Sida Evaluation 04/09

The East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development (BIO-EARN)

E Jane Morris
Niels P Louwaars

Department for
Research Co-operation

The East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development (BIO-EARN)

E Jane Morris
Niels P Louwaars

Sida Evaluation 04/09

Department for
Research Co-operation

This report is part of *Sida Evaluations*, a series comprising evaluations of Swedish development assistance. Sida's other series concerned with evaluations, *Sida Studies in Evaluation*, concerns methodologically oriented studies commissioned by Sida. Both series are administered by the Department for Evaluation and Internal Audit, an independent department reporting directly to Sida's Board of Directors.

This publication can be downloaded/ordered from:
http://www.sida.se/publications

Authors: E Jane Morris, Niels P Louwaars

Sida Evaluation 04/09
Commissioned by Sida, Department for Research Co-operation

Registration No.: 2001-4134
Date of Final Report: February 2004
Printed by Edita Sverige AB, 2004
Art. no. Sida3808en
ISBN 91-586-8465-4
ISSN 1401—0402

SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
Address: SE-105 25 Stockholm, Sweden. Office: Sveavägen 20, Stockholm
Telephone: +46 (0)8-698 50 00. Telefax: +46 (0)8-20 88 64
E-mail: sida@sida.se. Homepage: http://www.sida.se

Table of Contents

Annexes

1. Executive Summary

1. The East African Regional Programme and Research Network for Biotechnology, Bio-safety and Biotechnology Policy Development (Bio-EARN) has been in operation since 1999 after a one year inception phase during which the programme was prepared by SEI and the partners in the East African region at the request of Sida.

2. Bio-EARN is unique in that it combines scientific and policy aspects of biotechnology in one programme. The focus on regional collaboration is to be supported for biotechnology, bio-safety and biotechnology policy since biotechnology encompasses a potentially powerful set of technologies that however require a large investment in human and material resources. Single institutions or even countries within the East Africa region could not attempt to individually develop these resources at a level required to achieve meaningful outputs. The international level of the network does however introduce some managerial challenges.

3. Bio-EARN has contributed significantly to the Phase I objective to build capacity and competence in the region through formal education (MSc and sandwich PhD programmes in Sweden), the provision of equipment to partner institutions, and through biotechnology-policy related workshops at regional and national levels.

4. The twenty PhD-students could provide a certain critical mass of knowledge in modern biotechnology in the region. Their distribution over widely differing technologies and applications (agriculture, environment and industry), however reduces opportunities for the region to play a role in these developments if it were to rely on the outputs of the Bio-EARN programme only.

5. In conjunction with the biotechnology research programmes, Bio-EARN has contributed to capacity building and awareness creation in the fields of bio-safety, intellectual property rights and biotechnology policy. Despite the programme's focus on senior scientists rather than administrators, Bio-EARN partners have been involved in national biotechnology policy forums, thus contributing to a direct impact of the programme at the policy levels.

6. Bio-EARN has not focused specifically on building the institutions that would be responsible for implementing the regulations. Other national and regional programmes now seem to be starting to fill that gap.

7. The compliance with an over-all aim as expressed in Phase II to use this biotechnology in a sustainable manner to help improve livelihoods, ensure food security and safeguard the environment is not measurable, mainly because most research programmes were not selected with that immediate objective. This inconsistency of objectives throughout the programme has led to some lack of clarity about the focus and priorities, and to a range of interpretations of the goals of Bio-EARN by different stakeholders.

8. Bio-EARN is appreciated by many stakeholders as a programme that has attempted to take the African priorities more seriously than many other development projects. It has been cited as one of the best development programmes from the point of view of willingness to listen to the needs of the region rather than imposing priorities top-down.

9. In practical terms, Bio-EARN took a rather action-oriented approach to selecting partners, focus areas and projects by operating at the (senior) researcher level rather than formalising its

activities at the institutional and governmental levels. This approach has been instrumental in a rapid start-up of the programme, creating a clear output in terms of capacity building to date.

10. The lack of involvement of the higher administrative and policy levels are, however, beginning to cause some setbacks now. The result of this somewhat informal approach is a weak institutional commitment (both at the African and the Swedish side). and insufficient ownership over the programme in the region. This is illustrated by the lack of commitment to employ several of the Bio-EARN students, the lack of commitment to invest in regional collaboration, and inefficiencies in the selection of material investments. This limited regional ownership challenges the programme's sustainability.

11. The action-oriented approach may also have contributed to differences in expectations amongst role players regarding most of the PhD-research programmes. These research programmes are insufficiently based on national and regional priorities for solving actual development problems despite documented efforts to actually do that. In some countries, the PhD students have been selected without due regard to their future career prospects in the institution or to maximising their future contribution to research in their home country.

12. The governance structure of Bio-EARN allows for a strong involvement of all concerned. However, there is some lack of clarity on where final decision-making should lie. The General Assembly is too large a body and meets too infrequently to play this role, while the Steering Committee should be primarily advisory in nature. By default, decision-making tends to revert to the coordinators at SEI, supported by the regional coordination office. The organisation at the national level is weak in several countries, thus providing insufficient counterbalance to the information and decision-making advantage that the regional and Swedish coordinators have. The strong personal commitment of the Swedish and regional coordinators has led to some perceptions of personalisation of the programme's management.

13. Serious governance problems do exist in the lack of transparency in the separation of the regional coordination from the national Ugandan focal point, and in the combination of functions by the regional members of the steering committee, who are themselves direct beneficiaries of the programme and therefore cannot be seen as independent advisors.

14. Regional cooperation is a prerequisite for obtaining tangible outputs from biotechnology development and application, and as such an objective of Bio-EARN. Despite attempts by the Bio-EARN programme to promote regional collaboration through the choice of clusters of research projects, regular meetings of the students in Sweden, and the regional workshops, there still is a long way to go in finding ways to enhance collaboration. Despite significant efforts Bio-EARN appears to have missed some obvious opportunities to increase cooperation, such as promoting joint curriculum development and faculty and student exchange within the region, and promoting sandwich programmes with partners in the region rather than with Swedish Universities. Sida regulations may however not be instrumental in forging collaboration beyond the north-south contact between Sweden and the region.

15. Nevertheless, Bio-EARN has been a pioneer in biotechnological cooperation in the region and any failure in this area should be assigned to the externalities rather than to the programme itself.

16. This report includes a number of critical comments on the implementation of Bio-EARN that could be taken as learning points for future programmes, such as:

    - limited links and synergy between the different aspects of the programme, especially research and bio-safety

- poor balance in supervision between Swedish and African supervisors, which might have been improved if joint registration for degrees could have been negotiated between relevant partner institutions.
- lack of emphasis on multi-disciplinarity in research programmes, thus insufficiently training students in research for development
- institutional IP policies that that are not well aligned with the mission of Bio-EARN or the public role of the institutions

17. Despite several flaws identified by this review, a Phase III could be considered and indeed is recommended in order to embed the achievements of Phases I and II. Bio-EARN and its partners currently face a very different environment compared with the inception phase of the programme. Bio-EARN may have to find its niche among a variety of donor-led biotechnology initiatives in the region, which are largely focused on bio-policy, bio-safety and implementation of technology in the market. The capacity building activities of Bio-EARN however could be seen as providing a unique benefit to the region. We would, however, like to warn against overly optimistic expectations with regard to the power of biotechnologies to solve actual problems in improving livelihoods, the environment and food security in the short time span of a Phase III of Bio-EARN. This should not however detract from the very real achievements and benefits of the Bio-EARN programme to date. If these achievements are to form the foundation for future growth, the preparation of a third phase needs to be truly participatory at all levels, and good planning should be the main priority rather than rapid implementation.

18. The increased awareness of the importance of biotechnology, as well as other biotechnology in initiatives in the region, forces Bio-EARN to professionalise its regional governance, thereby increasing ownership and providing for leadership in the region. Alternatively, Bio-EARN may link up with other African biotechnology initiatives, which would not only provide political credibility but would also increase the necessary regionalisation of the development and application of biotechnologies and biotechnology-policies.

2. Introduction

2.1 Background

The Bio-EARN Programme has been running since 1999. The programme is focused on building capacity in biotechnology, bio-safety and biotechnology policy development in Ethiopia, Kenya, Tanzania and Uganda. In order to make an assessment of achievements and impact of the programme an external evaluation of the Bio-EARN Programme was commissioned, and carried out during 2003.

2.2 Purpose and scope of the evaluation

The purpose of this evaluation is to:

– assess how successful Bio-EARN has been in fulfilling the research, dissemination, capacity building and policy impact objectives set in the first (1999–2001) and second (2002–2004) phases.

– make recommendations on the future direction, scope, content, functioning and funding of Bio-EARN, based on this assessment.

The evaluation may serve as background information to the Bio-EARN network for future development of the Programme and as background information for Sida and other stakeholders concerning possible future support to the Programme.

For this purpose, the Terms of Reference were designed to cover the following components over the period from January 1999 till November 2003 (see Annex 2.):

I) Evaluation of Bio-EARN activities

II) Evaluation of collaboration and communication activities

III) Assessment of the impact of Sida support

IV) General suggestions for improvement of the Bio-EARN programme

These terms of reference exclude the following items from the evaluation:

1. the inception phase, including the choice of themes and partners

2. the financial management of the programme and accountability.

However, we have taken the liberty to touch upon these issues wherever they appear relevant to the scope of the evaluation, especially with regard to the choices made during the inception phase.

While the evaluation was underway in Africa, the reviewers were asked to take the ongoing process for the preparation of a proposal for Phase III into account. We agreed to provide our suggestions for the future directions based on our assessment of the current programme (section 6). We have tried to clearly separate these two tasks, even though it was not possible to avoid discussing the ongoing process for Phase III during meetings with the stakeholders in the region.

2.3 Methodology

The evaluators have complementary experience that jointly cover industrial, environmental and agricultural biotechnology, technology transfer in relation to agricultural and industrial development, research, bio-safety, genetic resource and intellectual property policies and their implementation (see CVs, Annex 9).

We have interviewed relevant staff of (for the order of interviews see itinerary, Annex 8):

– the main contractor (SEI),

– Swedish institutions involved in the programme (universities and training institutions) and several of the African PhD-students,

– the policy support institution involved in Phase (ISNAR),

– Regional coordinator and National Focal Points and National Science Councils in Eastern Africa

– African research institutions

– Additional relevant stakeholders in the region (outside the group of partners) where they could be included in the itinerary.

The meetings were scheduled and organised by the national focal points and SEI. Some were necessarily planned during weekends. We consider the availability of Bio-EARN partners for these discussions during weekends both in the region and in Sweden as a sign of commitment. We are very grateful for the logistical support provided to us, and the open-minded attitude that we met towards discussions of the programme. In this review programme members of neither the donor nor the steering committee were included (except for some representatives in the steering committee of African institutions).

We have included discussions with a small number of interested outsiders to the Bio-EARN programme in order to obtain some outside views, e.g. managers of ILRI, AATF, BTA, ASARECA. However, the timing of the trips to Sweden and the region did not permit us to interview all persons involved in the programme (e.g. some students and supervisors, and a large number of persons involved in the numerous workshops and meetings that the programme organised throughout its existence).

Moreover, we reviewed project documents and outputs as provided to us by SEI, the regional coordination office and some materials provided by interviewees.

The current report is the result of our analysis of the discussions and documents. We hope that it provides some learning-points for future projects. We furthermore want to stress that the parts of the current report that deal with a possible third phase (chapter 6) should be read as a presentation of options and attention-points and by no means as contributions to a draft programme text.

3. Review of Mission and objectives of Bio-EARN

3.1 Overview of mission and objectives

The mission of Bio-EARN has been described for the first time in the proposal for Phase II as follows:

> *"The mission of the BIO-EARN Programme is to build capacity in biotechnology in Ethiopia, Kenya, Tanzania and Uganda and to promote appropriate research and related policies. The Programme aims to use biotechnology in a sustainable manner in order to help improve livelihoods, ensure food security and safeguard the environment".*

It contains elements that do not appear in earlier documents, notably the inclusion of long-term objectives related to livelihoods, food security and environment. The proposal for Phase 1 contains a long and descriptive set of objectives (see Annex 3), that are summarised in the executive summary of that document as follows:

> *"The principal objective of the proposal is to build national capacity and competence in biotechnology, bio-safety and biotechnology policy via support to selected institutions (see below) in Ethiopia, Kenya, Tanzania and Uganda, through a regional networking model."*

The logical framework that was developed subsequently contains 4 individual objectives indicating longer-term goals that are however different from the phase 2 mission statement:

> – *"Overall objective agricultural biotechnology:*
> *Increased capacity to make effective use of biological resources in a sustainable manner leading to improved agricultural productivity.*

– Overall Objective Environmental and industrial biotechnology
Improved environment and sustainable use of genetic resources.

– Overall Objective bio-safety capacity building and bio-safety research
Safe use and development of GMO's.

– Overall objective for biotechnology policy capacity building
Promote safe use and development of biotechnology.
Promote sustainable use of biodiversity."

Finally, SEI presented the following over-all objective of the programme to the reviewers in September 2003 as follows:

> *"Using biotechnology in a sustainable manner in order to help improve livelihoods, ensure food security and safeguard the environment."*

Despite this apparent reformulation of the objectives, a new log frame has not been developed for Phase II.

3.2 Review of desired outcomes

The differences between the versions of the objectives of Bio-EARN indicate a major shift in the desired outcomes of Bio-EARN. A very important addition in the second phase mission is the aspect of improving livelihoods and food security, which indicates that the programme aims at supporting resource-poor farmers, whose livelihood and food security are most challenged. This aspect is however deleted in the MoU leading to Phase II, but comes back very strongly in the presentation of the programme to the reviewers.

The problem appears very clearly in the choice of focus areas and the selection of research projects. The industrial biotechnology projects do not fit in the Phase II mission despite their scientific importance and opportunities for commercialisation. Secondly, the idea to invest in public-private partnerships with local private sector partners will result almost by definition in a focus on commercial sectors (e.g. farmers) rather than the resource-poor, which is difficult to match with the mission. The inclusion of other actors, such as non-governmental organisations in the Product Development Partnerships (PDPs) is a commendable attempt by the programme to widen the scope, but there is no evidence yet that Bio-EARN partners have the capacity to pursue such complicated institutional arrangements.

When the over-all objective is to build capacity in biotechnology, which is the primary focus of Sida as a research cooperation organisation, there is no immediate need to focus on regional priorities in the PhD-programmes. On the other hand, when the research projects should aim at improving livelihoods, food security and the environment, a much more comprehensive priority setting would have resulted in a very different list of projects. Currently, most students consider their projects very relevant for their countries and they have an expectation to contribute to actual development through the current research. To the reviewers, however, it seems more important that they learn technologies that can be very useful when they return to their countries (thus fulfilling Phase I objectives rather than Phase II objectives).

The mission and objectives have become broad and appear ambitious in scope relative to the funding available and the time frames.

Objectives have not been consistent throughout the programme, leading to insufficient clarity about the focus and priorities, and to a range of interpretations of the goals of BIO-EARN by different stakeholders.

We will use the objectives as presented for each phase, but refer to the differences where we consider it appropriate.

3.3 Selection of research focus areas and partners in relation to objectives

The idea for a regional programme on biotechnology appears to have emerged from the Biotechnology Advisory Committee at the Stockholm Environmental Institute. The initial documents refer mainly to the need to develop bio-safety capacity in the region. During a SEI-mission to the region, many institutions were visited and initial ideas about possible partners and focus areas were developed in close consultation with these African institutions. We understand that at this stage, the focus was widened to developing capacity to support both biotechnology research and development and the development of biotechnology-related policies and their practical implementation (including bio-safety). The consultation and preparation took most of the year 1998.

Priority setting was subsequently done during a meeting in Entebbe, which can be regarded as a matchmaking exercise where African interests and Swedish capabilities were connected. This has acted as a kind of 'self-selection' among institutes – those who did not respond to the invitation to develop concept notes were not further involved (e.g. Sokoine University) and one additional institution was included to match with a Swedish interest (Dept. of Biochemistry, University of Nairobi). This workshop represented a very important attempt to include African priorities and to create ownership within the region.

The selection of research focus areas and partners appears to have been based on a number of factors including:

- A pre-conceived idea before the start of the programme not to deal with two major biotechnology fields: veterinary and medical biotechnology
- Regional and national priorities as perceived by the African researchers contacted in the programme development phase
- Potential for linkage with Swedish partners
- Personal contacts with prospective partners

The approach was obviously pragmatic, and represented a compromise between what was desirable from a development perspective, and what was practical. In most cases the organisations and/or individuals were keen to be involved, which resulted in a selection on the basis of commitment, which is a key success factor. In some cases however, the matchmaking required some persuasion which resulted in a more limited degree of success (both in the selection of partners and PhD-students). This is most obvious in the inclusion of the industrial biotechnology in the programme. We also feel that this plays a role in the PhD-programmes on bio-safety and with at least one student working on environmental biotechnology.

> The inclusion of a variety of focal areas (agricultural, industrial, environmental biotechnology and bio-safety) has spread resources thinly, but on the other hand reduced possible limitations in the institutions to absorb the human capacity

At the level of individual PhD programmes, emphasis has been placed on selecting project clusters that would enhance regional cooperation. In the industrial biotechnology field this was however not possible due to limited capacities in the region. Also in the agricultural field, this has not always been successful (e.g. sesame oil).

We realise that the factors that influenced the selection of focus areas also affected the selection of individual research projects. The resulting somewhat ad-hoc approach has led to the following negative characteristics:

- In the agricultural field, national/regional priorities were only followed with regard to the choice of crops and technologies, and not necessarily with regard to the desired traits.
- Despite the clustering, research topics are spread over a broad area without adequate consideration being given to building of critical mass in any specific area. An early consideration of what would constitute critical mass could have led to more focus in project selection. Furthermore, the fact that there has been no attempt to cluster the PhD's in interdisciplinary groups that could work on different aspects of a particular development priority strengthens the focus on capacity building *per se* and not on a strong development orientation.
- Projects were proposed/selected by individual scientists, without always considering the availability of students and their career prospects. This may contribute to a lack of commitment from some East African countries to provide long-term research careers for the trained students.
- There are insufficient regional collaborative efforts among supervisors.
- Lack of transparency in the selection of partner institutions and individual students, and absence of a competitive process in most cases, may have contributed to the involvement of a few poor-performing students.
- Lack of vision on downstream aspects of many projects has resulted in lack of an evaluation of the true potential for creating value and impact to the region, as well as a lack of planning for how future implementation might be arranged.
- Lack of adequate supervisory support from the African institutions, has resulted in imbalances in some cases between the Swedish and African leadership roles.
- Uncertainty whether the students should focus on building their research skills or on solving problems in their home country.
- Unrealistic expectations by students that their projects will directly lead to outputs that will help improve livelihoods, ensure food security and safeguard the environment.

These comments are made on the basis of the current mission and objectives of the programme, concentrating on improving livelihoods, food security and the environment. However, if the objective was just to build biotechnology capacity in the region, the content of the research programmes becomes irrelevant. Some African supervisors currently take that stand: "the technologies that they learn are much more important than the project itself (e.g. the use of molecular markers) and may be used in any future project".

Other supervisors want their students to take their project to practical use despite complete ignorance of the technical and business approaches that may be needed to achieve that (e.g. specialty oils from sesame).

A lengthier preparation of the programme and a more strategic approach to selection of research focal areas, relevant institutions and students would have generated greater focus and chances for long term success, and would have facilitated the shift in objectives in the programme.

4. Review of Bio-EARN activities to date

4.1 Capacity building in biotechnology R&D – human and infra-structural capacity

4.1.1 General

The components of the capacity building activities as stated at the start of Phase 1 were:

- Preparative courses for PhD/MSc students
- PhD/MSc training through the well established "sandwich model"
- Faculty training (postgraduate training and research visits by faculty staff)
- Short term training and "hands on training" on various biotechnology policy issues, including bio-safety capacity building (e.g. training courses, workshops, internships etc.)

The major focus of the capacity building programme in biotechnology R&D has been the training of 20 PhD students, five from each country. There is no doubt that this training programme is contributing significantly to the biotechnology research potential of the countries concerned, and all parties interviewed felt that this was probably the most significant contribution made by the Bio-EARN programme.

4.1.2 Project selection

The projects were selected in agricultural, environmental and industrial biotechnology and bio-safety, and were intended either to contribute to solving actual problems in the region, or to simply create research capacities with the students. The list of projects is presented in Annex 7.

In selecting projects, emphasis was placed on projects that fit within perceived national or regional priorities (although in order to do this properly a much better stakeholder analysis would have been required), and more effectively on creating clusters of projects that would enhance regional cooperation. Projects were generally proposed by the African partners, and those that were aligned with the research interests of the Swedish partners were further developed and adopted. The ability of the African supervisors to play a supervisory role in the particular projects selected was apparently not examined in detail.

As a result of the need to balance the requirements of all the parties concerned, the following characteristics have emerged:

- In the agricultural field, national/regional priorities were only followed with regard to the choice of crops and technologies, not necessarily with regard to the desired traits
- Despite the clustering, research topics are spread over a fairly broad area without adequate consideration being given to building of critical mass in any specific area
- Regional collaborative efforts among supervisors are limited, due to a focus on individual interests

At this point, however, we would like to highlight a supportive comment made by some African partners on the fact that the priority setting exercise allowed the Swedish partners to significantly alter the initially African proposals: "collaboration will only work if all partners benefit – in an international cooperation programme there is no basis for any partner (group) to monopolise priority setting and benefits".

Lack of initial focus on later practical implementation of project outcomes has resulted in selection of some projects with limited potential for creating value and impact to the region (although there is an expectation that the potential exists), as well as a lack of planning for how future implementation might be arranged.

4.1.3 PhD/MSc training

The training has involved both African and Swedish supervisors in a sandwich model, with students spending at least half their time in the Swedish institution.

Positive aspects of the PhD training identified were:

- The sandwich programme model enables the students to benefit from the cutting edge research environment in Sweden, while still maintaining links with their home country.
- The equipment placement programme, for which the PhD students took responsibility in many projects, has been extremely valuable, and has contributed significantly to the building of capacity in the home country as well as exposing the students to the appropriate purchasing processes
- The willingness of the Swedish supervisors in most cases to visit their African counterparts, and *vice versa*, has contributed to a good understanding of the situation in the partner institutions and to the identification of opportunities for increased networking
- In some cases the Swedish partners have sent Swedish students to the African partners for short periods, thereby also stimulating mutual interaction
- The initial biotechnology course has been treated very positively by both students and supervisors
- The Svalöf-Weibull training course has been identified by all students as a highlight of their training
- The concentration of students from the different African countries at a limited number of institutions in Sweden has in a number of cases built friendships between the students which may stimulate future interaction within the region

Some areas that could have been improved include:

- The Swedish supervisors would have appreciated the opportunity to be involved in the selection of the students, a view that was not always shared by their African counterparts.
- Some of the PhD students are already well advanced in their careers (particularly those from Tanzania). The imposition of an upper age limit would have encouraged the countries to train their young scientists, but may have resulted in inability to participate by institutions that in some cases do not have younger staff or that have set procedures for international training opportunities.
- Selection of students who had an obvious interest in a future research career (as opposed to civil servants who are unlikely to utilise their PhD training directly) would have been beneficial.
- Lack of a competitive process and/or shortage of appropriate candidates, has led in some cases to involvement of poor performers.
- Gender balance has been an issue during the selection of students, which resulted in the enrolment of close to 30% women students in the PhD programme. Although selection of female students was encouraged, the number of such students still falls short of desirable levels.
- It would have been an advantage if the African institutions were required to make a commitment in writing to providing employment for the students at the end of their training. Most of the research

institutes enrolled students who were already staff members, but this was not the case in some of the universities. Such a commitment could also have contributed to the placement of equipment at the correct location for the student to be able to access it on his/her return. The requirement to provide employment might have delayed the start of the Bio-EARN programme, but would have alleviated later difficulties. In proceeding to Phase III, it is difficult for the African supervisors and students to plan projects when there is no certainty that the students will have positions in their home institution.

- Swedish institutions should have been required to commit themselves to not hiring the students for post-doctoral studies or a career in Sweden in writing, thus balancing responsibilities by both partners on their commitment towards the students.
- The communication and balance of influence between the Swedish and African supervisors has not always been optimal. Consideration might have been given to promoting joint registration for degrees, although it is understood that this could be a complex process involving extended negotiations.
- The requirement for the students to undertake their PhD training in Sweden has sometimes cut out potential collaborations with institutions elsewhere in the world that might have been more appropriate for particular projects
- Selection of projects based on institutional and national (rather than regional) interests has limited the potential synergies between students and projects, so that the potential for regional networking has probably not been fully exploited
- The breadth of the programme (agricultural as well as environmental/industrial and bio-safety research) has also limited synergies between students even within a single institution, despite concrete attempts by the Bio-EARN programme to stimulate contact among the students.
- Many of the students found the sandwich model imposed too severe a burden on their families, and suggested that more attention should have been paid to providing for family visits. This problem was exacerbated by the fact that many of the students are mature with considerable family commitments.
- The Swedish institutions and supervisors selected encompass a wide range of institutional and personal commitment, and ability regarding cooperation on an equal footing with their African counterparts. At the start of the programme, some of the Swedish supervisors had little idea of the background and working conditions in the African institutions.
- Insufficient emphasis was placed on assessing the level of know-how of the African co-supervisors in the proposed research topics to determine whether they would be well able to co-supervise the projects. As a result, in some cases the supervision is rather unbalanced and the students' periods in their home institution have not always been as productive as they might be.
- The students could have benefited from some additional training courses in e.g. didactic skills, proposal writing, research management, commercialisation and entrepreneurship. Such courses were either not available at the host institution in Sweden or were only available in Swedish. The proposal writing course, which is planned for April 2004 is a commendable effort, but we would encourage this and similar courses to be pursued with more vigour.
- The selection and implementation of the PhD-programmes do not provide for improving essential skills in research for development, i.e. participatory planning and interdisciplinary approaches to problem solving. The projects are academic in nature and students may find it hard to work in an environment where they will be asked to design biotechnology research towards problem solving in both research for development and public-private research partnerships.

– Some of the students appear to have unrealistic expectations that their projects will lead directly to outputs that will help improve livelihoods, ensure food security and safeguard the environment.

4.1.4 Faculty training

The approach of training faculty members from the African partner institutions as well as training the students has not only built capacity within the institutions but has also made the faculty members feel more fully involved in the Bio-EARN programme. In many cases faculty members have attended the same courses (e.g. Svalöf-Weibull course) as their students, thereby contributing to a common pool of knowledge. Faculty members have also in some cases spent extended periods of time in the laboratories of the Swedish counterparts, thereby forming personal linkages and contributing to the potential for future interaction.

Some suggestions for improvement of the faculty training, as identified by those involved, included:

– The Bio-EARN programme could have made provision for more training to be carried out in some cases in countries other than Sweden, and particularly for visits to counterparts in other Bio-EARN institutions. Even though there has been one such activity (in South Africa) many partners have the impression that Bio-EARN could not honour such requests.

– Provision for faculty members to attend international scientific conferences would have been helpful.

– In some cases the length of the courses (e.g. Svalöf-Weibull course and ACTS course) made it difficult for faculty members to attend, especially those with management responsibilities. Shorter courses would be easier.

– In addition, the Swedish partners could have been encouraged to collaborate with faculty in the African institutions to provide guidance and support in curriculum development

4.1.5 Infra-structural capacity

The two major components of infra-structural capacity building have been the provision of research equipment and computer equipment linked to e-mail and internet connectivity. Both aspects of infra-structural capacity building have played a vital role in the Bio-EARN programme to date, and have contributed significantly to the success of the programme and to the future sustainability of the research programmes.

The involvement of the PhD students, their supervisors, and the department as a whole in identifying priorities and deciding on the equipment to be purchased has ensured that they place high value on this aspect. All institutions visited were keen to point out the importance of the equipment as well as of their improved computer networking abilities.

In a few aspects the equipment placement programme might have been improved. These include:

– Make the acceptance of equipment orders subject to an inventory of existing equipment in neighbouring departments (in some cases also within the same department) to avoid duplication and promote a culture of sharing. The initiative to 'encourage sharing' has shown to be insufficient to avoid duplications. Consideration could be given to the introduction of appropriate financial management procedures for capital equipment (making provision for depreciation), thereby raising awareness of the need for a sustainable long-term capital equipment plan

– More attention could have been paid to the cost of importing equipment (duties on imports are high in some countries), on mechanisms to minimise these costs (e.g. use of embassy channels through Sida-involvement), and on appropriate budgetary provision so that research running costs did not have to be reallocated to meet import duties

– The long-term cost of equipment maintenance should be taken into consideration. Training of technicians in equipment maintenance may not be practical given the wide variety of equipment and its relatively sophisticated nature, but the financial and opportunity cost of malfunctioning equipment which needs to be sent away for repair is significant. Alternatively, the training of research staff to operate the equipment (instead of the scientists themselves) could lead to a more responsible use and reduced risks of breakdown.

All role players appreciate the value of the PhD training and associated components. Nevertheless, some more detailed planning at the inception of the programme with regard to criteria for selection of projects, students and institutions, might have delayed the initial implementation phase but would have probably benefited the programme in the long term.

4.2 Capacity and awareness building in biotechnology policy issues

4.2.1 General

Capacity building on the policy aspects of biotechnology is central to the Bio-EARN mission and objectives that aim at (in our understanding) creating a critical capacity in the region to decide on its own direction with regard to adopting such technologies in the member countries.

The programme has gradually shifted its focus on several of the issues around biotechnology policies from a largely international perspective in Phase 1 (under the guidance of ACTS) to national and in some fields institutional levels as currently guided by IBS. We welcome this trend, which is already yielding more tangible results.

The programming of the policy-related initiatives of Bio-EARN also changed after the first Phase. Initially, the programming was quite strict, based on a particular final output. From 2002 onwards, the planning decisions in the different regional and national initiatives were left to annual programming meetings. This increased flexibility and opportunities to focus on national and topical priorities, but it reduced the opportunity to plan initiatives in a particular sequence, involving the same participants where necessary to provide follow-up of outcomes of earlier meetings.

Decisions on participation were largely left to scientists and the heads of the partner institutions that delegated less-involved staff in several cases. Even when National Focal Points were charged with the selection of a delegation, they often delegated this task with the same result. Quite often participation was focused on the scientists and research-managers with little involvement of persons more directly involved in policy formulation.

4.2.2 Biotechnology policies

Biotechnology policies build on two key factors:

– formulating ideas about the benefits and opportunities for using the wide range of bio-technologies for accomplishing development objectives, against the costs and risks associated with these, and

– Creating awareness among all stakeholders, including the general public about these ideas.

The Bio-EARN strategy has been that these two go hand in hand. From the start of the programme, a biopolicy internship, and courses and workshops dealing with different aspects of biotechnology policy formulation and biotechnology awareness have been organised, at a time when the knowledge about biotechnology was very limited beyond a small portion of the scientific community in the region. The first section of Annex 4 summarises the activities in this field. Kenya was the only country where these activities could build on past initiatives by ISAAA, BTA and others, but Bio-EARN also took a

very active position there throughout its two phases. Bio-EARN was commended by various stakeholders in the region for its open and impartial position, where some other organisations were found to do biotechnology advocacy with a strong emphasis on promoting transgenic crops. The Bio-EARN contribution to the discussion in several countries has been to widen the scope of the debate from transgenics to the much wider arena of biotechnology.

Even though most activities did not particularly focus on the policy makers themselves, they provided a firm background for a wide range of technical biotechnology specialists to act in policy preparation committees installed by the governments. As such, we conclude that Bio-EARN has played a crucial role in stimulating discussions and formulating biotechnology policies, without being the final editors of the documents.

More specifically: Bio-EARN partners played a major role in a meeting with a large number of members of the Kenyan parliament and other key persons in the field of policy preparation and confirmation in Mombasa in October 2003. In Tanzania, the involvement of Bio-EARN partners in different fora culminates in a three-day meeting on the issue in November 2003, chaired by the President. In Ethiopia, a biotechnology policy document is currently before the Cabinet, and the Ugandan President has taken a very active interest in this field and communicated directly with Bio-EARN partners.

In spite of some apparent shortcomings, the role of Bio-EARN in supporting awareness building of biotechnology in different sectors of society and in actively supporting policy formulation has been exemplary.

4.2.3 Capacity to develop and implement bio-safety policies and regulatory frameworks

The medium term (5 years) expected outputs as stated in the original proposal were:

1. All countries should have a functional bio-safety regulatory system and be able to evaluate transgenic plants already tested and commercialised in other parts of the world.
2. The Bio-safety National Committees (now formed in all four countries) should be able to evaluate data and information generated elsewhere, and adapt it to their own specific ecological situation.
3. The bio-safety regulatory instruments in the region should now be in the process of being harmonised.

The programme intended to achieve this through:

- Research on ecological impact assessment of transgenic crops
- Capacity building in bio-safety implementation
- Training of PhD students in bio-safety and bio-ethics
- Added to this list was the development of botanical background information to support bio-safety reviews (botanical files)

The training of six MSc students and subsequently three PhD projects in ecological research related to gene flow, was an added component of capacity building in bio-safety. These projects have unfortunately turned out to be quite theoretical in nature, and not necessarily relevant to the East African situation, particularly in the current stage of development of bio-safety processes. It is not clear to the reviewers whether these students will actually obtain the skills (in addition to their theoretical background knowledge) to actively contribute to biosafety decisions. There is a big gap between this theoretical approach and the very practical activities in one small aspect of biosafety evaluations, the botanical files.

It is not certain that the PhD students will be substantially better placed to review applications for release of GMOs in the short term than scientists with a more general background in relevant areas. The students themselves indicated that they were concerned about expectations back home that they will know all aspects of risk assessment. They see themselves as providing some scientific input into guidelines/risk assessment processes but do not have broad knowledge to provide leadership, and are not connected to policy makers. Some mentioned that the MSc-course was a general ecology course and they commended the efforts to organise specific short-courses in risk assessment at their request.

The different regional, national workshops and international training courses in Sweden and The Netherlands have increased the awareness and knowledge of bio-safety issues among a sizeable group of people in the region. The focus was on general awareness-raising, and as there was no substantive investment in "train-the-trainer" programmes, the sustainability of these initiatives may be limited. The compilation of a Bio-safety Resource Book is a more tangible product of Bio-EARN in this field and is a commendable output of the programme, which can indeed be used in future national or regional capacity building programmes.

The PhD students attended a training course on bio-safety in Sweden. In discussions with several students that work on transformation, the reviewers did not observe any application of this knowledge in their own research programmes. They had not made a bio-safety assessment of their project, nor did they seem to be aware of the potential bio-safety issues of their activities when it would come to application in their countries.

The current status of bio-safety in the region is that Kenya and Uganda are developing legislation and have a functioning interim bio-safety process, while Tanzania and Ethiopia are still developing a bio-safety framework and have some way to go. Much depends on local leadership. Realistically, the expected medium tem outputs were probably not achievable without a more focused high level intervention. The UNEP-GEF capacity building efforts, as well as the new USAID/PBS programme now getting under way may have the resources to achieve success, building on the groundwork of the Bio-EARN programme.

It may be hoped that these programmes will result in the harmonisation of bio-safety regulatory instruments in the region, which Bio-EARN had intended to accomplish during the first two phases. This has not succeeded, largely because two countries (Tanzania and Ethiopia) still lack official biosafety guidelines, despite commendable efforts by Bio-EARN to stimulate this through workshops etc.

The development of the Botanical Files has been delayed due to personal and administrative reasons. All concerned are positive about the speed at which the activity will be able to start. The reviewers have not been able to confirm this, but note that guidelines have been made available to the African collaborators during the review and that a workshop has been planned to review the first results in January 2004.

Bio-EARN has built capacities and laid the groundwork for drafting of bio-safety guidelines and legislation. Subsequent activities could be left in the hands of other agencies that appear to have access to higher policy levels.

4.2.4 Intellectual property management and partnerships

Intellectual property rights play an important role in biotechnology research both in terms of third party rights (impacting on access to technologies) and in managing locally developed IP. The partner institutions in the region have very little experience in managing these.

Bio-EARN has been proactive in dealing with the issue of material transfer agreements (MTA's) that lay a foundation for the sharing of rights, and in creating awareness of the need to involve national

authorities (at least in Ethiopia) in the transfer of genetic resources. These MTA's have been used by partner institutions beyond the Bio-EARN projects. The reviewers however question whether the provision in article 2 that puts the responsibility of complying with the national laws to the provider is in agreement with the spirit of the CBD.

Bio-EARN initially intended to concentrate on the international IP agenda, i.e. analysing *sui generis* options for the region within the TRIPs Agreement, but soon moved its objective and workshops to the institutional capacities to manage IP. This nullified the role of Bio-EARN in promoting development-oriented IP regulations in the region. However, given the problems the programme coordinators have encountered in reaching the appropriate policy levels directly (see 4.2.2), it is considered a wise decision to reformulate the objectives regarding IP.

Several workshops have dealt with institutional IP (see Annex 4) and some institutions have a draft IP-policy (example: Moi University). Institutions such as Nairobi University, which have ostensibly a functioning IP management system, lack the capacity for effective implementation particularly in the biotechnology area. Others, such as the University of Addis Ababa appear to maintain the policy of producing public goods (though this may be a defensive response to a vacuum in IP policies). Awareness is however limited concerning publication strategies that would aim at limiting the opportunities of outsiders to protect related knowledge through wide claims.

In most cases it appears difficult for the Bio-EARN partners to reach the appropriate management levels in their institutions with their messages regarding the importance of IP, in some cases frustrating public-private partnerships (example: University of Nairobi).

It was noted that the current institutional IP-documents have been prepared with the objective of maximising revenues from protecting IP. They do not include a decision support system that guides the decisions as to whether or not to protect an invention throughout the process, based on business plans that analyse the potential market for the patent. They also do not seem to include guidelines as to meeting the objectives of the public institutions towards national policies regarding poverty alleviation. If Bio-EARN intends to work towards improving livelihoods and food security, it would have been necessary to include ways to secure royalty-free access to protected inventions by the poor, such as smallholder farmers. The reviewers have not noticed any inclusion of this important aspect in the institutional IP-frameworks, nor in the agreements between Bio-EARN partners (south-north or south-south).

Furthermore, the reviewers have not seen any detailed IP-plans for the research projects. These should analyse preferably before the start of the project:

1. the freedom-to-operate when it may come to commercial use of the results, and

2. the IP that will be produced by the project and their intended use and management.

Even the collaboration contracts are not clear on how to regulate the IP issues; only the MTA's mention that this will be negotiated between the partners. The students themselves appear to have a limited awareness of the IP issues concerning their projects and do not necessarily take these into consideration in assessing the future potential of their research.

Bio-EARN has created some awareness of Intellectual Property issues in biotechnology. However, Bio-EARN itself does not seem to have an IP-policy towards meeting its objectives. Institutions still have a long way to go in developing policies and implementation strategies.

IP is important, but by no means the only key issue in forging public-private partnerships (PPP) in research. Bio-EARN has spent a number of meetings and workshops on this issue, which the coordinators consider to be key to the sustainability of the biotechnology research capacity in the region. The reviewers feel however that this attention to PPP's may create excessive expectations from this type of research funding (especially in agricultural and environmental research). PPP's provide only a minor percentage of the research funding in similar institutions in Europe in the presence of a much more developed private sector compared with eastern Africa.

The PPP approach is successful in only a few cases when institutions try to 'sell' their inventions (or partially-developed products and processes) to private industry (science-to-market) as was presented to the reviewers as the over-all paradigm of biotechnology research. More often, institutions are able to jointly design projects with industry, based on an understanding of the latter's problems in developing products or producing them efficiently (market-to-science-to-market). In both cases the research component is, however, very limited both in time and investment compared to the up scaling and commercialisation phases of product development. Unfortunately, the third phase proposal is intended to take science to the market instead of taking the market to science. Finally, possible contradictions between the commercialisation of research and patenting its results and the Bio-EARN mission to improve livelihoods have not been sufficiently analysed.

The widening of the partnership concept to PDP's (Product Development Partnerships) that could involve less-commercially focused, or non-commercial partners as well such as cooperatives and NGO's is an important development in this respect. However this may introduce very different IP-requirements.

4.3 Comments on current programme structure and management

4.3.1 General

The current Bio-EARN management structure is outlined in Annex 6 (second diagram). It shows the General Assembly as the highest organisation in the structure, with the Steering Committee falling under it. The coordinators (SEI and a regional coordinator) are shown as performing a central and parallel role, linked through national focal points to network partners. The Terms of Reference for SEI and the regional coordinator were defined in the Phase II proposal, with some changes from Phase I in line with attempts to shift more responsibility towards the regional coordinator. The current terms of reference can be found in Annex 5 of this report.

4.3.2 Swedish coordination

At the inception of the programme Sida contracted SEI as their implementing arm. All parties interviewed are unanimous in their acclaim for the individual roles played by Ivar Virgin and Benita Forsman of SEI. They are judged as highly efficient, responsive to requests, and fully committed to the success of the programme. Their presence has been critical to the achievements of the programme so far, and will remain important for future success according to the partners in the region.

Apart from the roles played by these two individuals, the role of SEI as an institution appears less clear. SEI was assigned the programme management without having a track record of implementation of similar programmes. As a result the institute may not fully recognise the difficulties and complexities of the programme management, as this programme is outside the scope of its normal core business. In designing the programme, Ivar Virgin had no prior learning within SEI to draw from.

In line with Sida objectives, the SEI coordinating team has attempted to place more responsibility for the programme at regional level. However this has left somewhat of a vacuum. We were informed that the SEI staff no longer visit the region as often as before, but that the people in the regional office are

too busy (or have an inadequate budget provision) to visit the other countries in the region. This devolution of responsibilities introduces actual management functions to the regional coordination office, which seems to be in conflict with the facilitating rather than a management role that the regional coordinator sees for himself. Furthermore it must be clear that a certain slow-down in the programme may be the price of devolution of responsibilities to the region. The sponsor will have to be prepared for such a slow-down.

4.3.3 Regional coordination

The role of regional coordinator was originally assigned to an Ethiopian who was known to the Swedish partners. His position was however not supported by the Ethiopian national focal point and he did not have the full trust of the regional partners since he was considered 'too Swedish' as a result of his knowledge of the Swedish language and culture.

The regional Coordination role was eventually re-assigned to Uganda (Dr Charles Mugoya, assisted more recently by Dr John Bananuka). Charles Mugoya appears to have the trust of all players in the region; at least as long as his responsibilities are limited and the SEI coordinators are available to take final decisions

Some confusion has arisen within the programme following attempts to separate the roles of the regional and national coordinators in Uganda. The regional coordination office has formally been assigned to the NFRD; an NGO affiliated with the Uganda National Council for Science and Technology (UNCST). However, Dr. Mugoya remains the regional coordinator and is still employed by UNCST. Dr. Bananuka is apparently employed by NFRD (which also manages the finances, but reports to UNCST in this regard), but is referred to as the assistant of Dr Mugoya. NFRD and UNCST have not been able to convince us (nor many regional partners) that the network has obtained an impartial coordination unit with the involvement of NFRD. Despite the very limited time that he spends on BIO-EARN, Dr Mugoya provides a strong leadership to the network, which may be difficult to replace by any NFRD staff.

The terms of reference of the regional coordinating office are clearly spelled out in a tripartite MoU between SEI, UNCST and NFRD. Nevertheless, the perception of some regional players is that the role of the regional coordinator is too loosely defined, and overlaps to some extent with the national coordination role. In some instances it was suggested to us that the regional coordination should be scrapped completely (in other instances we heard the opinion that the national coordination should be scrapped instead).

The majority of players, while agreeing on the need for regional coordination and while seeing this as the key body where African ownership of the programme should reside, agreed that the current balance of power should not be further shifted towards the regional coordinating office by giving it full financial management responsibilities. It is thought that this would lead to problems not only as a result of possible inefficiencies at the coordinating office, but also because of inefficiencies in the regional banking systems which would hamper the transfer of funds between countries. This would furthermore require a fundamental change in the position of the regional office from facilitating (as expressed by Mugoya) to management and control functions.

4.3.4 National coordination

In all four African member countries, the role of national coordination resides in the National Science and Technology Councils/Commissions. At an early stage in the inception of the programme, the Councils were contacted by SEI, and were involved in the process of partner selection within the countries.

The national focal point activities are governed by a MoU signed between the Councils and the regional coordinating office. This was only put in place during 2002.

The Councils within the four countries do not have equal importance or influence within their governments. In most cases they have responsibility to draft national science and technology policies, but do not necessarily have a mandate to make proactive recommendations to their governments, and do not all have responsibility for determining the allocation of government research funds. The Kenyan council considers itself weak compared to its neighbours.

The roles of the national coordinators are influenced both by the standing of the particular individuals within their organisations, and the standing of the organisation itself within the national science and technology system. It is extremely important that the heads of the Councils should themselves be fully committed to the Bio-EARN programme. The convening of a Bio-EARN meeting between the Council heads in 2002 has identified the serious lack of contact with these heads as a major obstacle to the functioning of the national focal points and the programme as such. The presence of the heads of the Councils has had a very positive impact on the programme. It is very necessary to provide a follow-up in order to build on this new commitment to the programme. The primary role of the national focal point is to organise national workshops and other activities. They act as a contact point to the national institutions and should monitor the activities of these institutions. In reality, when a problem occurs at an institution they do not seem empowered to intervene, and it appears that the resolution of the issue is most often left to SEI to sort out. Also in the field of national workshops, some national focal points are more proactive than others are.

4.3.5 General Assembly and steering committee

The steering committee is currently composed of five independent technical experts as well as a representative from a Bio-EARN institution in each of the member countries.

The role of the steering committee is described as providing guidance to the programme, ensuring proper management, resolving conflicts and assessing programme outputs (see detailed ToR in Annex 5).

It is however not clear to many of the partners to whom this guidance is to be given, and where the final decision-making will lie. The management chart indicates that the steering committee falls under the General Assembly, but as this Assembly convenes only once every two years it is apparent that this body cannot make ongoing decisions. The steering committee itself only meets annually (although meetings have been held twice a year on a few occasions), and on this basis it is also difficult to see how it can completely fulfil its mandate in areas such as conflict resolution.

We have the impression that the General Assembly is meant to be the highest authority in the programme. However, the co-ordinators at the regional coordination office and SEI have the strongest information base and are likely to influence the Assembly, which cannot have in-depth discussions among its 100+ membership. Since some of the national focal points seem to prepare poorly for these assembly meetings, the region doesn't effectively use its powers in the network. The partners have the majority influence in the governance of the network but often feel governed by the co-ordinators, which is one of the key factors contributing to a lack of ownership.

If the steering committee's activities are to be carried out effectively, it is important that the steering committee should be neutral. We understand that the concept of representation of the national Councils/Commissions on the steering committee was rejected in order to avoid national bias. While we accept the rationale for this decision, the institutional representatives introduce an even more direct conflict of interest. It would have been much better to include independent individuals from the region in the steering committee.

4.3.6 Cost of Programme Coordination

The budget drawn up at the beginning of Phase I indicated a modest 7% of budget allocated to programme coordination. This was presumably an underestimate, since by the stage of the Phase II proposal the programme coordination was budgeted at around 12% of costs (calculated from the actual figures provided, although the budget states that coordination is approximately 10% of budget). The 2002 financial statements show that the 12% figure was indeed correct.

The actual expenditure on programme coordination is likely to be higher than shown in the financial statements. It is not clear whether the allocation to regional and national workshops also includes some associated management overheads. Bio-EARN apparently does not fully cover salaries of the regional coordinator or the national focal point coordinators, and hence some of the overhead costs are absorbed by the national councils/commissions. It also seems unlikely that the budget fully reflects the overhead costs of SEI. The costs of the General Assembly are shown as a separate item, not included in the programme coordination, although the General Assembly is a key part of the management structure according to the organisational chart.

The cost of programme coordination is somewhat on the high side, due in large part to the complexities of the programme and the management model, which requires a multiplicity of coordinators in order to try and achieve ownership at every level. Recognising that the reviewers were not asked to comment on the expenditure in detail, and in the absence of detailed cost-statements, we nevertheless consider that based on a superficial overview the coordination costs for such a complex programme are fully acceptable.

4.3.7 General level at which the network operates

Bio-EARN operates at the level of scientists or department heads in the research institutes and at the level of administrator in the National Focal Points. This arrangement seems to have been chosen to speed up the inception phase of Bio-EARN with the commendable attitude: "let's get to work".

Even though it may have worked in the earlier phases of Bio-EARN, we consider this a key factor in the lack of ownership that the programme suffers from. In some countries, the necessity for such initiatives to be embedded institutionally and even nationally is critical for its sustainability.

This accounts for the (lack of) involvement of deans or vice-chancellors in the partner-universities, which may be one of the reasons why the initiatives on institutional IP-policies seem to be difficult to implement. It is also felt in the National Focal Points that in some cases individuals have not communicated well with their superiors, leading to confusion about the plans for a possible Phase III among many other things.

Involving the relevant governance levels within the partner institutions may have delayed the priority setting processes quite a lot, but it may also have reduced the current uneasiness, which is commonly described as lack of ownership in the region. The basis of this problem must be found in the inception phase.

During the inception phase and thereafter, there have also been no scientific interventions with, or involvement of, higher levels of government such as ministries of agriculture, environment or science & technology. Such involvement would have facilitated progress on the policy aspects of the Bio-EARN programme in particular, although it could also be argued that without first raising the level of awareness of the people "on the ground" there would be little to be gained from a higher level intervention.

4.4 Collaboration and communication

4.4.1 General

Bio-EARN is primarily a network of partners within East Africa. Two out of three objectives for Phase II deal with collaboration and communication in the region:

2) Promote collaboration in biotechnology, bio-safety, and biotechnology policy development to address key challenges and opportunities in the region.

3) Foster communication, nationally and regionally, among scientists, policy makers, bio-safety regulatory officials and the private sector"

In addition to increased communication and collaboration in the region, several partners expressed an interest in establishing sustainable collaboration between the African and the Swedish institutes. SEI appears not to be seen as a partner in this respect, and does not seem to have an interest in linking its own knowledge with the partners in Bio-EARN beyond the two staff involved in management and coordination tasks. The reviewers have not seen evidence of attempts to link initiatives and knowledge of SEI as an organisation other than the programme co-ordinators with the African partners.

4.4.2 Research Collaboration and Communication

The planning of the research activities in the programme intended to lay the basis for research collaboration. Projects were clustered to some extent in order to promote collaboration between the students, and subsequently between institutions in different countries of the region.

The clustering was however not implemented throughout the programme. This was due to differences in priorities and capabilities of the collaborating institutions: industrial biotechnology stayed within the University of Nairobi, vegetable oils at Moi University, etc. Secondly, the programme provides opportunities for students to meet in Sweden despite their physical distance – again to facilitate future contact. This has resulted at least in one case where a student spent time in the home-laboratory of one of his colleagues.

However, the facilitation of collaboration is not extended to the African supervisors and to the labs of different Bio-EARN partners within a country. Supervisors expressed a wish to have the opportunity to visit each other (within the region) in the framework of ongoing projects (see discussion on faculty training above). On the other hand, in some cases partners do not even know what the capacities are of Bio-EARN partners in the same city (e.g. Biodiversity Institute in Addis Ababa) to enable the sharing of expensive equipment and expertise. One good reason for not sharing was given: "we don't want other – maybe less experienced people – to handle our valuable equipment". This could be overcome by training good assistant researchers to operate the equipment rather than the researchers themselves.

The interest in regional cooperation is distinctly different among countries, with some Ethiopian partners least interested because – as they say – the priority crops are so different that joint priorities are difficult to find. Unfortunately cooperation at the technology level does not seem appealing, and there is a feeling that cooperation should be rooted in mutual strength and synergy – "we first have to be a centre of excellence ourselves, after that we can be a partner in research". As long as the regional players do not have confidence in their own abilities, they are reluctant to reach out to other potential partners in the region.

4.4.3 Communication and collaboration in policy issues

A serious attempt has been made to connect the partners in order to facilitate ideas and experiences with regard to biotechnology policies. Internet conferences were developed, but do not seem to have got off the ground. This method of communication may have been new to some of the participants,

the physical computer and internet facilities may have been absent, too slow or too expensive, or the discussion items may not have received sufficient priorities compared to the other duties of the partners.

Most communication on biotechnology and bio-safety policies thus went through regional and national meetings and through the publications that were derived there from. It is not clear how often the partners consult the Bio-EARN – internet site, but the availability of all documents there provides at least a good backup for the partners and others in the region who are interested in the issues.

Collaboration on biotechnology policies within Bio-EARN proves to be time-bound. Issues that are discussed in regional meetings and workshops lead in several cases to national initiatives in which the national policy makers are targeted. Results of these national consultations could however very well be shared among network partners, thus strengthening the capacities even more.

Given the fact that most network partners know each other personally by now, and that the digital facilities have greatly improved in the region, we may assume that future attempts to use the internet to discuss ongoing issues may be more successful.

4.4.4 Management Communication and Collaboration beyond Bio-EARN

The arrangement to have a programme coordinator (SEI), a regional coordination office, national focal points, and institutional and individual partners creates a severe load upon the communication lines.

Whereas the communication between SEI and the Regional coordination office seems to work well, the communication among focal points has not been smooth in all cases.

Partners complain about the reduction of the frequency of physical visits by the co-ordinators after the regional office took over some of these responsibilities. Management communication from national focal points to partners and to the regional coordination office differs greatly in different countries. Where in some countries the national focal points have organised a platform to be able to discuss issues and prepare for regional meetings with all Bio-EARN partners in the country, other national focal points are less proactive (and are bypassed by the national institutions as a result). This may be one of the reasons why some countries (notably Tanzania) have been much more proactive in organising national workshops than others (notably Ethiopia). The amount of time that national focal points are able to spend on the Bio-EARN programme compared to their other duties may also be a factor.

Apart from the purely managerial aspects (see 4.3) the reviewers consider the provision of computer facilities to some of the partners and especially the focal points, an essential investment for the running of such a complex programme and a commendable input by the project.

Furthermore, the Bio-EARN Newsletter seems to be appreciated by the partners. It provides a useful overview of highlights and upcoming activities. Similarly, the printing of proceedings of workshops and training programmes is useful, but the distribution of these within the member countries does not seem to be very effective in all cases. It is also not very clear to what extent biotechnology-related programmes outside Bio-EARN have a regular access to these hard copies.

Close co-ordination by the African Network partners themselves with the multitude of existing and upcoming initiatives in biotechnology seems necessary. The Bio-EARN documents, website and newsletters seem good tools.

4.4.5 Communication between scientists and other stakeholders

Phase II of Bio-EARN explicitly targeted improved communication between scientists and policy makers. This was considered essential in order to ensure impact of the Bio-EARN policy –oriented workshops and training courses.

In some cases, the programme managed to directly involve higher level officials and politicians, but in most cases the initiative came from these higher levels. This proves that the national biotechnology capacity that Bio-EARN has assisted to develop has caught the eye of relevant policy makers. Whether these scientists have the ability to get their messages across to such non-specialists largely depends on individual strengths that Bio-EARN may not be able to influence.

Connected to this are the contacts between Bio-EARN and the growing number of other biotechnology-related initiatives in the region. Although Bio-EARN was the first network to effectively ask for attention to biotechnology developments by scientists and policy makers in most countries and at a regional level, in the meantime many other initiatives are under way. In only a few cases, Bio-EARN has involved representatives of such initiatives directly in its meetings and workshops. At a personal level, the regional coordinator has been called upon in several cases to discuss issues with them, and nationally there have been contacts as well. However, there seems to be little sharing of information, neither from the regional coordination office to the partners (and vice versa) nor among the Bio-EARN partners on these developments. For example, many Bio-EARN partners were not fully aware of

- the NEPAD Bioscience Initiative,
- the US-sponsored programmes ABSPII and PBS,
- the OAU and UNEP-GEF initiatives on bio-safety,
- biotech capacity building by the Rockefeller and McKnight Foundations and FAO,
- the (planned) GTZ-activity on bio-safety linked to the African Model Law
- bio policy activities by IPGRI, and
- various regional activities by NGO's like BTA.

Even some national councils were not fully informed. If Bio-EARN and its partners want to remain the focal point of biotechnology development in the region, and if it wants to plan effectively for the future, communication with these initiatives seems essential.

4.4.6 Sustainability and expansion of the current collaboration

The Bio-EARN programme has provided a basis for regional collaboration in sectors where the knowledge and interest in each other's work was limited. This is likely to continue in areas where partners benefit from strengthened contacts and where persons appreciate or like each other. In other sectors it is likely to disappear.

Benefits may relate to availability of technologies, natural resources such as trial facilities or genetic resources, or simply because financing agencies require multi-party consortia for the acquisition of research grants. Swedish institutions are likely to take part in such continued collaboration since they have an interest to increase the number of students and they have funding opportunities that require collaboration with the South (e.g. EU-INCO).

Signs of continued collaboration are found for example in Uganda, and were reported from Tanzania, where Swedish students were found to be working on environmental research through KTH-Stockholm and Lund University respectively. Other examples are that African institutions have been able to source Sida grants for additional exchanges.

> Internet and the organisation of meetings greatly facilitate communication and collaboration, but success is based on a personal interest and commitment to collaborate and the will to tackle the hurdles in communication, such as cultural differences. Obviously, this has worked better among some than with others until now. Expecting wonders from a network like Bio-EARN is not realistic.

5. Outputs and Impact of Bio-EARN to date

5.1 General

The objectives of the Bio-EARN programme have been formulated in such a way that it is difficult to link them to quantitative impacts (the three objectives are couched in the terminology of "enabling", "promoting" and "fostering", which are very open-ended verbs). We have therefore chosen rather to review the outputs and impacts of the various activity-groups.

The outputs of the Bio-EARN programme may be quantified in terms of publications, degrees, workshops, policy and strategy documents, infrastructure, equipment etc. In comparison, measuring the impact of capacity building programmes in a timeframe of 5 years is very difficult. For many longer-term activities, such as PhD-programmes, the impact on the described programme mission and objectives is as yet immeasurable. In the case of shorter-term activities, such as the policy workshops, the impact of Bio-EARN may be compounded with other developments in the region. Therefore, a description of impacts necessarily has to be qualitative and needs to be read with some caution.

5.2 Outputs and impact of capacity building: formal education

The training of six MSc students and 20 PhDs represents a significant output of the programme. An impressive list of publications has already resulted from these degree courses, and this list will be much longer by the time the students graduate. The general impression is that most publications and manuscripts are in well-reputed journals, which is an indication of the quality of their work. Obviously, some students have been able to start publishing results earlier than others. This however is not an indicator of the quality of the research, which can only be formally evaluated at the end of their studies.

It appears that the students are committed to returning to their home country where they will want to create a positive impact on the use and development of biotechnologies according to their countries' needs.

It is not expected that most of the PhD projects will provide the basis for products that will directly contribute to the latter section of the mission statement: "*to help improve livelihoods, ensure food security and safeguard the environment*". Within this view, the scientific impact is limited. Immediate impact might be more likely for the environmental biotechnology projects than for most of the plant biotechnology studies. Nevertheless, in all cases, the body of expertise resulting from the PhD studies will pave the way to generate outputs with the potential for future impact.

The impact of the PhD-projects may also lie in the promotion of regional collaboration, which has been shown already by students spending some time in another country in the region as part of their work. The networks formed with Swedish partners will also stimulate longer-term collaborations between Sweden and the region.

It is still too early for measuring actual impact along the lines of the Logical Framework of the Bio-EARN programme.

5.3 Outputs and impact of investment in equipment and infrastructure

The Bio-EARN programme has made considerable investment in research equipment, linked to the PhD programmes and IT infrastructure both at research institutions and at the national focal points.

These are very tangible outputs, which will have a subsequent impact based on their effective utilisation.

The IT connectivity is highly appreciated by all concerned, and forms the basis not only for enhanced communication among network members, but also provides the foundation to access up to date information from the internet, including scientific journals. The future impact of this investment is expected to be significant. In the long term, bio-informatics will become a critical part of the biotechnology expertise in the region, and it is essential to make a start not only to build up the infrastructure but also to familiarise the scientists with the potential for accessing biological information through the internet. The updated Bio-EARN website will also provide a source of valuable information through the internet.

The impact of the purchase of scientific equipment will depend on its effective use by the Bio-EARN students on their return, as well as by their supervisors and a subsequent generation of students and scientists. It is to be hoped that the majority of Bio-EARN students will find employment in the institutions that have benefited from the equipment placement programme.

5.4 Outputs and impact of bio-safety research and capacity building

The Bio-EARN programme has resulted in a range of outputs in the bio-safety field. A very significant output is the Bio-safety Resource Book on Risk Assessment and Risk Management. The number of scientists and policy makers within the region with knowledge of bio-safety risk assessment procedures has greatly increased through a range of workshops and training programmes. The impact of this training will be felt once more applications for field trials of GMO's are received in the region.

The impact of the PhD bio-safety research programmes can not yet be established, but it is to be expected that the PhD bio-safety graduates will be well placed to make a substantial contribution to the bio-safety risk assessment processes in their home countries. Similarly to the other PhD-programmes we expect that the research results will have little direct impact on the region. The impact of the MSc-programme may be measured by the whereabouts of the students: one is working in the Environmental Protection Authority in Addis Ababa and has responsibility for development of guidelines for environmental impact assessment of GMO's; one continued his academic education in Germany in the same field, thus contributing even more to bio-safety capacity of his country once graduated.

All countries in the region have made some progress towards the development of national bio-safety systems, although to a varying extent. The Bio-EARN programme can be credited at least in a substantial part for having initiated the development of these processes, for providing expertise to the national committees developing these systems, and for paving the way for future bio-safety activities.

5.5 Outputs and impact of the biotechnology policy activities

Kenya and Uganda have a biotechnology policy in place. Ethiopia's biotechnology policy is before the Cabinet and Tanzania has recently established a drafting committee. These are tangible developments since the start of Bio-EARN. None of these came directly from Bio-EARN workshops. In all cases, however, Bio-EARN partners were heavily involved in the national committees that developed these documents, and the Bio-EARN awareness creation and capacity building activities in this field must have contributed significantly to the processes that led to the policies and their content.

The drafting of the documents, and the involvement of Bio-EARN partners in the relevant committees, show that the programme has contributed to "foster communication between scientists, policy makers, bio-safety regulatory officials and (in some cases) private sector nationally".

Being one of the first biotechnology initiatives in the region, Bio-EARN has contributed substantially to building the awareness of biotechnology related issues at various levels. We were informed that in Tanzania the President intends to chair a 3-day meeting on biotechnology towards the end of 2003.

In most of the countries in the region, the Bio-EARN partners are now recognised as being the foremost biotechnology experts as a result of the training they have received. They are therefore consulted by their governments on matters of biotechnology policy (for example, the President of Uganda requested a meeting with some of the Ugandan Bio-EARN partners in order to learn more about the implications of the technologies).

5.6 Outputs and impact of IP-related activities

The Material Transfer Agreement that Bio-EARN developed has been widely used within the Bio-EARN programme (for the PhD-projects), and also as a model for other transfers of materials by the partners in the region.

Some Bio-EARN partners have developed an IP-policy for their institutions largely as a result of the regional and national Bio-EARN workshops; in other cases IP policies are in preparation. It may well be concluded from the interviews during the review that Bio-EARN has created awareness among many partners in the region of the importance of Intellectual Property Rights regimes for the public research infrastructure in the country and for cooperation agreements among (public and private) researchers.

The institutional IP-capacity has not been used yet in the Bio-EARN projects themselves in the absence of suitable inventions from the programme and because some institutions lack sufficient human resources to handle complex IP-applications and negotiations.

6. Options and recommendations for Phase III

6.1 Focus and intent

6.1.1 Lessons learnt

Bio-EARN has suffered during the first two phases from unclear objectives, where capacity building was described as 'a goal in itself' in Phase I, and great expectations were created in Phase II regarding the value of the programme for application in improving livelihoods, food security and the environment. The industrial application (extracting enzymes from extremophiles) did not fit into the new mission, but was nevertheless maintained.

Any Phase III proposal requires a feasible (not over-rated) objective and if further goals are added, projects have to be at the heart of these goals.

6.1.2 Need

To stimulate discussion at the appropriate levels in the region about the general objectives for biotechnology development, which can be derived from the national policies that Bio-EARN has helped to create. Bio-EARN partners in the region then have to take into account all the other initiatives in this field when determining the specific objectives for Phase III, extracted from these general objectives. Realistic time frames have to be set to reach goals that can be achieved in a three-year time span with

the available capabilities. Emphasis should be placed on the development of a logical framework in order to streamline focus and bring together the variety of expectations by the different partners.

6.1.3 Options and recommendations

Depending on the outcome of the discussions of the general objectives, a direction can be developed. We recommend continuing on the path that Bio-EARN has taken in the previous phases for the coming years:

1. To stick to the over-all focus of Bio-EARN, being biotechnology, bio-safety and related policies, e.g. not diverting into major product development initiatives that lay the focus of the programme on downstream technologies (e.g. breeding) and investments in commercialisation processes. If Bio-EARN wants to link science with the market (which is an over-all issue in any kind of research), it could assist multi-stakeholder priority-setting initiatives with private and/or public or civil society partners and bring in biotechnology-based opportunities.

2. To stick to the over-all objective of Bio-EARN to build capacity to allow the countries in the region to decide on the acceptance and use of biotechnologies within their own development priorities. This implies for Phase III that Bio-EARN should build on the capacities that have been developed in the previous phases, based on a clear definition of goals that are prioritised in the region. Special emphasis may be given to link technical capabilities with policy makers, e.g. through organising meetings preceding major international meetings (of CBD, WTO/WIPO, etc.)

3. To stick to the methodology to advance biotechnologies through regional cooperation. Several stakeholders clearly expressed that national research priorities were more important than regionally perceived priorities. This seems to cause problems for the Network, but we see no contradiction: scientists working with the same technologies on different crops can benefit from cooperation. Secondly, almost all participants agree that regional coordination is essential with regard to the development of policies and harmonised regulations.

4. To broaden the scope towards using other funding opportunities for strengthening biotechnology research and capacity building by putting emphasis on the regional capacities to effectively use competitive grant opportunities in the region (e.g. through the NEPAD initiative) and beyond (e.g. EU- 6th Framework Programme).

6.2 Participation and ownership – inception phase

6.2.1 Lessons learnt

Working at the technical levels has the advantage that the implementation can start soon after the conception of an idea, but it may backfire later (e.g. when students have to be employed; when difficult management decisions have to be made). Different levels of ownership can be distinguished: personal, institutional, national and regional. Since Bio-EARN has objectives that relate to policy support and regional cooperation, the ownership in the region needs to be strong at the higher levels. Ownership at national levels needs to be significantly strengthened to ensure that a regional programme does not inadvertently bypass national systems.

A strong personal commitment in the Swedish institutions may suffice for now, but the commitment should move to institutional levels if the South-North links are to become sustainable.

6.2.2 Need

There is a need to have a strong commitment to the Bio-EARN objectives and the programme itself both at the regional level and at the national and institutional levels in all countries. At the national

level, high-level discussions will be required to encourage countries to commit to implementing biosafety laws and IP/ABS legislation as a prerequisite for involvement in a Phase III.

6.2.3 Options and recommendations

Different options arise depending on the importance assigned to ownership in the region. The review concludes that a significantly strengthened ownership is essential, but that different countries (and stakeholders within the countries) put different weight at where this ownership should lie. Bio-EARN could remain an independent initiative with independent governance structure, or it could link up (at varying degrees) with other ongoing initiatives.

Option 1. Ownership at the highest political level

The NEPAD Bioscience initiative aims at stimulating biotechnologies in Africa (starting in East and Central Africa) through the development of technology platforms that provide a service to the region. A competitive fund for regional collaborative projects will be set up in tandem with the establishment of a research infrastructure at the ILRI compound in Nairobi. The kick-off of this initiative was given during the review mission by various Ministers and Science-managers. Canada pledged a sizeable amount for the initiative at the occasion.

We have established that ILRI has mechanisms to manage multi-donor funding for this NEPAD Bioscience initiative, and that they would be fully able to ring fence contributions from individual donors where this was required.

Bio-EARN institutions could be assisted to link up with this initiative in Phase III providing the following benefits:

- align with the regional priorities set by the Bioscience Initiative that have the blessing of NEPAD, securing ownership at the highest levels
- start to link the facilities that they have developed through Bio-EARN (and others) with the upstream technologies that will be available in Nairobi
- by joining the NEPAD initiative, regional cooperation will be promoted in line with the objectives of Bio-EARN and overhead costs could be kept to a minimum by combining management structures at regional level

Modalities of linking Bio-EARN with the NEPAD Bioscience Initiative will need to be investigated. We believe that it should be possible for a Bio-EARN programme to operate within the Initiative without losing its own priorities to build on the capacities that were developed in the earlier phases. By locating the regional office in the Bioscience Initiative at ILRI, banking problems that would arise if financial management responsibilities were to be moved to any individual country in the region would be avoided. This would also create a possibility for Bio-EARN to establish a sustainable institutional basis in the region. We understand that Sida has experiences with such institutional devolution to the region with the Soil & Water Conservation Programme, which is now continued under the flag of ICRAF. Bio-EARN may have to adapt to a new governance and management structure if this option were to be chosen. Several institutions/persons involved in Bio-EARN have key positions in the Interim Steering Committee of the Bioscience Initiative (notably UNCST, KARI, G. Persley), thus facilitating the linkages.

Option 2. Ownership at the institutional level (regional)

Extensive regional priority setting exercises have been done and are still underway in the field of agriculture through ASARECA. This regional organisation is governed by a board consisting of all the heads of the National Agricultural Research Systems. These persons then link up at the national levels with

the research institutions and universities. ASARECA will gradually be operating more directly under the guidance of the African Regional organisation FARA (which is currently linking up with NEPAD).

ASARECA has recently started a biotechnology programme, with a former Bio-EARN partner as the programme director. This programme will start to coordinate a regional biotechnology programme ABSPII sponsored by USAID and is looking for additional initiatives to complement its portfolio.

Linking up with ASARECA has the advantage that ownership would be significantly increased, especially at the (joint) institutional level. ASARECA furthermore concentrates on rather applied research, which fits into emerging ideas by several Bio-EARN partners to take science to the market. There are however also some additional issues to consider:

1. ASARECA is an agricultural organisation, which may not be willing to manage the environmental/industrial biotechnology aspects of Bio-EARN as well. A (rather rigorous) way out would be to connect the environmental biotechnology activities with the Lake Victoria programme that is supported by Sida, as a research programme concentrating on solutions for industrial and domestic waste in freshwater areas (including lakes in Ethiopia);

2. Through its tasks in the field of agriculture, ASARECA has few links with the national councils/committees for Science and Technology. Several universities in the region are also poorly connected to ASARECA.

3. The influence of USAID is currently significant in ASARECA and particularly in the biotechnology programme. Some Bio-EARN partners expressed their concern about that, which could lead according to them towards considering GMO's and bio-safety through US-standards (substantial equivalence rather than the precautionary principle) which is in accordance with neither the CBD nor the African Model Law on bio-safety.

With regard to this latter concern, Bio-EARN could either stay away from the ASARECA biotechnology programme, or join it with the aim to balance the approaches.

Modalities of a possible linking of Bio-EARN with ASARECA will need to be investigated.

Option 3: continue with Bio-EARN as an independent programme

The pragmatic approach of Bio-EARN so far has been effective in creating biotechnology capacity and awareness in the region. Now that the awareness is there, Bio-EARN activities and partnerships will have to be institutionalised.

If Bio-EARN is not to link up with the above regional initiatives, it will have to take drastic measures to gain the ownership at the national and regional levels before embarking on Phase III. The current governance structure may need to be revised, and a renewed priority setting exercise may be needed that gives weight to the national priorities (as expressed at the national level instead of as perceived by individual scientists).

Critical success factors for a Phase III will therefore be:

1. The national levels are to take the lead in developing the Phase III proposals, assisted by the current coordinators. Heads of the Councils/Commissions will need to be requested to delegate their staff (e.g. the national focal points), supported by biotechnologists from the Bio-EARN partners in their countries, to develop national expectations for Bio-EARN – Phase III. These are basically the national Bio-EARN platforms, which seem to operate quite well in all countries, except Ethiopia. Thereafter national levels should meet with their counterparts from the other countries to try and reach agreement.

2. Sida may discuss conditions as to the key determinants of the programme, such as: regional cooperation; biotechnology areas; the wish to link with earlier initiatives; synergy with other national and donor-supported initiatives in biotechnology and bio- safety in the region, etc. Sida may also propose a time schedule for this exercise.

3. Sida will need to offer to support this process through the provision of well-informed independent persons, such as the current Bio-EARN coordinators to guide the processes at the national and regional levels. Sida may also facilitate the involvement of additional persons, e.g. specialised in the policy fields in the region (e.g. IBS/ISNAR) and the current Swedish partners in this process.

6.3 Programme structure and leadership (during implementation)

6.3.1 Lessons learnt

Programme structure is essential to create transparency in management, support for decisions and in general a smooth operation of a programme. Leadership is another key element for success of a complex programme like Bio-EARN. Leadership is based on personal characteristics rather than on institutional arrangements. Bio-EARN is providing strong leadership, particularly at the international (Virgin) and to a lesser extent at the regional (Mugoya) levels. Virgin and Forsman are important as the embodiment and instigator of the programme and have a lot of credit due to their commitment and effectiveness in running the programme. Mugoya is seen as the African 'face' of the programme and an important personality in biotechnology development in Africa. This leadership has been essential for the successes of Bio-EARN so far. In some countries, leadership is lacking at the national levels, both in terms of national focal points and at institutions, resulting in insufficient initiatives or inability to resolve problems. Leadership was provided in the initial stages in the form of facilitating participatory processes in the region to establish priorities and the work programme.

However, in later stages, several stakeholders have conceived the leadership as ownership at the level of the coordinators, especially at the regional level. The main reason for this is the lack of leadership at the national level, which did not always effectively exercise its counterbalancing roles as given by the management structure of the programme.

6.3.2 Need

To design governance and management structures that clarify the roles of all players, identify the decision-makers and facilitators, and that meet the requirements for participation and ownership (see above).

6.3.3 Options and recommendations

Coordination: leadership in participatory processes is essential at the level of the coordinators at all levels. The regional coordinator has the personal trust of the majority of players in the region, which we have not found in the NFRD to which many tasks have been delegated, but there is a strong risk of 'personalising' the regional coordination role which challenges ownership at lower levels.

Leadership at the national focal points will be strengthened when some of the heads of the national councils/commissions are more directly involved. Although a good start was made in 2003, this however has not resulted in tangible improvements of the effectiveness and efficiency of the national focal points in all cases.

Personal leadership can only work effectively if embedded in the appropriate structure. The position of the regional coordinator is still too much confounded with the UNCST despite the introduction of the NFRD. If management responsibilities are to be moved to the region, these will have to go to a fully neutral player. Alternatively, a regional coordinator from one country in the region could operate from

an institution in another country to avoid national bias. This will however add costs. Similarly, the valuable leadership from SEI could continue after more management responsibilities have been moved to a neutral player the region.

Devolution of financial management responsibilities to the region was not welcomed by all stakeholders. Problems were identified as to the lack of transparency and efficiency when funds had to move through the regional office into one of the other member countries (converting currencies several times, creating losses in value and efficiency). Secondly, we found a lack of confidence in the capacity of any office in the region to handle funds impartially.

An independent Bio-EARN may strengthen the regional office and avoid any (perceived) inequalities between partner countries. Options that may be investigated:

1. If it is found inevitable that one of the partner institutions houses the regional office, make sure that the regional coordinator is based in another country and not in his/her home institution. The present arrangement with an affiliated NGO is not sufficient to avoid a sense of conflicts of interest.

2. To find an independent organisation in the region, preferably with a regional signature. There are several NGO's with an interest in biotechnology issues, all based in Kenya, but with different levels of regional operations), e.g.

– ABSF, James Ochanda, running US-sponsored programme
– Aharvest, led by Florence Wambugu, one of the first GMO-proponents in the region
– ISAAA, experienced in brokering GMO-licenses, but is not originally Africa-based
– BTA, led by Joseph Wekundah, experienced in running biotechnology-programmes for grass root development.

If a suitable focal point in the region can be developed, the role of SEI may be in monitoring and evaluation plus for specific tasks as requested for by the region. In case the regional coordination office has any limitations in transferring funds within the region (through banking or currency procedures), SEI could continue to disburse funds, based on decisions by the regional office.

The steering committee has given advice on the implementation of Bio-EARN. Through its composition with renowned specialists in biotechnology and bio policy, the steering committee has contributed to the leadership of the Bio-EARN management structure. However, the involvement of representatives of participating institutions introduces the possibilities of conflicts of interest and thus challenges the credibility of the decisions taken. The Steering Committee should provide an independent view on developments and is not the place to primarily build ownership with the executing partners through their direct involvement.

In this regard it might be an advantage if the member country representatives could be selected from institutions that are not direct beneficiaries of the Bio-EARN programme. It should also be clarified whether such country representatives are indeed representing their country, or are present in their individual capacity or as institutional representatives. Some of the steering committee representatives from the region do not seem to have an interest in informing themselves of the details of Bio-EARN projects other than their own, including those being undertaken even within the same institution, and only learn the details when they attend a General Assembly meeting.

Also the role of the General Assembly is neither clear, nor accepted by a number of stakeholders. Its tasks and functioning have to be redefined as a result of increasing the institutional basis of Bio-EARN.

When considering the governance and management structure, one may take into account that with similar annual budgets and in the absence of large-scale additional PhD-programmes, much more money will be available for work in the region compared to the first phases.

Moreover, the role of national focal points will change if projects are undertaken as regional initiatives involving more than one country. In that case the ability to integrate will be more important than the promotion of national interests. One option in this case might be to include the heads of the Science Councils in the steering committee and to eliminate the national focal points from the implementation of Bio-EARN.

6.4 Content

6.4.1 Lessons learnt

Priority setting of projects is much more difficult and takes more time when the research is required to lead to solutions to actual problems in the region, and even more so when the solution of such problems require public-private partnerships. Priority setting exercises cannot be researcher-led and may involve a detailed multi-stakeholder process.

The biotechnology environment in the region has changed considerably in the last few years (to a significant extent as the result of Bio-EARN Phases I and II).

6.4.2 Need

There is a need to obtain an agreement on a programme that balances the national and regional priorities and that finds a clear niche with regard to other initiatives.

6.4.3 Options and recommendations

A detailed analysis has to be made in the region as to the ongoing initiatives sponsored by the national Governments and other (inter) national and regional organisations. This analysis could lead to a special 'niche' for Bio-EARN. A preliminary analysis leads to the following observations:

- ABSP/USAID, partly through ASARECA, McKnight, ISAAA aim at research towards taking GMO-products to the field/market.
- PBS, GTZ and UNEP/GEF will concentrate on biotechnology policies, and in particular bio-safety
- CIDA/IDRC concentrates on development of platform technologies in the region
- DGIS is likely to concentrate on grass root development through biotechnologies
- Rockefeller concentrates on capacity building
- AATF and ISAAA concentrate on brokering/negotiating access to technologies.

Based on such an analysis, Bio-EARN has to determine an appropriate spread of activities (research, development, policy, bio-safety), through regional collaborative projects, based on excellent science and regional priorities, in which modalities have to be determined for interaction within the region and with Swedish partners.

Based on this preliminary analysis, which has to be confirmed/specified by a planning process for Phase III, we consider the following 'niches' to be appropriate for Bio-EARN:

- Continue with policy activities at institutional level

- Concentrate on non-GMO biotechnologies in the region (marker-assisted breeding, environmental biotechnology) that have the potential to contribute to the mission statement (i.e. either abolish the industrial biotechnology component or change the mission statement).
- Provide training in multi-stakeholder analysis, interdisciplinary research planning, market research and business planning, economic analysis and commercialisation, and proposal writing to enable the Bio-EARN students to find their way in using their technical skills in research for development.
- Probably, initiatives on bio-safety by other programmes will concentrate on the regulatory issues, and not so much on the implementation. Bio-EARN may be able to contribute to bio-safety research capacity, and in providing policy makers with expert advice.

6.5 Process

In order to accommodate the above recommendations, the process for the development and design of a possible Phase III needs due attention. The process needs to take into account a clear focus and intent of the programme, supported by the region and – in the case that the partners want to draw on support by Sida – within the objectives and capabilities of that organisation.

Clear choices have to be made on the role of Bio-EARN in terms of supporting the capacity of the partner countries to make informed decisions on the development and application of biotechnologies in the region, or whether the programme should be focusing on implementing those policies by taking the technologies to actual use. Such choices have to relate to the multitude of initiatives that have recently started in the region by a range of organisations.

We would caution against a loss of focus and would welcome a continuation of the programme through supporting the students in their return to their countries, and the institutions in which they work.

Policy related activities remain important, or even become more important when so many different actors enter the scene. Bio-EARN could well build on past experiences.

Regional collaboration, both in science and in policies is imperative for a field of technology that requires major investments in equipment, human resources and consumables and in which international scientific developments follow each other at such a quick pace.

In order to create a greater ownership in the region, the process of developing a new phase has to be truly participatory. Sufficient attention has to be paid to a sustainable institutional structure that optimises the strengths in the region.

The inception of Bio-EARN is mentioned to be pragmatic in this report, a characteristic which is considered useful for the start-up phase of this initiative, but which is showing some limitations now that the Bio-EARN network has become more mature. A design of a new phase necessarily has to take this lesson into account. As a result it may require more time in order to base Phase III on the true and broadly-supported priorities of the region. Sida must be prepared to invest in this process and to allow it to take more time than envisaged – and thus to support a bridging phase if necessary.

Annex 1

Terms of Reference

Evaluation of the BIO-EARN Programme

1 Background

The BIO-EARN Programme has been running since 1999. The Programme is focused on building capacity in biotechnology, biosafety and biotechnology policy development in Ethiopia, Kenya, Tanzania and Uganda (hereinafter East Africa) In order to make an assessment of achievements and impact of the programme an external evaluation of the BIO-EARN Programme will be carried out during 2003.

2 Purpose and Scope of the Evaluation

An evaluation of the BIO-EARN program is suggested with the purpose to:

1) Assess how successful BIO-EARN has been in fulfilling the research, dissemination, capacity-building and policy-impact objectives set in its first (1999–2001) and second phase (2002–2004).

2) Based on this assessment, make recommendations on the future direction, scope, content, functioning and funding of BIO-EARN.

The evaluation is expected to serve as background information to the BIO-EARN network for future development of the Programme. The evaluation will also serve as background information for Sida and other stakeholders concerning possible future support to the Programme.

3 The Assignment (issues to be covered in the evaluation)

The assignment covers the activities of the BIO-EARN Programme over the period of 1 January 1999–November 2003. The assignment shall address the following components:

I) Evaluation of BIO-EARN activities

The evaluation should address to what extent the BIO-EARN Programme contributed to:

- Capacity building in Biotechnology R&D at East African network institutions. This includes infrastructure and human capacity.
- Improving East African countries' ability to develop and implement biosafety regulatory frameworks.
- Raising awareness of biotechnology policy issues in East Africa.
- Improving East African countries ability to formulate biotechnology policies

II) Evaluation of collaboration and communication activities

The evaluation should address to what extent the BIO-EARN Programme contributed to:

- Improved collaboration and communication between East African network scientists and network institutions (including network institutions in Sweden and the Netherlands).

- Improved communication and dialogue between scientists, policy-makers, biosafety officials and stakeholders, at both national and regional levels.
- Stimulating Swedish research institutions to further engage themselves in R&D collaboration with East African R&D institutions.

III) Assessment of the impact of Sida support

The evaluation should assess the impact of the BIO-EARN Programme in the following areas:

- The scientific impact of the Programme (e.g. quality of publications and key scientific results).
- Capacity building impact at R&D institutions (e.g. their ability to engage in future high quality biotechnology R&D efforts, their visibility and networking capacities).
- The ability of East African countries to address/ raise awareness /formulate/implement effective biotechnology policies.
- The overall development in East Africa (e.g. the programme impact on food security, livelihoods and the environment).

IV) General suggestions for improvement of the BIO-EARN programme

The evaluation should make suggestions on how the BIO-EARN programme could continue to support Biotechnology R&D efforts in East Africa in order to help improve livelihoods, ensure food security, and safeguard the environment. This would include comments on present status and suggestions for future:

- Programme content
- Programme structure
- Programme management

4 Methodology, Evaluation Team and Time Schedule

In undertaking the tasks listed under the section "The assignment", the consultants shall employ the following methodology, to which they are invited to add complementing elements that they think are called for:

The evaluation procedure includes a study of essential documentation as well as interviews at all network institutions. The essential documentation will be provided to the evaluators by the BIO-EARN secretariat.

Site visits

During the site visits the evaluators shall carry out in-depth interviews as follows:

- Interviews with key person at all network institutions in Sweden and in the Netherlands.
- Interviews with key persons at all network institutions in Ethiopia, Kenya, Tanzania and Uganda.
- Interviews with other relevant persons (institutions) in Ethiopia, Kenya, Tanzania and Uganda. To be discussed with SEI.

Division of labour between the two evaluators

Given the limited time and resources available for the evaluation, we suggest that the two evaluators divide the tasks of studying the documentation and conducting the interviews between themselves. We leave the details of the division to the evaluators.

Team and Time Schedule

The team shall consist of two experts.

1. Mr. Niels P. Louwaars, Programme Secretary, DLO programme International Cooperation c/o POBox 88 6700 AB Wageningen, The Netherlands (agricultural biotechnology, biosafety, biotechnology policy, technology transfer).

2. Dr. E Jane Morris PhD, Director, African Centre for Gene Technologies, P O Box 75011, Lynnwood Ridge, Pretoria 0040, South Africa (biotechnology, biosafety, biotechnology policy).

The evaluation will entail a total of 5 weeks per evaluator (25 days) spread over the period September, 2003–February 1, 2004 according to a time schedule agreed on with SEI and Sida. The Consultants shall make their own travel arrangements.

5 Reporting

The evaluation report shall be written in English and should not exceed 40 pages, excluding annexes. The draft report shall be submitted to Sida electronically no later than 15 December 2003.The draft report will be sent by Sida to SEI who will send it to the BIO-EARN Steering Committee and the Regional co-ordinator for their comments. Those comments, will be sent by SEI to reach the evaluators not later than 15 January 2004.

Within two weeks after receiving comments on the draft report and no later than 1 February 2004, a final version shall be submitted to Sida electronically and in three hardcopies. This version should also be orally presented to Sida by one, or both evaluators. The evaluation report must be presented in a way that enables publication without further editing. Subject to decision by Sida, the report will be published in the series *Sida Evaluations*.

Annex 2

List of abbreviations

AATF	African Agricultural Technology Foundation
ABS	Access and Benefit Sharing (ref. CBD and International Treaty)
ABSF	African Biotechnology Stakeholders Forum (NGO based in Nairobi)
ABSPII	Agricultural Biotechnology Support Programme (2nd phase)
ACTS	African Centre for Technology Studies (Nairobi)
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
Bio-EARN	East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development.
BTA	Biotechnology Trust Africa (regional NGO-originating in Kenya)
Costech	Commission for Science & Technology (Tanzania)
CBD	Convention on Biological Diversity
CIDA/IDRC	Canadian International Development Agency/ International Development Research Centre
DGIS	Directorate-General for Development Cooperation (DGIS) Ministry of Foreign Affairs of the Netherlands
ESTC	Ethiopian Science & Technology Commission
EU/INCO	International Cooperation research programme of the European Union
FARA	Forum for Agricultural Research in Africa
FAO	Food and Agriculture Organisation of the United Nations (Rome)
GEF	Global Environment Facility
GMO	Genetically Modified Organism
GTZ	Gemeinschaft für Technische Zusammenarbeit (Co.Ltd.): implementing agency of the German Ministry for Development Cooperation
IBS	ISNAR Biotechnology Service (Washington)
ICRAF	International Centre for Research in Agroforestry (Nairobi)
IP/IPR	Intellectual Property (Rights)
IPGRI	International Plant Genetic Resources Institute
ISAAA	International Service for the Acquisition of Agro-biotechnology Applications (Ithaca, USA)

ISNAR	International Service for National Agricultural Research (The Hague, The Netherlands)
IT	Information Technology
KARI	Kenyan Agricultural Research Institute
KTH	Royal technical University (Stockholm)
MoU	Memorandum of Understanding
MSc	Master of Science
MTA	Material Transfer Agreement
NCST	National Commission for Science and Technology (Kenya)
NEPAD	New Partnership for Africa's Development
NFRD	National Foundation for Research and Development (Uganda)
NGO	Non-Governmental Organisation
OAU	Organisation for African Unity (Addis Ababa)
PBS	Programme for Biosafety Systems (USAID)
PhD	Doctor of Philosophy
PPP	Public-Private Partnership
SEI	Stockholm Environmental Institute
Sida	Swedish International Development Agency
SAREC	Research Cooperation Department of Sida
ToR	Terms of Reference
TRIPS	Agreement on Trade-related aspects of intellectual property rights
UNCST	Uganda National Council for Science and Technology (Kampala)
UNEP	United Nations Environmental Programme (Nairobi)
US/USA	United States (of America)
USAID	US-Agency for International Development (Washington)
WIPO	World Intellectual property Organisation (Geneva)
WTO	World Trade Organisation (Geneva)

Annex 3

Objectives of BIO-EARN according to the documents.

Proposal phase 1 (main text):
"It is expected that the program will result in a significant capacity building in biotechnology, biosafety and biotechnology policy in the region. In the medium term perspective (4–6 years) the goal is to educate 20 PhD students in the fields of agricultural and environmental biotechnology. This will contribute to the creation of a critical mass of scientists, who are able to adopt and develop suitable and safe technologies for the region. The programme will result in significant strengthening of the biosafety regulatory framework within the region and adequately trained National Biosafety Committees. The programme will also strengthen human capacity to address identified biotechnology policy needs including the generation of policy option to address major challenges. Finally, the programme will stimulate the dialogue between the policy makers and scientists and enhance collaboration between the countries to address key problems, challenges and opportunities in the region."

Proposal phase 1 (logframe):
"Overall objective agricultural biotechnology
Increased capacity to make effective use of biological resources in a sustainable manner leading to improved agricultural productivity.

Overall Objective Environmental and industrial biotechnology
Improved environment and sustainable use of genetic resources.

Overall Objective biosafety capacity building and biosafety research
Safe use and development of GMOs.

Overall objective for biotechnology policy capacity buidling
Promote safe use and development of biotechnology.
Promote sustainable use of biodiversity."

Proposal Phase 1 (executive summary):
The principal objective of the proposal is to build national capacity and competence in biotechnology, biosafety and biotechnology policy via support to selected institutions (see below) in Ethiopia, Kenya, Tanzania and Uganda, through a regional networking model.

Proposal phase 2
Mission statement
"*The mission of the BIO-EARN Programme is to build capacity in biotechnology in Ethiopia, Kenya, Tanzania and Uganda and to promote appropriate research and related policies. The Programme aims to use biotechnology in a sustainable manner in order to help improve livelihoods, ensure food security and safeguard the environment*".

Programme Objectives
Overall objectives of the Programme are to:

Enable the countries in the region to develop biotechnologies and policies according to their own needs, abilities and opportunities;

Promote collaboration in biotechnology, biosafety and biotechnology policy development to address key challenges and opportunities in the region;

Foster communication between scientists, policy makers, biosafety regulatory officials and private sector nationally and regionally.

Memorandum of understanding between UNCST, NFRD and SEI for BIO-EARN regional Co-ordination during 2002–2004

The overall objective of the BIO-EARN Programme is to strengthen institutional capacity, to engage in regional and international research collaboration and, in the longer term, carry out quality research independently. The Programme also aims at stimulating national and regional collaboration within biotechnology R&D, biosafety and biotechnology policy to address key problems, challenges and opportunities in the region.

Presentation to the evaluators by SEI, September 2003

Over all objective:

– Using biotechnology in a sustainable manner in order to help improve livelihoods, ensure food security and safeguard the environment.

Specific objectives:

– Improving the capacity in using science based biotechnology including recombinant DNA techniques

– Improving the national and regional capability to assess the risks and benefits of recombinant DNA techniques

– Improve communication between policy makers, biosafety regulatory officials and research scientists (and private sector) nationally and regionally

– To enable the countries in the region to develop (bio)technologies and policies according to their own needs, abilities and opportunities

– Enhance regional collaboration to address key problems, challenges and opportunities in the region.

Annex 4

Workshops and training courses organised or attended by Bio-EARN

Workshops/courses on Biotechnology policy

Year	Workshop/training course	Number of BIO-EARN participants
1999	Biotechnology Policy Capacity Building: Biotechnology Assessment Regimes and Experiences, September 27–29, Nairobi	38
	Training course on Biotechnology and Public Policy; September 30–October 29, Nairobi	8
2000	Workshop and training course on building national biotechnology Innovation systems, Nairobi	8
2001	Towards formulation of conducive biotechnology policy options, January 10–11, Morogoro.	28
	Matching institutional capabilities to national needs and international requirements, Dar es Salaam, December 4–5	30
	Biotechnology Research and Development in Tanzania, Dar es Salaam, November 12–13	37
	Biotechnology Policy and Strategy for Ethiopia, Addis Ababa, December 11–13	97

Workshops/courses on Biosafety policy

Year	Workshop/training course	Number of BIO-EARN participants
1999	Regional training workshop on risk assessment and management, Entebbe, December 29–December 2	34
	Risk assessment of transgenic products in East Africa	7
2000	Course on risk evaluation of GMO's, Lund, June	
	Genetically modified crop plants practice: biosafety and the route from gene to market, Svalöv, October	24
2001	Workshop on safety in biotechnology of foods and feeds, Nairobi, October 17–18	53
2002	Plant Biotechnology and biosafety course and botanical files workshop, Wageningen, May 24–June 13	10
	Regional biosafety workshop (jointly with IBS-ISNAR), Nairobi, November 26–28	32
	Biotechnology workshop on biosafety capacity building in east and southern Africa, Stockholm, October 16–18	6
2003	Genetically modified crop plants practice: biosafety and the route from gene to market, Svalöv, March 24–April 11	23
	Plant Biotechnology and biosafety course and botanical files workshop, Wageningen, June 9–20	1

Workshops/courses on intellectual property rights, access to genetic resources and public-private partnerships

Year	Workshop/training course	Number of BIO-EARN participants
1999	Biotechnology policy internship on Bioprospecting in Ethiopia. Nairobi, October 1st–December 23	1
	Workshop on access to genetic resources with particular emphasis on research and transfer of biotechnology, Kampala, November 29–30	57
	Development of institutional intellectual property rights management systems. Masai Mara, December 6–7 (jointly with KIPO)	35
2000	Workshop and training course on enlarging public-private sector partnerships inbiotechnology, September 18–25	
	Genetically modified crop plants practice: biosafety and the route from gene to market, Svalöv, October	24
2001	Enlarging public-private partnerships in biotechnology, Kampala, November 29–30	65
2003	Genetic resources and intellectual property rights; pathways for development, Svalöv, May 5–23	7
	Genetically modified crop plants practice: biosafety and the route from gene to market, Svalöv, March 24–April 11	23
	Institutional intellectual assets and intellectual property rights, Nairobi, September 17–19 (organised by ILRI)	8
	Workshop on intellectual property rights, Dar es Salaam, November 2003	12

Annex 5

Terms of reference of the management structures

Terms of reference for the Co-ordinator at SEI as of January 2002;

- Overall programme monitoring and financial management.
- Overall financial management of BIO-EARN research projects
- Support of BIO-EARN students in addressing their needs.
- Support BIO-EARN regional co-ordinator in programme management.
- Subcontracting network research partners.
- Subcontracting regional co-ordinator.
- During beginning of Phase II, support the regional co-ordinator with financial management of funds for regional and national activities.

Terms of reference for the Regional Co-ordinator as of January 2002

- Co-ordination of all regional policy activities (e.g. regional biosafety and biotechnology workshops).
- Identification and subcontracting of actors involved in regional biosafety and biotechnology policy capacity building.
- Subcontract national focal points and national workshops to undertake activities.
- Organise regional planning meeting when necessary.
- Provide SEI with activity and impact reports from the Programme.
- Management and preparation of Steering Committee meetings.
- Production Newsletters and be responsible for BIO-EARN website development.
- Organise regional workshops.
- Monitor regional collaboration and co-ordination.
- Address and respond to problems of regional character within the network.

The regional co-ordinator will also negotiate all Memorandums of Understanding (MoU's) with the National Focal Points regarding national activities. The financial responsibilities will be transferred gradually. In the beginning of Phase II, the regional co-ordinator will do all subcontracting of institutions involved in national and regional activities apart from the financial part. The financial transfer of funds will be approved and managed by SEI on the basis of contract and MoUs. By the end of the period the financial management of these activities will also be done by the regional co-ordinator.

National Focal Points

The terms of reference, for the Focal Point during this phase are as follows:

- Act as a contact point between SEI, the regional co-ordinator and BIO-EARN institutions on all activities.

- Organise national biosafety and biotechnology policy workshops.
- Disseminate information on ongoing training courses including the selection of trainees for these courses according to their relevance to national needs as well as institutional needs.
- Popularise and integrate BIO-EARN activities at national level[1]. Assist the BIO-EARN co-ordinators with co-ordinating BIO-EARN activities at national level.
- Call BIO-EARN national meetings, popularise BIO-EARN activities to other stake holders at national level
- Monitor the BIO-EARN institution activities.
- Ensure that BIO-EARN institution activities are reported on time in an agreed format.
- Assist in developing IPR agreements between partner institutions.

The Steering Committee

The Terms of Reference for the Steering Committee are to:

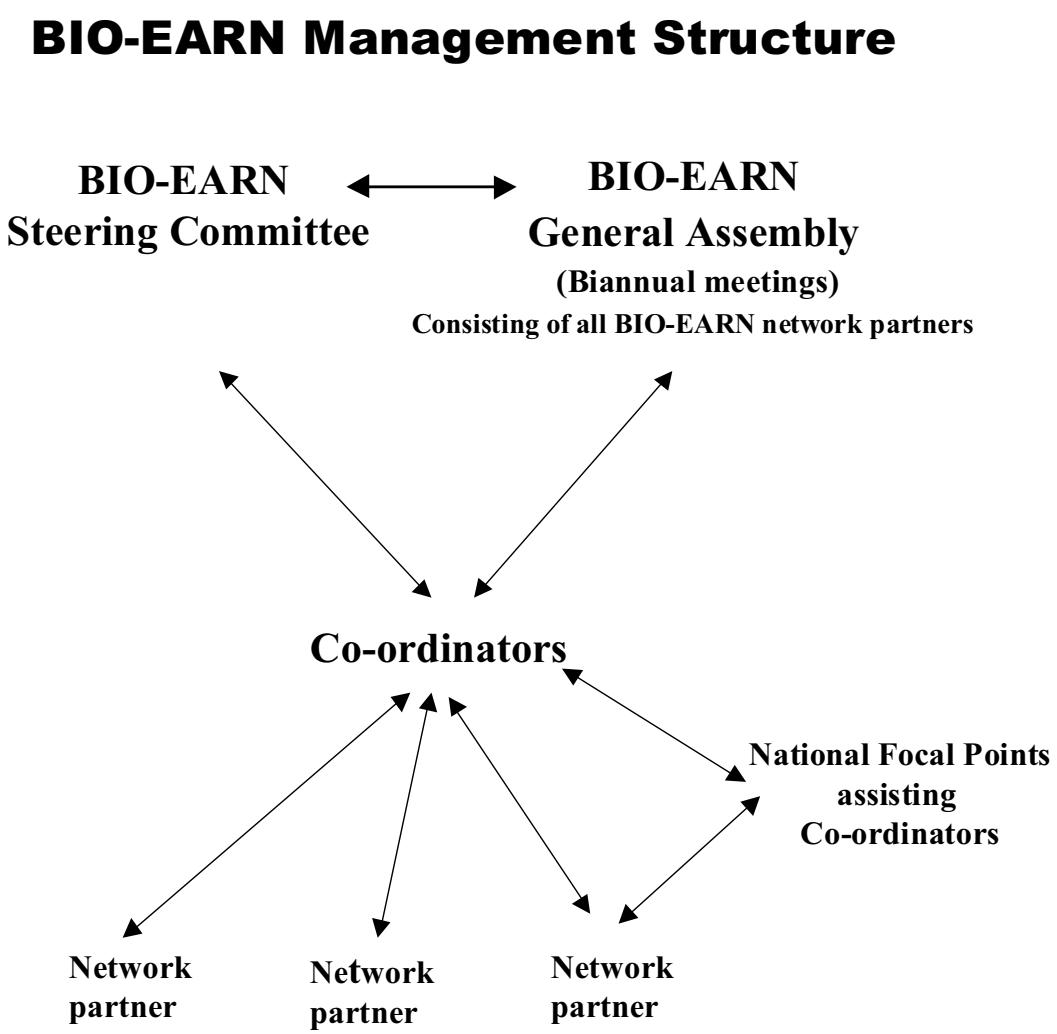
- Offer overall policy guidance/direction
- Ensure that the Programme is within budget and fits the overall programme objectives
- Make adjustments to the Programme, if needed
- Ensure proper management and control of programme organisation and administration
- Review annual plans and budgets of the Programme
- Resolve conflicts
- Assess and review programme outputs.
- Commission special studies, if funds permit.

1 This would be done through informing government bureaucrats, members of parliament, consumer groups, NGO's, business community, private sector, farmers, of the BIO-EARN programme and related biotechnology policy issues through national workshop activities.

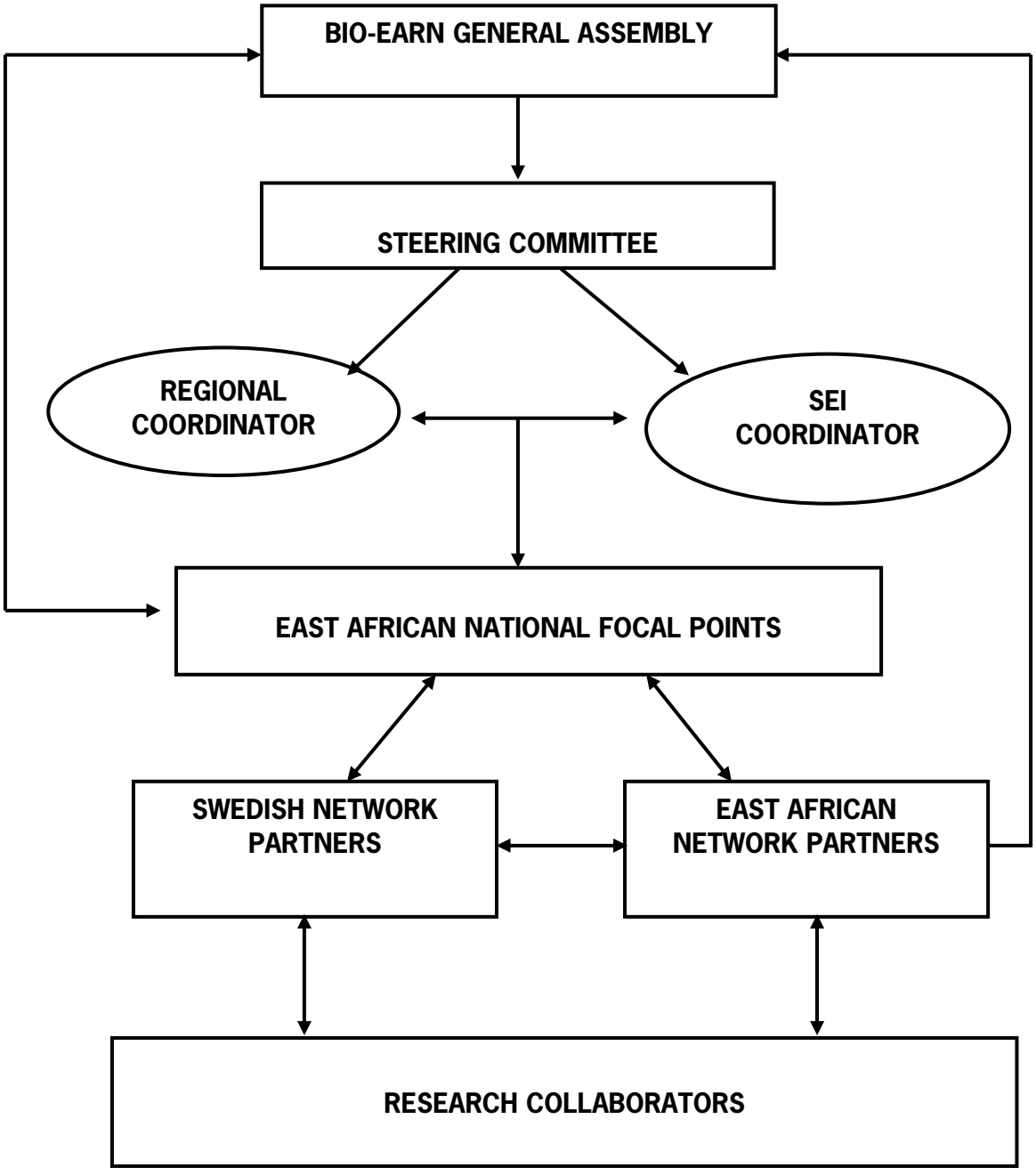
Annex 6

Management Structures of Bio-EARN

a) Management structure as defined in the Phase 1 proposal



b) Current Management structure as defined for Phase II



Annex 7

BIO-EARN Research Projects

East African/Swedish Actors	Project	Student/ Proj.No.
Agricultural Biotechnology		
Biology Department, Addis Ababa University / Department of Crop Science, Swedish University of Agricultural Sciences, Alnarp	Molecular Genetic Diversity analysis of forest Coffee *(Coffee Arabica)* in Ethiopia	Esayas Aga **771102**
Mikocheni Agricultural Research Institute, Dar es Salaam / Department of Crop Science, Swedish University of Agricultural Sciences, Alnarp	Determination of genetic diversity of the Tanzanian cultivated coffee gene pool, using molecular markers	Linus Masumbuko **771202**
Biology Department, Addis Ababa University / Department of Horticulture, Swedish University of Agricultural Sciences, Alnarp	Genetic and biotechnological approach towards producing clean and disease free *Enset Ventricosum*	Genet Birmeta **771302**
Mikocheni Agricultural Research Institute, Dar es Salaam / Department of Plant Biology, Swedish University of Agricultural Sciences, Uppsala	Molecular markers for identification of viruses and virus resistance in Sweet Potato with emphasis on virus disease complexes in East Africa.	Fred Tairo **771402**
Department of Crop Science, Makerere University / Department of Plant Biology, Swedish University of Agricultural Sciences, Uppsala	Molecular markers for identification of viruses and virus resistance in Sweet Potato with emphasis on virus disease complexes in East Africa	Settumba Mukasa **771502**
Med Biotech Laboratories, Kampala / Department of Plant Biology, Swedish University of Agricultural Sciences, Uppsala	Identification of Molecular Markers for Cyanogenic Glucoside Content in Cassava *(Manihot esulentum Crantz)* and for the analysis of cassava variability in Uganda	Elizabeth Kizito **771602**
Department of Crop Science, Makerere University / Department of Plant Biology, Swedish University of Agricultural Sciences, Uppsala	Molecular studies of the Gray Leaf Spot Fungus, *Cercospora zeae-maydi:* Gene flow, host specificity and infection biology	Patrick Okori **771702**
Department of Crop Science, Makerere University / Department of Plant Biology, Swedish University of Agricultural Sciences, Uppsala	Metabolic Engineering of Starch Synthesis in Cassava *(Manihot esculenta Crantz)*	Yona Baguma **771802**
Kenya Agricultural Research Institute (KARI) / Department of Plant Biology, Swedish University of Agricultural Sciences, Uppsala	Generation of Transgenic Cassava, Sorghum and Barley with Modified Starch Content	Joel Mutisya **771902**
MOI University, Eldoret / Department of Crop Science, Swedish University of Agricultural Sciences, Alnarp	Genetic manipulation of oil quality in sesame *(Sesamum Indicum L)*	Beatrice Angiyo Were **772002**

Biology Department, Addis Ababa University / Department of Crop Science, Swedish University of Agricultural Sciences, Alnarp	Micropropagation of *Hagenia abyssinica* (Bruce) J.F.Gmel.(Rosaceae) with special reference to rooting	Tileye Feyissa **773002**
Environmental/Industrial Biotechnology		
Department of Biology, University of Addis Ababa / Department of Biotechnology, Royal Institute of Technology	Developing and optimising techniques for the treatment of selected wastewater types with a special focus on biological nitrogen removal from tannery wastewaters in Ethiopia	Seyoum Leta **772102**
Applied Microbiology Unit, University of Dar es Salaam / Department of Biotechnology, Royal Institute of Technology	Study of nutrient uptake in stabilisation ponds with special emphasis on phosphorus removal	Lydia Mbwele **772202**
Institute of Environmental and Natural Resources and Department of Biochemistry, Makerere University / Department of Biotechnology, Royal Institute of Technology	Developing and optimising techniques for the treatment of selected wastewater types with a special focus on biological nitrogen removal from Nakivubo Wetland System in Uganda	Joseph Kyambadde **772302**
Applied Microbiology Unit, University of Dar es Salaam / Department of Biotechnology, Lund University	Optimization of biomethanation of organic biomass by enhanced hydrolysis and retention of active biomass	Anthony Mshandete **772402**
Departments of Botany & Biochemistry, University of Nairobi / Department of Biotechnology, Lund University	Extremophiles for Environmental Biotechnology	Kevin Raymond Oluoch **772502**
Department of Biochemistry, University of Nairobi / Department of Biotechnology, Lund University	Stable biocatalysts from extremophiles for utilisation of renewable raw materials	Suhaila Omar Hashim **772602**
Biosafety/Risk Assessment Research		
Department of Biology, Addis Ababa University / Department of Theoretical Ecology, Lund University	The effects of environmental factors on female choice and gene dispersal	Teklehaimanot Haileselassie **772702**
Department of Botany, University of Nairobi / Department of Theoretical Ecology, Lund University	The mechanisms behind female choice and its effect on gene dispersal	Samuel Kiboi **772802**
Applied Microbiology Unit, University of Dar es Salaam / Department of Theoretical Ecology, Lund University	Environmental effect on gene dispersal through pollen dispersal	Margret Nkya **772902**

Annex 8

Itinerary for external reviewers

Fri. 11.09 Travel to Stockholm

Sat. 12.09 Discussion with Virgin, Forsman, SEI

Sun. 13.09 Study documentation

Mon.14.09 Stockholm Technical University: Dr Dalhammer.
Student: Ms Lydia Mbwele.
University Uppsala: Bergman (dept head), Dixelius, Gullberg, Janssen.
Students: Yona Baguma, Fred Tairo, Settumba Mukasa, Joel Mutisya
Travel to Malmö

Tue.15.09 University of Lund, Dept. Biotechnology
Students: Suhaila Hashim, Kevin Oluoch, Anthony Mshandete
University of Lund, Dept of Theoretical Ecology: Dr. Skogsmyr
Students: Samuel Kiboi, Margaret Nkya, Teklehaimanot Haileselassie
Agricultural University Alnarp: Welander, Stymne
Students: Beatrice Were, Esayas Aga
Svalöf-Weibull: Kristoffer Vamling, Inger Åhman
Travel to Amsterdam

Wed.16.09 ISNAR Biotechnology Service (IBS): Mr. J. Komen

Thu.17.09 Arrival Pretoria (Morris)

Thu.30.10 Travel to Nairobi
Dr. John Mugabe (NEPAD Science and Technology Forum)
Kenya Agricultural Research Institute, Biotechnology Dept.: Dr. Odhiambo
Dr. Gabrielle Persley, Doyle Foundation

Fri.31.03 National Council for Science and Technology: Dr. Kirea
University of Nairobi, Dept of Botany: Dr. Kinyamario
University of Nairobi, Dept of Biochemistry: Dr. Mulaa

Sat.01.11 Mr. Theo van der Sande (DGIS)
Moi University: Drs Gudu and Onkware

Sun.02.11 National Council for Science and Technology: Dr. George King'oriah
Travel to Dar es Salaam

Mon.03.11 COSTECH: Dr. Rose Kingamkono (focal point) + Dr. Kasonta (former focal point)
Mikocheni Agricultural Research Institute: Dr. Kullaya, Dr. Meneny, Mr. Linus Masumbuko (and Dr Fregene of CIAT – briefly)

Tue.04.11 University of Dar es Salaam – Botany Department: Dr Magingo (head), Microbiology unit: Dr Mugasa Rubindamayagi, Dr Amelia Kivaisi (head).
COSTECH: Drs Rose Kingamkono (focal point) + Dr. Kasonta (former focal point)

Wed.05.11 Travel to Entebbe.
ASARECA: Dr Ngichabe coordinator biotechnology & biosafety programme

Thu.06.11 Kampala: Julius Ecuru, National Focal Point
Institute for the Environment, Makerere University: Dr Kasoma (head), Dr. Kansiime,
Student: Joseph Kyambadde Dept. of Agronomy, Makerere University: Dr Adipala
Students: Patrick Okori + Settumba Mukasa
Kawanda Research Station: Dr. Sengooba, regional coordinator PBS-programme and
Dr. Gahakwa head NARO-Biotechnology Project

Fri.07.11 MedBiotech Laboratories: Dr. Egwang
Uganda National Council for Sci&Technol: Dr. Nyiira (executive secretary), Dr. Mugoya,
Mr. Ecuru, and Mr Lubega, head of finance
National Foundation for Research and Development: Dr. John Bananuka.
Travel to Addis Ababa

Sat.08.11 University of Addis Ababa: Dr. Kifle Dagne (head), Prof. Endeshaw Bekele
(Steering Committee member), Prof. Zerihun Woldu, Fasil Assefa,
Student: Mr. Seyoum Leta
Mr. Girma Yoseph, Ethiopian Science&Technology Commission.

Sun.09.11 Reporting

Mon.10.11 Environmental Protection Authority: Dr. Tewolde Berhan, Mr. Solomon Kebede
Institute for Biodiversity Conservation & Research: Dr. Girma Balcha, Dr. Haile Selassie
Yibrah; Dr. Tesfaye Melesse; Mr. Mesfin Bayou
Ethiopian Science & Technology Commission: Mr. Mulugeta Amha, Getachew Mengistie,
Girma Yoseph

Tue.11.11 Reporting
Travel to Nairobi

Wed.12.11 International Livestock Research Institute: Dr. Carlos Seré (DG),
Dr. Bruce Scott (Director Partnerships)
African Agricultural Technology Foundation: Dr. Eugene Terry
Biotechnology Trust Africa: Dr. Joseph Wekundah (Director)
Departure for Pretoria and Amsterdam.

Thu.13.11 Arrival Amsterdam (Louwaars)

Recent Sida Evaluations

03/39 **Sida's Program Twinning Cooperation between Municipalities in Sweden and in Countries of the South**
Bo Andréasson, Lennart Königson
Department for Central and Eastern Europe

03/40 **Project on Reviving and Constructing Small Water Harvesting Systems in Rajasthan**
Pankaj Kumar, B M Kandpa
Department for Asia

03/41 **Sida-funded Projects through UNICEF – Bolivia, 1989–2002**
Tom Dahl-Østergaard, David Moore, Paola Rozo
Department for Latin America

04/01 **Sida's Support to Regional Development Plans in Lithuania, Part II**
Dan Hjalmarsson, Carl Fredriksson
Department for Europe

04/02 **Private Sector Development Support in Action: Sida's Approach, Working Methods and Portfolio in Russia and Ukraine**
Carl Fredriksson, Dag Hjalmarsson, Paul Dixelius
Department for Evaluation and Internal Audit

04/03 **Programa de Reforço da Capacidade Institucional (RCI) do Ministério da Educaçaõ em Moçambique 1998–2002**
Karin Schulz, Grayson Clarke, Maria Catela, André Calengo
Department for Democracy and Social Development

04/04 **Management Audit of the Swedish Red Cross**
Arne Svensson, Tony Bennett, Gunnar Danielsson, Malena Jönsson, Stina Waern
Department for Co-operation with Non-Governmental Organisations, Humanitarian Assistance and Conflict Management

04/05 **Sida Support to Save Catchment Council**
Shinga Mupindu, Nigel Murimirudzombo, Pascal Changunda
Department for Africa

04/06 **Israel/Palestine Centre for Research and Information (IPCRI)**
Gordon Tamm, Michael Schulz, Åke Nihleen, Helena Lindholm Schulz
Department for Asia

04/07 **Review of Swedish Support to Human Rights and Democracy through Partnership with CSOs in Kenya**
Mutahi Ngunyi, Helena Kithinji, Simon Matsvai
Department for Africa

04/08 **Textbooks for all**
The Pilot Project for Publishing in Tanzania
Leif Grahm, Kajsa Pehrsson, in collaboration with Lipangala Minzi
Department for Democracy and Social Development

Sida Evaluations may be ordered from:

Infocenter, Sida
SE-105 25 Stockholm
Phone: +46 (0)8 779 96 50
Fax: +46 (0)8 779 96 10
sida@sida.se

A complete backlist of earlier evaluation reports may be ordered from:

Sida, UTV, SE-105 25 Stockholm
Phone: +46 (0) 8 698 51 63
Fax: +46 (0) 8 698 56 10
Homepage: http://www.sida.se

SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
SE-105 25 Stockholm, Sweden
Tel: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64
E-mail: sida@sida.se. Homepage: http://www.sida.se