Dates :** 19/5/91 to 1/6/1991\*

#### **Background:**

Bean research in Tanzania is headed by three separate institutions viz : Lyamungu Agricultural Research Institute (LARI), Uyole Agricultural Centre (UAC) and Sokoine University of Agriculture (SUA). LARI has responsibility for medium altitude zone which includes bean production districts in Arusha, Kilimanjaro, Tanga, Kigoma, Shinyanga, Kagera, Mwanza and Mara regions. UAC is responsible for the high altitude zone found mostly in Iringa, Mbeya, Ruvuma and Rukwa Regions while SUA is responsible for low altitude zone which mainly includes Morogoro and Coast regions.

Low bean yields continue to be a problem in all the areas mentioned above despite efforts made by scientists in developing production packages. Main constraint is seen as the adoption of the available packages by peasant farmers which could be due to unawareness or unsuitability of the existing packages.

Development of packages suitable for the wide prevailing environments need adequate testing and thus inclusion of as many testing environments as needed. This calls for the need of trained personnel to be stationed at the sites and hence this training proposal.

#### **Objectives:**

- (a) To equip participants with the knowledge of bean growth and development.
- (b) To provide the necessary skills for conducting on-farm trials and thus establish uniform methodology for on-farm bean research.

#### **Participants:**

Twenty Agricultural Field Assistants with Certificates or Diploma in Agriculture working with beans in the districts that we are doing on-farm research.

\*Dates later revised to 3-14 June, 91.

### Course Content:

The course is on-job training oriented and hence 90% of the time will be spent in the field.

Topics to be covered include.

- (1) The growth and development of the bean plant - OTE
- (2) Improved production packages available to date - MET
- (3) On-farm trials )
  - Site selection )
  - Land preparation ) MET &
  - Trial design and layout ) OTE
  - Planting )
  - Trial management including data collection )
  - Pest and disease identification - DJA, JKA & DM
- (4) Seed production on peasant farmers' fields - CSM

A minimum number of discussion lectures will be conducted before or after an appropriate audiotutorial is shown. Field practicals and on-farm visits will occupy most of the time. Participants will be provided with hand-outs for the few lectures.

### Progress evaluation:

Participants progress in gaining knowledge and skills will be monitored through classroom discussions and exercises and through observations during practicals. Field reports and final written tests will also be used.

### Resource Personnel:

We anticipate that bean research scientists and some technicians from the National and Regional Programmes will participate.

### Course Expenses:

ITEM	COST IN US\$
1. Accommodation and meals	5,232.32
2. Transport (participants and field trips)	1,047.47
3. Stationery	505.05
4. Participants out of pocket allowance	4,200.00
5. Resource personnel allowance	1,000.00
6. Closing ceremony (certificates etc.)	400.00
Total	12,384.84

### Organizers:

- (1) Dr. C.S. Mushi
- (2) Dr. M.E.T. Mmbaga
- (3) Mrs. F.A. Assenga

ARTI-Lyamungu  
P.O. Box 3004  
Moshi, Tanzania

Arusha, February 28th., 1991

Dr. C.S. Mushi  
ARTI Lyamungu  
P.O Box 3004  
Moshi  
Tanzania

Dear Dr. Mushi,

RE : SUBMISSION OF A SUB-PROJECT PROPOSAL ON 'SCREENING FOR BEAN TOLERANCE TO LOW PHOSPHORUS'.

I would like to inform you that the sub-project proposal on "Screening for Bean Tolerance to Low Phosphorus" by myself and Dr. M.E.T. Mmbaga, which was submitted for consideration at your last Steering Committee Meeting in September, 1990 at Morogoro, Tanzania, has now been revised as suggested by your committee taking into consideration reviewers comments and suggestions.

We would be grateful to the Steering Committee if this project can be considered favourably so that we can get to the task of conducting the trial; noting that it is addressing a widespread and rather important soil fertility constraint problem that has long been recognized in the SADC region.

Thanking you in advance.

I remain.



I.K. KULLAYA

cc : Dr. David Allen ✓  
Dr. C. Wortmann

## CIAT/SADCC REGIONAL BEAN RESEARCH SUB-PROJECT PROPOSAL

### SCREENING FOR BEAN TOLERANCE TO LOW SOIL PHOSPHORUS

I.K. Kullaya<sup>1</sup> and M.E.T. Mmbaga<sup>2</sup>

**Collaborators :** Zambia and Malawi

#### **Rationale**

A significant proportion of SADCC regional bean growing area has phosphorus deficiency as a major limitation to optimum crop production. Compensation of this nutrient deficit by fertilizer application is expensive to low income sector due to high price of phosphorus fertilizer relative to other commonly required fertilizers and high amounts of P required to meet the high P-fixation capacities of these soils. There is also a low recovery fraction of added fertilizer P by the crop. Addition of adequate phosphorus fertilizer to obtain optimum yield is in most places beyond small farmer's financial ability; and is contrary to CIAT's low input crop management philosophy. The potential solution to low soil phosphorus bean production limitation in the SADCC region with limited capital resources is to decrease crop requirements by selecting varieties tolerant to low levels of available P in the soil; hence the proposed project.

Screening beans for tolerance to low soil phosphorus project is a low input crop production strategy to improved bean yield and is consistent with the recommendations of the Pan African Working Group for Cropping Systems and Soil Fertility Research on Beans in their meeting held in Nairobi - Kenya from 12-14 February, 1990.

The subsequent combination of low P - tolerant bean varieties to be identified with efficient method of P - fertilization and cheaper sources of P would allow rapid and low cost development of considerable area of marginal bean lands in the region.

- 
1. *Soil Fertility Specialist*
  2. *Agronomist/Physiologist.*

based at the Agricultural Research and Training Institute  
Lyamungu, P.O. Box 3004 Moshi, Tanzania.

## INTRODUCTION AND BACKGROUND

Dry beans (*Phaseolus vulgaris*) are widely grown in Africa as a food crop of major importance by both small holders and commercial producers. Africa is second in bean production to Latin America. Yield levels are generally low because of various production constraints. One of the major problems is also infertility (Lynch and Pina, 1988) particularly phosphorus deficiency which is common in major bean growing regions of Africa .

The major soil group found in bean growing areas of Africa are Alfisols, Oxisols Ultisols and Inceptisol, (Mughogho and Wortmann, 1988), all known for their P deficiency. Besides their high P fixing capacities, these soils have other characteristics which tends to exacerbate P - stress problems such as low pH, low exchangeable bases and high exchangeable aluminium and/or manganese to a phytotoxic level.

The P - nutrition of bean crop could be improved by :

1. P - fertilizer application, liming and addition of organic residues to match the bean crop requirement or
2. Improving the adaptation of the crop to the existing soil environment.

The first alternative, though effective, is rather expensive and beyond the financial ability of most bean producers in Africa. Massive application of P are often required to quench the high P fixation capacities of P fixing soils (Younge and Plucknett, 1966). Rates as high as 500 - 1000 kg P/ha have been found to be required in order to obtain dramatic yield increase in some Oxisols (Sancho and Uehara, 1976).

Many tropical soils rarely respond to liming if pH exceeds 5.2 - 5.5. Beans as a leguminous crop plant needs high amounts of calcium and is more sensitive to Al and Mn toxicity. (Lynch and Piha, 1988). Liming soils to pH 5.5 eliminates Al and Mn toxicity and supplies Ca to plants. However, lime requirements to effect desired pH changes in some tropical soils are in the range of several tonnes/ha. It is obvious that adequate P - fertilizers/lime application to meet crop requirement cannot be implemented by subsistence farmers with limited capital. Furthermore, P fertilizers are relatively expensive and will remain so for several years to come. Moreover, over-fertilization/liming of inherently infertile soil may lead to problems of nutrient imbalance and trace elements deficiency which are difficult and expensive to reverse. Also P is known for its low efficiency in application. In general, fertilizer P - recovery values are in the range of 5-10% for annual crop and 20-30% after 5 years of crop uptake (Russel, 1973).

These considerations no doubt justify the second option as the long-term solution to improving bean yields on infertile soils in the SADCC region; hence the need for the plant breeder to develop bean genotypes with improved adaptation to low P soils. This approach is feasible because genotypic variation in beans P - utilization has been observed (CIAT 1976). and shown to be heritable (Lindgren *et al.* 1977). However, the breeder needs to be availed with bean varieties which are tolerant to low P to serve as a source of parents for breeding P efficient plants. This need can be achieved by screening bean varieties for their tolerance to P stress.

#### PLANT = P = USE EFFICIENCY CLASSES

Plants can be grouped into 4 classes with respect to their efficiency in response to P - supply.

1. RE Responsive efficient plants which yield well under P - stress as well as with adequate supply of P.
2. RI Responsive inefficient plants which yield less under P - stress but will produce the same or better than the efficient plant with an adequate P supply.
3. NE Non-responsive efficient plants which produce well under P - stress but relatively poorly under optimum P supply.
4. NI Non-responsive inefficient plants which do not yield well irrespective of P level.

Our aim is to obtain bean plants of class 1 to recommend to the breeders. Class 2 plants are good for low input production systems where farmers cannot afford fertilizers while class 4 beans are of little use for breeding or production purposes.

#### OBJECTIVES

1. To identify and evaluate bean varieties for their tolerance to low P stress.
2. To recommend promising tolerant bean varieties to breeders for subsequent bean genetic improvement work and/or to farmers for use in soils with low P.

#### EXPECTED IMPACT

1. Bean producers will be provided with bean varieties which can yield efficiently in P - deficient SADCC area under low and medium input agricultural systems. Types 2 and 3 beans will be particularly useful to small farmers with limited resources.

2. Use of varieties more tolerant to low levels of available P will result into a more efficient and economic use of fertilizer P input as the need for it cannot be completely eliminated.
3. Plant breeders will obtain bean varieties with superior adaptation to P constraint. These will be used in a breeding program in an effort to alleviate low P fertility limitation to bean production in the region.
4. Funds for purchasing P - fertilizer will be saved and thus become available for other uses.

### APPROACH

A set of 400 lines will be screened for tolerance to low P at one primary site (Mlana in Tanzania) for two seasons. After the first season 50% will be passed to the second season and thereafter 64 promising lines will be advanced to secondary screening at several sites located in Tanzania, Zambia and Malawi.

Dr. Charles Wortmann is currently assembling the first set of entries in Uganda and the second set is expected to be a core collection from CIAT germplasm. The screening work is here considered as an on going project.

### METHODOLOGY:

#### Phase I: Management of Primary Screening Site: Mlana - Tanzania

An experiment will be conducted using International Bean Soil Adaptation Nursery (IBSAN) entries to determine the P level at which greatest genetic variability is expected. This stage is crucial for the subsequent primary screening phase. If the P stress is too high plants will not develop and if the stress is too low plants may grow luxuriantly. In both cases genotypic variation for tolerance will be too small for efficient selection. The trial will consist of 20 entries, 2 reps, 0.6m x 3m plots (single row) at 0, 15, 30, 45, 60, and 75 kg/ha P<sub>205</sub>. N to be applied at 30 kg/ha and other stresses to be adequately controlled. The P level at which greatest yield variation occurs will be determined.

#### Phase II: Primary Screening

Site: Mlana - Tanzania

Season 1: 400 entries, 2 reps, 0.6 x 3m plots (single row) on a low P site evaluate for vigour at R5 and yield by weight. The entries to be grouped by seed source, seed size, growth habit and phenology. A check variety to be included every eight plot - Carioca for non climber and G2333 for climbers. Selection to be made on the basis of vigour and seed yield.

Season 2: 200 entries, 2 reps, 0.6 x 3m plot (Single row), P stress and non P stress in adjacent fields. Check varieties as in season 1. Selection to be made for responsive efficient plants (R E) on vigour yield basis i.e. good performance in both fields. 64 best entries to be selected for secondary evaluation at several sites in phase III.

Phase III: Secondary Screening.

Site: Mlala and Lushoto (Tanzania) Misamfu (Zambia) and a site in Malawi.

Season 3: 64 entries 4 reps, 1 x 3m plots (single row), 'P stress' and non P stress in adjacent fields, yield by weight and selection to be made for RE plants. Checks as in seasons 1 and 2 but also a local check will be included in every eighth plot.

Season 4: Repeat of season 3, if necessary.

Phase IV: The superior materials are advanced to national bean research programmes for possible variety release, breeder's genetic improvement or and studies of mechanisms of tolerance as the case may be.

#### WORK PLAN

- 1991 Season 1 - Studies on the management of primary screening site
- 1992 Season 1 - Evaluation of 1st set of 400 entries.
  - Season 2 - Evaluation of 1st set for the second season.
  - Evaluation of 2nd set for the 1st season.
- 1993 Season 1 - Evaluation of 1st set for the third season.
  - Evaluation of 2nd set for the second season.
  - Season 2 - Complete evaluation of 1st set for the fourth season.
  - Evaluation of 2nd set for the third season.
- 1994 Season 1 - Tolerant lines advanced to breeding programs, AVTs and possibly on farm trials in P-stress areas. Mechanistic and genetic studies may begin.
  - Complete evaluation of 2nd set go to breeding programs.
  - Continue screening and evaluation and other studies.



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PHOSPHORUS SUB-PROJECT BUDGET ESTIMATES (US \$)

ITEMS AND DESCRIPTION	1991
1. Agrochemicals:	
Fertilizer and Lime	500
Insecticides	50
Fungicides	100
2. Field Supplies:	
Labels, tags, bags, stationary, sprayer protection	800
3. Soil Analysis:	300
4. Communication, reports publication, literature	400
5. Local travel subsistence allowance	2,000
6. Labour	3,000
7. Transport - fuel + lubricants	1,000
Subtotal	8,150
Contingency 10%	815
	<hr/> 8,965

## APPENDIX 16.

### INTERCROPPING QUESTIONNAIRES SURVEY WORKPLAN

#### BACKGROUND:

Beans are the major source of protein for both rural and urban populations providing over 10 percent of total protein consumed. Beans also contain carbohydrates and some of the vitamins and minerals essential for human nutrition. Common beans supplement foods rich in carbohydrates such as rice, maize, banana, and root crops. Bean consumption has increased recently due possibly to increased prices of poultry and animal products. Bean prices on the informal markets range from \$.25 to \$.50/kg suggesting that either there is high demand for beans or that the national bean production is inadequate to meet increasing consumption demands.

Increased bean production in Tanzania might be achieved mainly through are expansion and intensification. Land area is scarce and therefore intensified bean production through intercropping, relay intercropping and multiple cropping are the only options for small scale farmers to increase bean production in the country. Beans are eaten in various dishes at least five times in a week. Policy makers and agricultural administrators have realized the critical role beans play in human nutrition. Consequently, two seminars on intercropping (major productional system) were organized at SUA in 1976 and 1980 as a means to improve small holders bean production.

#### NUMBER OF ENUMERATORS:

- (1) Dr. M.E.T. Mmbaga (Agronomist)
- (2) Mr. Ephram Nkonya (FSR - Economist)
- (3) Mr. Dastun G. Msuya (Pathologist)
- (4) Mr. L.E.S. Mollel (Entomologist - Technician)
- (5) Miss. Grace Kitange (Technician).

#### ZONES TO BE COVERED

- (1) NORTHERN ZONE

REGION	DISTRICT/ VILLAGE	NO. OF FARMERS	DAYS/ DISTRICT	TENTATIVE TIME FOR SURVEY
Kilimanjaro	Moshi (Rural)	20	2	June 1991
Kilimanjaro	Mwanga	20	2	January 1992
Kilimanjaro	Same	20	2	January 1992
Travelling from village to village			2	
Sub-total			8 days	= 8 days.

**(2) SOUTHERN HIGHLANDS**

REGION	DISTRICT/ VILLAGE	NO. OF FARMERS	DAYS/ DISTRICT	TENTATIVE TIME FOR SURVEY
Mbeya	Mbozi	20	3	April/May 1991
Ruvuma	Mbinga	20	3	April/May 1991
Travelling to Mbeya and Songea			3 x 2 return trip	
Sub-total days			6 + 6	= 12 days.

**(3) WEST LAKE REGION**

REGION	DISTRICT/ VILLAGE	NO. OF FARMERS	DAYS/ DISTRICT	TENTATIVE TIME FOR SURVEY
Kagera	Bukoba	20	3	Oct./Nov. 1991
	Muleba	20	3	Oct./Nov. 1991
	Karagwe	20	3	Oct./Nov. 1991
Travelling to Bukoba and Karagwe			5 x 2 return trip	
Sub-total days			9 + 10	= 19 days
Total days = 8 + 12 + 19 = 39 days.				

**CROPPING SURVEY BUDGET ESTIMATES**

(\$)

ITEM DESCRIPTION	UNITS	COST/ UNITS (\$)	TOTAL COST (\$)
(1) Numerators 39 days	5	50/day	9,750
(2) District Specialist (lunch) 23 days	1	5/day	115
(3) Petrol			
- Moshi - Karagwe (1450km) x 2	725 litres *	1 dollar	725
- Arusha - Mbeya (1360km) x 2	680 litre	1 "	680
- Mbeya - Songea (500km) x 2	250 litre	1 "	250
- Moshi - Rombo/Same (300km) x 2	150 litre	1 "	150
- Within Kagera zone	50 litre	1 "	50
- Within Southern highlands zone	50 litre	1 "	50
- Within Northern zone	50 litre	1 "	50

(4) Photocopy - Questionnaire (25 page/copy) 25 x 160 x .4	160 copies	.40 "	1,600
(5) Correspondence - envelopes, telex, telephone etc.	Variable	Variable	100
(6) Two film slides/zone x 3 zones	6	10	60
(7) Data Board, pencils, sharpeners, pens, rules, stationery	Variable	Variable	50
Sub - Total			13,630
-----			
(8) Contingencies (15%) - Vehicle Breakdown - Spares - Repairs - Lubricants etc.	Variable	10	3,689
Grand Total			17,319
-----			

\* Based on 4km/litre.

#### NEEDS

- 4 WD Vehicle (7 passenger capacity)
- Petrol containers
- Camera

#### JUSTIFICATION

Dry bean is the first among grain legumes in production, consumption and research priority in Tanzania. Bulk of beans (over 80 per cent) are produced by small farmers in association with annual and perennial crops. Since beans are grown in association with maize, (dominant practice), coffee, banana, cassava, potatoes, and sorghum, (depending on altitude, climate and farmers preference), the cropping pattern in itself drastically reduces bean yields. As a result, the yields per hectare are less than 500kg suggesting that some of the associations are quite complex, thus leading to reduced bean yields. Diagnostic survey of the intercropping pattern will reveal problems associated with the cropping pattern and improved package can be recommended. The budget requested will enable the scientists to better understand the intercropping pattern. Furthermore, the funds will enable the identification of the constraints associated with bean production under intercropping and the development of improved package aimed at increasing bean yields in the country. Hence, producers and consumers will obtain adequate supply of beans and excess beans could be sold to increase producer's income.

## APPENDIX 17.

MALAWI BEAN PROGRAMSADCC/CIAT REGIONAL SUB-PROJECTGERMPLASM SCREENING FOR ANGULAR LEAFSPOT RESISTANCE IN BEANS  
EXPENDITURES APRIL, 1988 TO FEBRUARY 1989

<u>FIELD</u>	(MK)	
Hoes	48.50	
Hoes	178.65	
Gumboots	<u>457.53</u>	
		684.68
		[2,600.00]
<u>LABOUR</u>		
Students	504.00	
	462.00	
	84.00	
	42.00	
	<u>20.00</u>	
		1,112.00
Labourers	214.36	
	3,058.80	
	326.40	
	58.08	
	180.80	
	<u>188.65</u>	
		4,027.09
		[8,400.00]
<u>STATIONERY</u>		
Photocopying	0.64	
	28.80	
	18.88	
	43.50	
	1.28	
Duplication	12.16	
	23.30	
	1.60	
Tables for CIAT (4)	<u>8.00</u>	
		138.16
		[3,120.00]

**TRAVELLING**

Meals served to SADCC/CIAT		
Scientists	152.50	
Subsistence	450.00	
	175.00	
Mileage claim	285.00	
Mileage claim	390.00	
Subsistence	300.00	
	100.00	
Fuel	409.60	
	770.58	
	607.96	
	113.46	
	<u>153.08</u>	
		3,907.18
		[6,500.00]

---

<b>Grand Total</b>		<b>9,869.11</b>
		<b>[27,820.00]</b>

---

Please Note; 1 US\$ = 2.6 MK

MALAWI BEAN PROGRAMME

SADCC/CIAT REGIONAL SUB-PROJECT

GERMPLASM SCREENING FOR ANGULAR LEAFSPOT RESISTANCE IN BEANS  
EXPENDITURES MARCH, 1989 TO JANUARY, 1990

<u>FIELD</u>	<u>MK</u>	
Fertilizers	851.28	
Fumigation sheet (2)	422.00	
Actellic dust (20kg)	<u>320.00</u>	
		1,643.28
		(2,327.96)
		[2,600.00]
 <u>LABOUR</u>		
Labourers	188.65	
	220.22	
	13.86	
	509.96	
	526.68	
	630.15	
	583.11	
	<u>449.35</u>	
		3,011.97
Technician	180.80	
	92.80	
	591.47	
	93.20	
	93.00	
	93.00	
	93.00	
	93.00	
	<u>93.00</u>	
		1,413.27
		4,425.24
		(9,564.33)
		[8,400.00]
 <u>STATIONERY</u>		
Photocopying	3.84	
Duplication	16.00	
Typing	46.00	
Photographic film	22.00	
	<u>46.65</u>	
		134.49
		(272.65)
		[3,120.00]



**TRAVELLING**

Fuel	113.46	
	153.08	
	165.42	
	161.82	
Drinks for CIAT scientists	58.08	
Medical treatment	1.80	
		653.66
		(4,560.84)
		[6,500.00]

---

<b>Grand Total</b>		7,623.43
		(17,492.54)
		[27,820.00]

---

Please note: 1 USD = 2.6MK

( ) = Total for project expenditure upto January 1990  
[ ] = Amount given at beginning of project

**MALAWI BEAN PROGRAM**  
**SADCC/CIAT REGIONAL SUB-PROJECT**

**GERMPLASM SCREENING FOR ANGULAR LEAFSPOT RESISTANCE IN BEANS**  
**EXPENDITURES FEBRUARY, 1990 - FEBRUARY 1991**

<u>FIELD</u>	MK	
PDA, Nutrient Agar, Yeast Extract	3,218.00	
Dimethoate	<u>742.00</u>	
		3,960.80
		(6,288.76)
		[2,600.00]
<u>LABOUR</u>		
Labourers	1,075.36	
	135.11	
	256.64	
	494.28	
	528.29	
	469.20	
	<u>519.36</u>	
		3,478.24
		(13,042.57)
		[8,400.00]
<u>STATIONERY</u>		
Photocopying	503.04	
		503.04
		(775.69)
		[3,120.00]
<u>SERVICES</u>		
Fax	9.00	
Computer charges	900.00	
Photocopying	<u>39.84</u>	
		948.84
<hr/>		
<b>Grand Total</b>		11,994.48
		(33,940.81)
		[31,200.00]
<hr/>		
<b>BALANCE</b>		- 2,740.81 as
		at 28 February, 1991
<hr/>		

Please note 1 USD = 2.6 MK

( ) = Total for project expenditure up to February, 1991

[ ] = Amount given at beginning of project

**MALAWI BEAN PROGRAM**  
**SADCC/CIAT REGIONAL SUB-PROJECT**

**SCREENING FOR DROUGHT TOLERANCE IN BEANS FOR THE SADCC REGION**  
**EXPENDITURES JUNE, 1988 TO AUGUST, 1990**

<u>LABOUR</u>	(MK)	
Labourers	3672.66	
	4239.75	
	<u>1839.19</u>	9,751.60
Technician	1440.00	
	<u>1440.00</u>	2,880.00
Students	184.53	
	60.00	
	80.00	
	<u>207.49</u>	532.02
		13,163.62
		[11,850.00]
 <u>SUPPLIES</u>		
Bicycles (2)	1050.00	
Gumboots	130.00	
Hoes	48.50	
Plastic sheet	422.00	
Stakes	20.00	
Heating elements	540.00	
Computerdisks	60.00	
Landrover tyres and tubes	2475.00	
Cloth for sampling bags	<u>160.00</u>	
		4,905.50
		[10,000.00]
 <u>SERVICES</u>		
Typing	30.00	
	40.00	
Graphics	22.00	
	10.00	
Tailoring sampling bags	35.00	
Photocopying	518.32	
	82.77	
Computer charges	<u>900.00</u>	1,628.09
 <u>TRANSPORT</u>		
Fuel	290.00	
Mileage claim (V.No 2087)	65.00	
Mileage claim (V. No. 1259)	80.00	
Mileage claim	40.00	
Mileage claim (V. No. 965)	200.00	
Mileage claim	40.00	
Mileage claim	<u>35.00</u>	
		750.68

IRRIGATION

Repair of motor

1,498.44

1,498.44  
[1,300.00]

---

**Grand Total**

21,946.33  
[31,200.00]

---

Please note: 1 USD = MK 2.6

**MALAWI BEAN PROGRAM**  
**SADCC/CIAT REGIONAL SUB-PROJECT**

**SCREENING FOR DROUGHT TOLERANCE IN BEANS FOR SADCC REGION**  
**EXPENDITURES SEPTEMBER, 1990 TO FEBRUARY, 1991**

<u>LABOUR</u>	MK	
Labourers	540.26	
	723.86	
	782.56	
	889.13	
	828.68	
	612.79	
	<u>513.09</u>	
		4,890.37
		(18,053.99)
		[11,850.00]
<u>SUPPLIES</u>		
Tyres and tubes	2,475.00	
Medicines	15.96	
Compressor/cylinder	<u>2,561.50</u>	
		5,052.48
		(9,957.98)
		[10,000.00]
<u>TRANSPORT</u>		
Fuel	91.33	
	111.72	
	823.05	
	<u>76.69</u>	
		1,102.79
<u>TRAVELLING</u>		
Fuel	1,451.20	
Medical treatment	42.12	
Battery	495.00	
Vehicle repairs	201.83	
Mileage & subsistence	<u>1,285.60</u>	
		2,778.92
		(7,339.78)
		[6,500.00]
Grand Total		10,721.00
		(27,446.78)
		[27,820.00]
<u>BALANCE</u>		373.22
	as at February, 1991	

Please note that 1 USD = 2.6 MK

( ) = Total for project expenditure up to February, 1991

[ ] = Amount given at beginning of project.

**MALAWI BEAN PROGRAM**  
**SADCC/CIAT REGIONAL SUB-PROJECT**

**BEAN APHIDS AND THEIR MANAGEMENT WITH REFERENCE**  
**TO BCMV IN SADCC REGION**

**EXPENDITURES JUNE 89 - JULY 90**

<u>EXPENDABLE EQUIPMENT</u>	MK	
Agric. and Hardware supplies	734.90	
Consumable stores	13.60	
Fertilizers	545.75	
Overalls, boots	<u>448.86</u>	
		(1,743.11)
		[1,300.00]
 <u>LABOUR/ASSISTANCE</u>		
Wages	719.75	
		(719.75)
		[2,600.00]
 <u>TRAVEL/SUBSISTENCE</u>		
Mileage and subsistence	4,124.45	
Vehicle hire (course)	2,388.71	
College vehicle hire (course)	548.08	
Fuel (course)	<u>204.60</u>	
		(7,272.84)
		[1,530.00]
 <u>ADMINISTRATIVE</u>		
Stationery	92.80	
Photocopying	670.38	
Telephone	138.00	
Accounting	40.00	
Accommodation/meals (course)	5,267.00	
Allowances (course)	3,384.00	
Course sundries	<u>1,185.13</u>	
		(10,347.31)
		[780.00]
<hr/>		
<b>GRAND TOTAL</b>		(22,826.35)
		[25,666.69]
<b>Balance as at 28 February, 1991</b>		2,840.34
<hr/>		

Please note 1 USD = 2.6 MK

( ) = Total for project expenditure up to February, 1991

[ ] = Amount given during the course of project

SADCC/CIAT

Regional Collaborative Research Sub-Project Agreement

Grant Agreement No:..... Date: .....

(1) Grant: ..... US\$

(2) Grantee: .....

(3) Project Title

(4) Administering Institute/Department

(5) Budget as approved and conditions for the Grant other than general conditions.

With reference to the items under (1) to (5) CIAT, and the Grantee (2) and the Administering Institute (4) have agreed to their joint interest in supporting the sub-project (3) registered as SADCC/CIAT Sub-project No:.....

CIAT will engage itself for a period of ..... years commencing on .....19 ... by a grant of US \$.....subject to conditions under (5) and general conditions otherwise stated on this page and overleaf.

For CIAT ..... Date .....19...

We accept the grant (1) and agree to abide by the conditions

For Administering Institute .....Date.....

Witnessed by ..... Date .....

On behalf of the SADCC/CIAT Steering Committee.

## General Conditions of Grant

### Responsibilities of Grantee

The Grantee agrees that the Grant provided shall be used solely for the purpose of the sub-project. The Grant is not transferable to another person without the written consent of the SADCC/CIAT Steering Committee. The programme cannot be changed without the written consent of the SADCC/CIAT Steering Committee. An annual written report must be submitted by the Grantee to the SADCC/CIAT Steering Committee, with a copy to the Regional Coordinator.

### Responsibilities of CIAT

When CIAT has received a duly signed copy of the grant agreement, the grant is at the disposal of the Grantee within the period of the agreement or if the agreement is cancelled or otherwise changed or some other circumstances prevents the fulfilment of the agreement.

### Responsibilities of Administering Institute

The Institute (Department, Division) undertakes to administer the Grant for uses solely within the sub-project and to provide the facilities necessary for the research.

Equipment purchased for the sub-project and requiring installation will be installed by the Institute. Equipment and instruments purchased by the sub-project shall remain the property of CIAT until the completion of the project at which time their disposal will be arranged. Under most circumstances such purchases would become the property of the Institute.

### Payment of Grant Reports and Renewal

Upon receipt of the signed copy of this agreement, CIAT will disburse money according to the cash flow profile which should be prepared by the Grantee and accepted by the SADCC/CIAT Steering Committee, always subject to the receipt of satisfactory financial and technical reports by the Steering Committee.

At the termination of the first year of the grant, and before renewal for a second year, if any, an account of expenditure will be submitted and approved by the Steering Committee of SADCC/CIAT. The Grantee is required also to present all research results of the sub-project at Regional Workshops as designated by the Steering Committee, and is also urged to publish papers in the Zimbabwe Journal of Agricultural Research (which is the journal of agricultural science of SADCC) or another appropriate referred journal. The Grantee shall keep SADCC/CIAT informed of the possible application of results of the sub-project and shall deposit a copy of all publications with SADCC/CIAT.





# SOKOINE UNIVERSITY OF AGRICULTURE

FACULTY OF AGRICULTURE  
DEPARTMENT OF CROP SCIENCE AND PRODUCTION  
P.O. Box 3005 MOROGORO TANZANIA  
TEL. 3511/4 TELEX 55308 SUAMO TZ TELEGRAMS "SUA" MOROGORO

Our Ref. CS/PF/24

Your Ref. ....

Date February 6, 1991.

Chairman,  
Steering Committee,  
CIAT/SADCC Regional Programme,  
c/o Dr. David J. Allen,  
Regional Coordinator,  
Box 2704, ARUSHA.

*Received 21.2.91*  
*DJA.*

re: SOUTHERN BCMV REGIONAL COLLABORATIVE RESEARCH SUB PROJECT:  
PROGRESS REPORT AND APPLICATION FOR GRANT FOR A JOINT  
EASTERN AND SOUTHERN REGIONAL SUB PROJECT

Reference is made to my letter and sub project proposal of October 14th, 1988 requesting for a grant to enable us establish nurseries for BCMV Resistance in Southern Africa.

By a telex message dated March 28th 1989 (Ref. ICC/3/89), the Regional Coordinator, Dr. David J. Allen, confirmed that your committee had approved 5000 USD in part for the take-off of the sub-project. By another telex of Dec. 12, 1988, Dr. Allen further informed me that he had agreed in principle with Dr. Roger Kirkby that in view of the fact that a similar sub-project was already underway in the Eastern Africa under Dr. Samson Owera, the latter and I should get together and prepare a joint sub-project proposal for the Eastern and Southern Africa in order to share specialist facilities.

Although we got together from May 28-June 3, 1989 in Morogoro, and although we were successful in our mission which was eventually edited by Dr. Allen, details of the sub-project budget could not be finalised as SWAN AIR did not send PTA to our collaborators in Zambia and Zimbabwe - even after the Kampala workshop. Fortunately, the collaborators attended the 2nd Regional Workshop on Bean held in September 1990 in Morogoro and spent a whole evening deliberating and deciding on the role of each member of the collaborating countries - and a revised proposal budget was finalised subject to your approval. Regretably by this time, Dr. Owera had left Makerere University for another organisation but Mrs. Theresa Sengooba had capably taken over Dr. Owera's responsibilities in the sub-project.

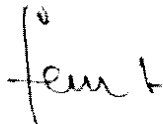
You will therefore please find attached herewith (for your perusal and consideration) the following:

- a) Copy of a report of the progress made from the Tanzanian end between 1989 to date as presented in form of an abstract of a research manuscript to be edited and submitted for consideration for publication in either Plant Pathology, Plant Disease or Tropical Agric., Trinidad.

- b) Copy of a signed financial statement from the finance department of the University on how the fund disbursed by CIAT/SADCC Arusha was utilized. You will note that we have recently over spent our budget by over 63,000/-. This is because the Franco Tanzanian Horticultural Development Programme, based in SUA, was gracious in accomodating our request to order and purchase some essential chemicals needed for serological work for us from overseas. This was done and the programme was duely reimbursed it's equivalence in local currency (duty free). With the purchase of these chemicals, it has been possible for us to complement our back-testing studies using Drifjhout differentials with some agar-gel double diffusion tests. The department feels extremely pleased that CIAT/SADCC was able to provide funds to carry tests which hitherto had never been carried out before in the department (or within any other research organisation in Tanzania at large). The list of chemicals ordered and paid for included those for which ELISA could be used but we lack an ELISA reader - (15,000 USD). With Dr. Owera lost to another organisation, the Steering Committee is urged to reconsider providing funds for the purchase of this equipment in the spirit of the recommendation made in Kampala - the need for some minimum facilities in the region. Furthermore, with the purchase of these chemicals, our investigation is becoming less and less reliant on overseas laboratories whose role may become only to confirm our results ~~as~~ recently done for us in Wageningen. We urge the Steering Committee to consider how and if Dr. Roger Kirkby can approach Makerere University to loan to SUA via his programme some of the facilities left (and now abadoned) by Dr. Owera.
- c) A revised copy of the joint proposal on the Establishment of Nurseries for BCMV Disease Resistance in Eastern and Southern Africa as agreed on by representatives of the participating countries during the meeting held in Sept. 1990 in Morogoro. Although the collaborators are yet to submit their Action Plan for 1991 these are already briefly described in the body of the sub-project proposal.

We look forward to your favourable consideration and approval of this request.

Sincerely yours,

  
Allan Femi Lana, Ph.D. (Massachusetts)  
PROFESSOR OF PLANT PATHOLOGY/VIROLOGY

cc: Dr. David Allen, CIAT/SADCC, Arusha \*  
Dr. Roger Kirkby, CIAT/SADCC, Kampala  
Dr. Clement Mushi, National Research Coordinator,  
Bean Programme Lyamungu, Tanzania.  
All Collaborators, Uganda, Zambia and Zimbabwe.

SOKOINE UNIVERSITY OF AGRICULTURE

FINANCE DEPARTMENT

FINANCIAL STATEMENT FOR THE PERIOD FROM JULY 1989 TO FEB. 1991

RE: CIAT/SADCC BCMV SUB PROJECT (SOUTHERN AREA)

Amount received:

1. Cheque No. B262504 of 20:7:89	T.shs.	276,000/-
2 Cheque No. B284907 of 19:2:90	T.shs.	<u>382,000/-</u>
Total	T.shs.	<u>658,000/-</u>

Less actual expenditure on:

	T.shs.
a) Purchase of 1 Refrigerator .....	157,000/-
b) Purchase of 1 deepfreezer and voltage stabilizer ..	270,000/-
c) Travelling .....	80,000/-
d) Chemicals (Imported)* .....	<u>225,000/-</u>
Total expenditure .....	<del>725,000/-</del> 722,000
Debit Balance .....	<u>84,000/-</u>

Prepared by: .....

*M.H. Ngunuwe*  
M.H. Ngunuwe  
Accountant  
REVENUE ACCOUNTANT  
SOKOINE UNIVERSITY OF AGRICULTURE  
MOROGORO

Checked and Certified by: .....

*G.M. Mvoga*  
G.M. Mvoga  
University Bursar  
SOKOINE UNIVERSITY OF AGRICULTURE

Approved by: .....

*Allan Femi Lana*  
Prof. Allan Femi Lana  
(Project Director)

FACULTY OF AGRICULTURE  
SOKOINE UNIVERSITY OF AGRICULTURE  
CROP SCIENCE DEPARTMENT  
MOROGORO

\* The chemicals were purchased and imported on our behalf by the Franco-Tanzanian Horticultural Development Project. They were reimbursed in local currency (duty free - see letter for details)

ARUSHA, 18TH FEBRUARY, 1991 ARS 0218

TO: PROF FEMILIANA, CROP SCI

FM: DAVID ALLEN, SABCC/CIAT

AA: MKS YR MAIL OF 11 FEBRUARY

RE: BETTIE CALCULATES BALANCE DUE ON BCMV SUB-PROJECT IS USD 723,372  
X-BRITISH 141904/91 DRAFTED AWAITING YR ARRIVAL HERE

CC: REPORTS ON BOTH MECHANICAL AND FINANCIAL STATUS TO SC MOST WELCOME WE CAN MULTIPLY COPIES HERE. NOTE NEXT SC MEETING IS 4-5 MARCH

DD: EYE REALISE EYE ONE U COMMENTS ON SENGODA DRAFT. SORRY FOR DELAY

BEST REGARDS

42119 UNIONS MZ  
55506 UNIONS MZ

Bus car

\* Once this amount is collected, deposited, it will take the project out of the red. Many thanks for the confidence & trust  
fg

CIAT INTER-REGIONAL COLLABORATIVE RESEARCH SUB-PROJECT

TITLE: Establishment of Nurseries for BCMV Disease Resistance in Eastern Southern Regions of Africa.

SUB-PROJECT

COORDINATOR: Allan Femi Lana, Department of Crop Science, Sokoine University of Agriculture, P.O. Box 3062, Morogoro, Tanzania.

COLLABORATORS: Theres a Sengooba (Mrs) Uganda  
Coy Haciwa (Zambia)  
Mrs Olivia Venge (Zimbabwe)

OBJECTIVES:

- (a) Survey and identify Bean Common Mosaic Virus (BCMV) strains in Tanzania, Uganda, Zambia and Zimbabwe.
- (b) Evaluate/screen germplasm collection against prevalent BCMV strains at hot spots within the two regions.
- (c) Conduct comparative studies of pathotypes against promising materials within the two regions.

PROBLEM THESIS:

Bean Common Mosaic Virus (BCMV) is present everywhere bean (Phaseolus vulgaris) is grown and losses up to 54 - 80% (11) have been recorded due to the incidence of this disease. Severity of the disease is dependent on host/cultivar susceptibility, vector population, percentage seed-borne infection and strain of BCMV. Several strains of BCMV have also been reported (3, 5, 7, 8, 12). The host-strain combination in certain locations can result in severe host reactions (11, 12) almost to the point of an epidemic (2, 3). In fact, Silbernagel et al (11) have indicated that depending on the host strain combination, losses up to 80% of the potential seed yield can occur. These strains are grouped into two - the temperature insensitive dominant gene strains and the recessively controlled mosaic type inducing strains (3, 8). On the basis of a study initiated in 1981 in Africa, it has been demonstrated that the temperature inducing and highly pathogenic strains are prevalent all over sub-saharan Africa (11). Though not completely identified, most of these strains cause severe infection in bean cultivars or "land races" in Africa.

Temperature insensitive systemic necrosis caused by strains in pathogenicity groups III, VIa, and VIb of BCMV induce blackroot syndrome (3). This is a major problem for breeders in Africa because of their lack of knowledge currently of the existence of these variants (5, 6). For instance it is known that cultivars with dominant alleles II of the necrosis gene are susceptible to the black root unless, of course, they can be protected by additional genes for resistance. Silbernagel et al. (12) in his report on identification of TN 1 strain of BCMV in Tanzania wondered why BCMV races with many genes for potent pathogenicity are so prevalent in East Africa with no genes for resistance.

Similarly a recent report by Oweru, Vetten and Allen (personnel communication) indicates that the NL3 strain is predominant in Uganda while on the contrary BCMV-NY15 is predominant in Ethiopia. Earlier on, Kaanaiyan had also reported the over-whelming predominance of NL-3 in Zambia (4). The predominance of TB1 and NL-3 strain raises several questions for which we expect to answer if funds are provided for this joint inter-regional project proposal:

- Q(i) Is the prevalence and the pathogenicity of several BCMV and other strains in Africa influenced by the presence of alternate hosts?
- Q(ii) If so, will it be possible to control these diseases by elimination of contaminated seeds or will it be a wasted exercise?
- Q(iii) Will Van de Plank's theory that unnecessary pathogenicity genes tend to be eliminated from host population will no resistance gene be any more applicable if no alternate host is identified (Silbernagel - personal communication)?

Previous studies indicate that resistance based on two genes II and ii will be the best long range solution to this problem. Certainly, germplasm collection, screening procedures and breeding strategies will be needed to answer the aforementioned questions. If we recognise the severity of this disease, and the acreage involved, then there is a need to:

- a) identify all the strains available in this region,
- b) identify the alternate hosts for this virus and its strains,
- c) utilise the knowledge in a + b to assist plant breeders and virus

- c) utilise the knowledge in a + b to assist plant breeders and virus pathologists in choosing the appropriate breeding promising materials and screen them against all the known strains - hopefully we will, in the end, identify resistant cultivars in the two regions.

#### METHODOLOGY:

1. A survey of virus and virus-like symptoms on beans will be carried out both in farm's and experimental fields. This will include timed visitation to bean growing areas synchronised with the period between flowering and podding stages when symptoms would be heavily manifested in the fields. Using the same procedure of Milk and Silbernagel (personal communication), several fields and experimental stations in the areas under regional mandate will be visited; photographs of plants showing various symptoms will be taken; the youngest trifoliolate leaves will be collected as samples, in desiccating chambers with calcium chloride and properly labelled with date, location, symptom and sample number. Sampling will not be restricted to bean plantings alone but also to other leguminous plants which may serve as alternate hosts and which are found in the vicinity of the bean fields. These samples will be stored for subsequent identification purposes. (Time schedule for survey -see Appendix 1).
2. Each labelled sample will be analysed by mechanical inoculation in the greenhouses on to test plants to detect presence of transmittable viruses for identification later using host differentials (Drijfhout, 1978). This analysis will be confirmed by serology (Makkouk et al., Dijkstra et al. 1987).
3. Multi-locational testing will further be carried out to assess the performance of promising lines from individual locations against the specific strains prevalent in each region. This will involve each investigator providing sufficient seeds of each of the promising lines in his country to other investigators. This exchange of materials would enable each investigator to assess the performance of these promising lines from his country against the strains originating from countries other than his own. The strategy would be to eventually come up with a line that may

be resistant to most (or all) the strains prevalent in each participating country.

DURATION:

This is a continuous process of monitoring changes in the pathotypes within the locations in the two regions bearing in mind the unpredictability of weather and seasonal variations. This studies therefore will have two phases - and phase I will involve an initial two year period of testing breeding materials within each region against possible strains of BCMV. Phase II will involve of exchange of materials between collaborating countries - also for two years. Any other subsequent studies will be decided by the outcome of these two phases.



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## APPENDIX (a)

## CIAT INTER REGIONAL BCMV DISEASE RESISTANCE NURSERY SUB-PROJECT

(Phase 1)

Work-Plant 1991-92 - Allan Femi Land (Sub-project Coordinator  
1991

## 1. February - June 1991

- a. Survey of viruses present in bean fields under the National Bean Trials in Morogoro.
- b. Screening for BCMV resistance using 103 lines in the field against BCMV - type and TNI strains.

## 2. February - December 1991

Survey and identification of viruses occurring in Bean Fields in Arusha, Kilimanjaro, Iringa, Mbeya, Morogoro and Tanga, as well as in legumes in the vicinity of bean fields in this areas.

## 3. July - September 1991

Glasshouse screening using same lines against the same pathogenes as in 1 (b) above.

## 4. September 1991

Bean workshop in Morogoro - discuss with Owera in Morogoro.

## 5. October, 1991

Shipping (forwarding) of lyophilised inoculated leaf samples from 1(b) and 3 above for ELISA analysis - either to Owera's lab. or Morales or MInks. (SUA now has some facilities to carry out these tests locally but we still need an ELISA reader)

## 6. November 1991

Analysis of results from 5 above

## 7. December 1991

- a. Consultation with collaborators in Chipata, Zambia and Harare, Zimbabwe in preparation for next season.
- b. Prepare joint progress report with PI Eastern Region.

## 1992

## 1. January - March 1992

1. Present joint progress report to the Steering Committee
2. Conference with the 2 Regional Coordinators on Work Plan for 1992.

## 2. April - June 1992

Repeat program 1 - 4 of 1989 plan

These activities have already been carried out in 1990/1991 but for the same collaborators' visit, these should be repeated.

## 3. May 1991

Receive collaborators in Morogoro.

## 4. June - September 1992

Prepare manuscript for Bean Workshop. Consult Owera and collaborators by correspondence.

## 5. October 1992

Prepare manuscript for publication in either Plant Disease or Annals of Applied Biology or Crop Protection Journal (W/Germany).

## 6. DECEMBER 1992

Meet with coordinators lay strategy for Phase II.

## BUDGET PROPOSAL 1, 2

## A. PRIMARY BUDGET

Expenditure	Year I 1991	Year II 1992	Year III	Year IV
Ploughing and Harrowing (2 acres at 6 locations)	600	600	600	600
Labour (plot layout; planting, sampling, harvesting 100 mandays at 6 locations at \$90 per day.	1,800	1,800	1,800	1,800
Glasshouse repair and experiments.	4,000	-	-	-
Field materials such as bags, ropes, fertilizers and other agrochemicals at each location.	1,400	1,400	1,400	1,400
<b>Non-expendable items</b>				
Mortars and pestles x 3 (at 3 locations)	200*	600	-	-
Posts and labels x 6	600	600	600	600
Insect cages x 6	200	200	200	200
1 automatic 8-channel pipette	500*	-	-	-
1 automatic 1-channel pipette	200*	-	-	-
1 automatic 35 mm Camera + accessories	1,500*	-	-	-
<b>Expendable items</b>				
Plastic bags, labels etc.	200	200	200	200
Stationery (+ computer costs)	2,000	2,000	2,000	2,000
Elisa plates (2 boxes)	600*	1,200	1,200	1,200

Expenditure	Year I 1991	Year II 1992	Year III	Year IV
Elisa accessories dialysis tubes	800	800	800	800
Publication of results in reputable journals	-	-	-	500
<b>Personnel</b>				
Short term trainee at approx. US \$30 per month x 2	720	720	720	720
Fringe benefits to PI and collaborators	3,000	3,000	3,000	3,000
<b>Transport</b>				
Local travel + per diem	2,000	2,000	2,000	2,000
International travel by sub-project coordinators in test stations in each country	1,500	1,500	1,500	1,500
(i.e. Lana: Dar-Harare-Chipata-Entebbe return)				
per diem for sub-project coordinator at US \$80 x 14 days	1,120	1,120	1,120	1,120
Travel by 4 collaborators to PI stations per diem (\$0 x 7 days)	560	560	560	560
Airfare	480	480	480	480
Sub-total	24,480	19,140	18,540	18,540
(+ 10% Contingency)	2,480	1,914	1,854	1,854
GRAND TOTAL	27,928	21,054	20,394	20,394

1. Please bear in mind inflationary rate in each participating country.
2. This does not include the request for purchase of an ELISA reader ( $\pm$  15,000 US \$) see letter.

## APPENDIX 20.

**TITLE :** Studies on Importance, Pathogenic variation and Management of Anthracnose in the SADCC Region

**PRINCIPAL INVESTIGATORS :** Coy H. Hachiwa (Zambia)  
Fredrica Mwalyego (Tanzania)

**COLLABORATORS** : Malawi  
: Angola

### INTRODUCTION

Bean anthracnose is prevalent in Northern Zambia, the Southern highlands and North Eastern Tanzania, as well as parts of Angola and Malawi. There are reports of high disease severity during most seasons. However, there is no information on actual yield losses caused by the disease in farmers' fields and the exact boundaries of the disease are not properly documented. Knowledge of races present in the region is necessary for the effective screening of bean genotypes for resistance. Germplasm must be screened by inoculation with all existing races if the resistance is to be useful in the field. This is particularly important where trial locations are few since races which are at locations away from trial sites may not be tested against. Knowledge of existing races makes it easier to exchange resistant genotypes between countries since their type of resistance would be known.

Small scale farmers in Northern Zambia and Southern Tanzania prefer to grow beans in mixtures of landraces. Cultivar mixtures having resistant components have been reported to reduce the spread and severity of some diseases. It is important that the farmers system is evaluated for the control of anthracnose as such a method of disease control would be easily adopted. Such studies have to be combined with screening for disease resistance, since host resistance remains the cheapest known disease control measure for small scale farmers.

We propose that research be carried out on the above topics and that most work be done in Tanzania and Zambia but collaborative links be extended to other countries in the region. The research activities and findings will compliment and draw on efforts in collaborating countries in the region and countries in other CIAT region.

### OBJECTIVES

- a) Assess the importance of the disease through crop yield loss studies in farmers' fields and surveys throughout the bean growing areas.
- b) Identify the prevailing pathogenic races and map out their distribution.
- c) To study disease control measures through cultivar mixtures and plant resistance.

## METHODOLOGY

- a) Crop loss assessment due to anthracnose will be carried out under controlled conditions, in hot-spot areas and in other representative areas under farmers' field conditions. Farmers' landraces and genotypes with known reactions to anthracnose shall be used in the studies. The assessment will be done in both Tanzania and Zambia for two seasons.

Surveys on disease severity shall be made in all bean growing areas. The distribution and importance of the disease in different areas will be mapped out so that on-farm trials may be carried out at appropriate locations.

- b) At the same time as the surveys, different isolates of the pathogen shall be collected. These will be taken to the lab, isolated and cultured for multiplication. Purified isolates shall be used to inoculate the 12 CIAT differential genotypes so as to identify the races. The survey and pathogen collection will be done in both countries during the first year.

- c) Studies on cultivar mixtures shall include :

- (i) the effective levels of resistant components in a mixture
- (ii) the appropriate number of components
- (iii) the effectiveness of the currently grown mixtures and
- (iv) an assessment of the resistance levels in the components of currently grown mixtures.

The experiments for I and II shall be done in Tanzania using synthetic mixtures of known genotypes during the first two years and the results shall be applied to farmers landraces in both countries during the third and fourth years.

Screening of local and introduced germplasm for resistance to anthracnose shall be carried out in Tanzania during the first two years. The promising genotypes will be tested at many sites in the region during the third and fourth years.



SUMMARY OF ACTIVITIES

ACTIVITY	YEAR			
	1	2	3	4
Crop loss assessment				
- under controlled conditions	T,Z	T,Z		
- in hot-spot areas	T,Z	T,Z		
- in farmers' fields	T,Z	T,Z		
Surveys on disease severity	T,Z	T,Z		
Collection of isolates	T,Z	T,Z	T,Z	
Race identification of isolates		T,Z	T,Z	
Effect of synthetic cultivar mixtures	T	T		
Status of currently grown mixtures	T,Z	T,Z		
Improved mixtures			M,T,Z	M,T,Z
Screening of germplasm	T	T		
Multilocational testing			A,M,T,Z	A,M,T,Z

T = Tanzania  
 Z = Zambia  
 A = Angola  
 M = Malawi.

## BUDGET

	T	Z	T	Z	T	Z	T	Z
Personal emoluments - labour, wages etc.	1500	800	1500	1000	1000	1000	1000	1000
Equipment and materials - incubator, sprayer etc.	500	2000	1500	1000	1000	1000	1000	1000
Expendable supplies, reagents, media etc.	500	300	300	300	500	500	300	300
Travel & transport - Fuel	2000	1500	800	800	1000	1000	800	800
- Subsistence	600	500	300	300	500	500	300	300
Monitoring tours and visits to collaborators	300	300	1000	1000	400	400	1000	1000
Stationery, photography, publications.	100	100	100	100	100	100	100	100
Other contingencies	500	500	500	500	500	500	500	500
<b>Total</b>	<b>6000</b>	<b>6000</b>	<b>6000</b>	<b>5000</b>	<b>5000</b>	<b>5000</b>	<b>5000</b>	<b>5000</b>

## PROJECT PROPOSAL

**Title: Screening of bean genotypes for tolerance to low available P and high Al Saturation.**

**Introduction:**

Bean yields obtained at farm level are generally low (mean of 600 kg/ha across the province). This may be due to high soil acidity particularly high Al saturation and low available phosphorus-since the local soils are high P-fixing. Beans are a good and cheap source of protein. They are becoming an important relish and cash crop in the SADCC region and it is strongly felt that the present yields be improved.

**Objectives:**

- 1) To identify 25 varieties well adapted to conditions of high Al and low P soils in Africa after 2 seasons of evaluation at 2 locations and to characterize the response of these varieties on low P soils in the third season.
- 2) To increase production of beans in the region, particularly Zambia.

**Expected Impact:**

At present there is a very high demand for beans as a source of protein as beef is becoming more expensive especially in towns. Improved bean yields will greatly supplement the diet of many families. It will also improve the income of the small scale farmers especially the female farmers who cultivate most of this crop.

**Linkage and collaboration:**

Collaboration will be kept with SADCC/CIAT and Regional bean programme scientist especially those who will also be screening beans genotypes for high Al and low P. Close contact will also be kept with other bean researchers in the region.

## Materials and methods:

64 promising cultivars which have passed through preliminary screening at primary sites. (i.e. Mulungu in Zaire for high Al and Lyamungu in Tanzania for low P).

## Design

### 1) Split Plot design main-plots

low P stress, no stress (P applied).

### sub-plots

64 varieties, with check every eighth plot.

### 2) SubPlot size

2 row plots - 1m x 3m

### 3) Replications 3

## Locations

Misamfu Research Center and  
at Lucheche trial site in Mbala.

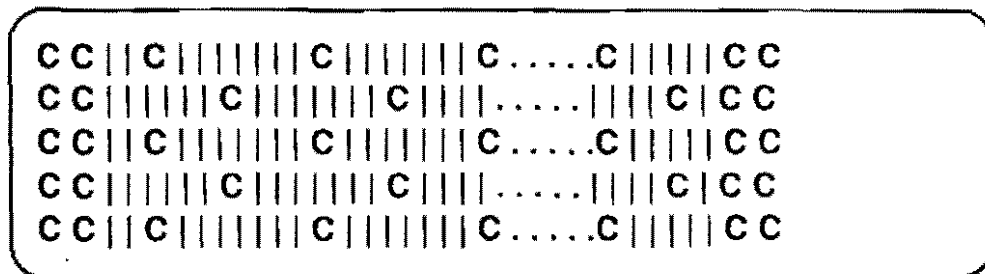
## Check-varieties

Carioca for non-climbers

G 2333 for climbers

Checks will be used in border rows.

Put one check entry for every eighth plot, as follows:



## Sources of Varieties

Varieties which have passed through preliminary screening at sites, Mulungu in Zaire for high Al and Lyamunga in Tanzania for low P.

The varieties originally came from:

- CIAT - Cali, selected by SB, JK, JL, JN
- Regional Nurseries
- National Programmes - AFBYAN, tolerant landraces, released varieties, etc.

## Management

Manage only non-experimental variables for optimal performance.

Control non-experimental stresses - insects, disease, weeds drought (if irrigation available). Apply lime and fertilizers, including P to the non-stress main plots, but excluding P in the low P stress main plots.

## Evaluation and Selection

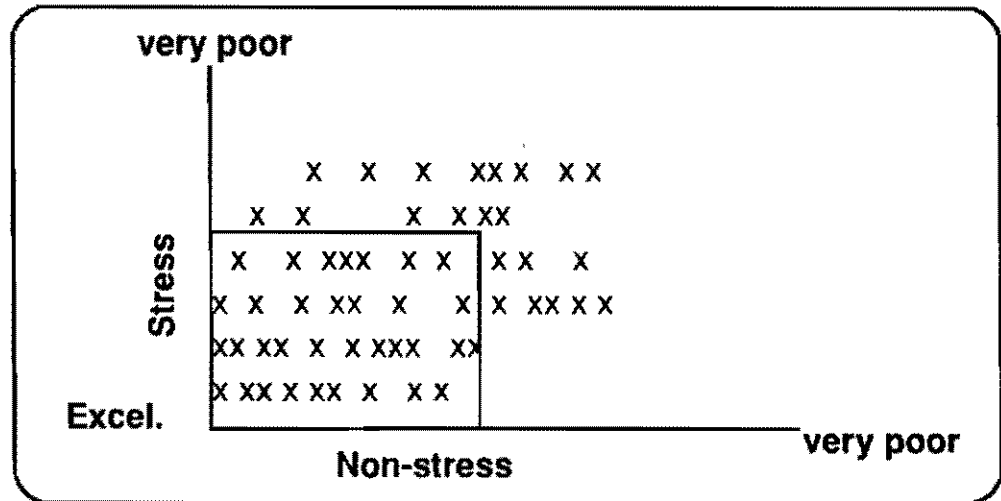
### Season 1.

At R7 (podfill), evaluate 1-9 (1. Excellent, 9. very poor).

- shoot growth
- symptoms of P deficiency
- growth habit

At R9 (Physiological maturity), score on a 1-9 basis for productivity.

Select the best 50% to be evaluated in the next season (sort by growth habit and select 50% of each growth habit) by plotting the R9 scores under stress against R9 scores under no stress, and selecting from upper right-hand part of the chart. (See the following figure).



## Season 2.

2 row plots, 3 reps, check every eighth plot.

R7 Veg. growth, growth habit, stress symptoms,

R9 (Physiological maturity), score on a 1-9 basis for productivity, and yield if possible.

Select best 40 entries, using same selection intensify for each growth habit, following criteria of first season, and send results to C.W in Uganda to be compiled for all locations to select the most promising 25 entries.

### **Season 3.**

Evaluate 25 lines selected in season 2, with 10 adapted but susceptible to low P stress (identified in season 1), plus check variety. The 25 tolerant lines will be selected considering information from all evaluation locations

- 4 row plots, 10 m long
- 4 replications
- 4 locations

### **Measure**

1. 35 DAP- above-ground biomass.
- 2.. P uptake of above-ground biomass
3. Nodulation
4. Mycorrhiza
5. Phy. Mat. Yield
6. N,P,K in seed
7. Measure Al, Ca, Mg uptake for Al stress at 35 DAP

### **Preparations.**

Optimal levels of stress and management of sites will need to be determined for the sites, though much needed information is available at most sites. The optimal stress level will allow the greatest differentiation between varieties, but still be sufficiently stressful that it will be the main stress to which the crop is exposed.

There is need to conduct trials this season (1991) in which levels of amendment of fertilizer will be applied to obtain varying levels of stress. Six IBSAN lines (single row plots) of similar growth habit and phenology will be planted in the (treatments in) sub-plots. Six levels of P for the respective stresses will be tested to determine the

optimal stress and non-stress levels. For Al, six levels of lime with 3 levels of banded P, will be tried to determine the management of the high Al stress and non-stress fields.



## **Budget For 1991 season.**

### **(Preparatory Management)**

One trial for low P and one for high AI will be conducted at Misamfu and Mbala making a total of four trials. These trials will be to determine levels of amendment of fertilizer to apply to obtain varying levels of stress.

The projected cost of running this trial is as follows:

#### **Labour:**

Five (5) workers at K2000/month for 3 months  
(growing period for beans).

**= K30,000.00**

#### **Transport:**

Fuel and oil, to Mbala (at 2 trips per month for 3 months).

**K100,000.00**

#### **Subsistence allowance**

Subsistence Allowance while in Mbala ( for 6 men for about 4 nights/man/month for 3 months).

**K72,000.00**

#### **Soil sampling and analysis**

Four composite soil sample per trial (4 trials) to be analysed for pH, exch. acidity and exch. cations.

**K30,000.00**

#### **Fertilizers and Lime:**

(Fertilizers, lime, and pesticides) **K7,000.00**

#### **Stationary and field equipment:**

( Hoes, ropes , labels, packing bags etc)

**K12,000.00**

**Protective clothes:**

Protective clothes for field work such as Overalls  
gumboots and raincoats.

**K20,000.00**

**Total K271,000.00**

! Note the exchange rate of the Zambian Kwacha to the US dollar changes from time to time. At the moment K40.00 = 1 US dollar.

## APPENDIX 22.

### PAN-AFRICAN CONSULTATIVE COMMITTEE (PACC) FOR BEAN RESEARCH

#### Purpose:

The general purpose will be to enhance effectiveness and efficiency of the Africa collaborative research network on beans and of CIAT's regional activities, by providing a high-level forum for interaction among the bean networks of the Eastern, Southern and Great Lakes regions and with CIAT.

Specifically, the PACC is expected to advise CIAT and regional steering committees in the following areas:

- research priorities relevant to bean productivity improvement across Africa;
- mechanisms for Pan-African coordination of research sub-projects;
- harmonization of project proposals submitted to donors in support of the three regions;
- staffing patterns of regional programs;
- institutionalization of the networks;
- further development of CIAT's strategy of collaboration with NARS.

#### Membership:

Two distinguished scientists and agricultural administrators from each of the three regions, and CIAT's coordinator for Africa will serve ex officio. CIAT's other regional coordinators will attend as non-voting resource persons. One of the representatives from each region will be appointed by a regional research institution (e.g. SACCAR) or by the regional Steering Committee; others will be selected, initially by CIAT in consultation with regional institutions and the Steering Committees, such that PACC composition is a balanced one that includes management from NARS, university and extension, biological and social scientists and bean research experience.

One third of inaugural regional members will retire each year, commencing three years after inauguration of the PACC. Thereafter, members will serve a four-year term. A member may be re-elected for one further term. The PACC collectively will elect its own replacement members.

The PACC will elect one member as chairperson for a two-year term. CIAT's coordinator will provide the secretariat.

#### Meetings:

The PACC will meet neither more frequently than annually nor less frequently than biennially. The venue will rotate among regions, and will normally be selected to facilitate viewing of an important regional bean activity.

Agenda items may be proposed by a member by a regional steering committee.