Funding the Activities of the *Phaseolus* Beans Advanced Biotechnology Research Network (BARN)

Bean Biotechnology Network

A Proposal for:

Der Bundesminister für Wirtschaftliche Zusammenarbeit (BMZ)

Executing Agency:

CIAT
International Center for Tropical Agriculture
Centro Internacional de Agricultura Tropical

February 1995

CIAT
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PDO-L005

February 23, 1995

Dr. J. de Haas
Head, Agriculture and Rural Development Division
Federal Ministry for Economic Cooperation and Development (BMZ)
Friedrich-Ebert-Allee 114-116
D-53113 Bonn
Federal Republic of Germany

Ref.: **Proposal for *"Phaseolus* Beans Advanced Biotechnology Research Network"**

Dear Dr. Haas:

We are pleased to submit for your consideration the proposal "Funding the activities of the *Phaseolus* Bean Biotechnology Research Network" (BARN), for which we wish to request support from BMZ. This project will facilitate the transfer of biotechnology to the NARS of developing countries and encourage a cooperative approach to using biotechnologies for solving priority challenges in bean production.

The proposal has been prepared in close consultation with GTZ (Dr. K. Wolpers) and Prof. H.J. Jacobsen, (University of Hannover). The latter is considered a key collaborator in the implementation of the project.

We look forward to a continuous fruitful collaboration with BMZ/GTZ in implementing this important project.

Yours sincerely,

ROBERT D. HAVENER
Interim Director General

Attachments

cc: ***Dr. K. Wolpers****, GTZ*
Dr. E. Kürschner*, ATSAF*
Prof. R. Casper*, Institut für Biochemie und Pflanzenvirologie BBA für Land-und Forstwirtschaft*
Prof. N.J. Jacobsen*, University of Hannover*

File: PDO 3.19.1.18 (PP-51)

Funding the Activities of the *Phaseolus* Beans Advanced Biotechnology Research Network (BARN)

BEAN BIOTECHNOLOGY NETWORK

A Proposal for: BMZ

Executing Agency:

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Acronyms

BARN	*Phaseolus* Beans Advanced Biotechnology Research Network
BGMV	Bean Golden Mosaic Virus
BMZ	Der Bundesminister für Wirtschaftliche Zusammenarbeit, Germany (Federal Ministry of Technical Cooperation)
CBB	Common Bacterial Blight
CIAT	Centro Internacional de Agricultura Tropical, Cali, Colombia (International Center for Tropical Agriculture)
EC	European Communities, Belgium
FAO	Food and Agricultural Organization
GTZ	Gesselschaft für Technische Zusammenarbeit, Germany (German Agency for Technical Cooperation)
IARCS	International Agricultural Research Centers
IDRC	International Development Research Center
IICA	Instituto Interamericano de Cooperación para la Agricultura de la Organización de Estados Americanos (OEA), Costa Rica
IPGRI	International Plant Genetic Research Institute, Rome
IPR	Intellectual Property Rights
LDCs	Least Developed Countries
MTA	Material Transfer Agreement
NARS	National Agricultural Research Systems
NARDS	National Agricultural Research and Development System
SC	Network Steering Committee

1.0 Summary

1.1 Title:

Funding the Activities of the Phaseolus Beans Advanced Biotechnology Research Network (BARN)

Short Title:

Bean Biotechnology Network

1.2 Objectives:

To catalyze biotechnology research towards the priorities of end-users; facilitate the transfer of technology to the NARS of developing countries through training and research cooperation; establish an international communications system for *Phaseolus* bean biotechnology and related activities; stimulate research using biotechnologies for solving priority challenges in bean production and utilization in developing countries.

1.3 Abstract:

The common bean is the most important food legume for over 500 million people in Latin America and the highlands of eastern, central and southern Africa. Modern biological technologies can play a key role in helping to solve many of the constraints affecting common bean production and utilization. A cooperative approach to biotechnology will have a decisive influence on the orientation of biotechnology research for *Phaseolus* beans by tackling prioritized research topics and involving scientific, policy making and donor communities, representing both technology generators and end-users.

The proposed network activities for which funding is requested include:

(i) the training of developing country scientists;

(ii) developing a communication system for the network including a newsletter and bi-annual scientific meetings;

(iii) bridging research projects considered essential to meet the network priorities and lacking initial support;

(iv) organizing a network Steering Committee representing the stakeholders of the network;

(v) providing managerial support for ensuring the functioning of the network.

The network has been maintained to the present with limited resources made available by CIAT and BMZ/GTZ for organizing the founding meeting (1990) and the first workshop (1993), respectively. Other important activities such as enhancing the capacity of NARS through training have not been carried out. Translating the proposed network objectives into benefits for bean farmers and consumers will require more sustained support of some essential activities of the network.

1.4 Cooperating Partners:

The network involves a number of scientists, policy makers and technology end-users from developing and developed countries. The last BARN meeting was attended by 30 people from 9 developing countries.

The proposed network activities will allow the strengthening of existing and future cooperative linkages between developed country advanced research institutions and CIAT, such as the case of the efforts at the Universities of Hannover (Prof. H.J. Jacobsen) and University of Hamburg (Prof. E. Heinz and Dr. F.P. Wolter).

1.5 Principal Scientists:

- Dr. William M. Roca, Head, Biotechnology Research Unit. CIAT
- Dr. Julia Kornegay, Leader, Bean Program, CIAT

1.6 Personnel to be Financed:

One Associate Scientist to coordinate the network; 9-12 fellowships for training scientists from developing countries; a number of participants (20-30) to attend the bi-annual BARN Workshops; Steering Committee (SC) members to attend the annual SC meetings.

Budget Total and Breakdown by Activities and Year:

(in thousands of current US$)

The total budget is US$817,507 broken down as follows:

Budget in US$	1995	1996	1997	TOTAL
Training of LDC's scientists	50,000	52,500	55,125	***157,625***
Network communications	75,000	5,250	79,012	***159,262***
Bridging projects	60,000	50,000	40,000	***150,000***
Network steering committee	15,000	15,750	16,537	***47,287***
Network management support	53,000	55,650	58,432	***167,082***
Indirect costs	50,600	35,830	49,821	***136,251***
Grand Total	***303,600***	***214,980***	***298,927***	***817,507***

2.0 Background and Justification

2.1 Relevance of the proposed program to developing countries

2.1.1 The Common Bean Crop

The common bean (*Phaseolus vulgaris*) is the most important food legume for over 500 million people in Latin America and the highlands of eastern, central and southern Africa. *Phaseolus* beans are the leading source of low cost protein and calories for the less privileged in Latin America and Africa. Beans are also important in the Middle East, in Eastern Europe, North America and China (snap bean). Demand growth for beans exceeds population growth by some 2% per year in Latin America and by 3% per year in Africa. Of a global total production of 9.5 million tons, more than 75% is produced and consumed in the developing world.

Beans are mainly produced by resource-poor farmers, often in complex mixed cropping systems. In Latin America, bean production is mostly market oriented while in Africa it remains principally a subsistence activity. Small farmers particularly in Latin America are increasingly using chemical inputs to increase potential production or to control insects and diseases with the resultant damage to the environment and human health.

In developing countries, bean production is constrained by biotic (pest and diseases), abiotic (e.g., soil fertility and water deficits), and socio-economic factors (e.g. input supply, credit and marketing problems). Overcoming these constraints in a small farmer setting is a substantial challenge, but with a very high expected pay-off. CIAT economists estimate that successful bean research could bring annual benefits of around US$500 million. Moreover, most of these benefits would accrue to small farmers (especially so in Africa) and/or to poor consumers (primarily in Latin America).

2.1.2 Common Beans, Biotechnology and Developing Countries

The final goal of modern agricultural biological technologies in the development process in third world countries is to further the well-being of the rural poor and to increase the availability of low cost protein and calories to the overall population.

Biotechnology can play a key role in helping to solve many of the constraints affecting common bean production and utilization. Key areas requiring attention include broadening the genetic base of common beans and facilitating the identification and transfer of useful traits from the primary and secondary gene pools. Increasing yield, with the longer term need to maintain the natural resource base, will be significant challenges remaining ahead for researchers.

Most developments in biotechnology have begun in the developed world. There, the speed of change in research is faster; the promise of biotechnology is becoming increasingly clear; and it is evident that the pay-off will be enormous, with the private sector playing an ever-increasing role in research and development. Most research in developed countries is targeted to well-defined, organized markets. In tropical countries, however, environments are less favorable, the people are poor, and markets are smaller and more diffuse.

It is necessary to ensure that the benefits of biotechnology also be achieved in developing countries for long-term public goals including growth, equity and good environmental stewardship. To effectively bridge the gap between basic research in advanced research institutions with the actual needs of bean farmers and consumers, it is necessary to identify and prioritize research topics to clearly indicate where there is a comparative advantage of biotechnology to overcome negative features of the crop, or to enhance features that would make it more attractive, or to open new opportunities.

2.1.3 Advantages of a network approach focused on *Phaseolus* bean biotechnology

A cooperative approach to biotechnology in the form of a network, involving developed and developing countries, will have a decisive influence on the orientation of biotechnology research to solve relevant constraints in developing countries. An outstanding benefit of a network approach is the identification of research priorities by consensus, involving scientists, policy makers and donor communities, representing both technology generators and end-users at different levels. An example of a well established and well functioning biotechnology Network is the Cassava Biotechnology Network (CBN) founded through the initiatives of, and coordinated from, CIAT.

The benefits of CBN have been not only in the increase of LDC's scientists participation or in a better coordination of information, but specially in the Network's efforts to integrate the inputs of technology end-users into biotechnology research prioritization. The expected benefits of implementing the BARN, as proposed, will build upon the experience gained by CIAT with the CBN.

Maintenance of economic yields, while preserving the natural resource base, are prime objectives of bean research programs. Particularly critical in developing countries is the continuous use of chemical pesticides to combat pests and diseases in bean fields; and the increased occurrence of soil related stresses (e.g. drought, nutrient uptake and cycling, and BNF) that constrain bean production. To a large extent, lasting solutions to these problems can be found in the rich genetic diversity of *Phaseolus* beans. Analysis and characterization of this biodiversity will help to develop and expedite conservation strategies, and their utilization to develop solutions to the constraints referred to above.

Biotechnology offers more efficient approaches and tools to expedite the assessment of genetic diversity, characterize *Phaseolus* beans gene pools and describes their evolution and domestication. Biotechnology will also allow the development of more efficient conservation and utilization strategies, particularly of the still untapped resources in wild populations. Furthermore, biotechnology will contribute in the analysis of the microbial populations, both beneficial and pathogenic, associated with *Phaseolus* beans. All this knowledge, in turn, will contribute towards developing improved strategies and technologies for increasing productivity while maintaining the natural resource base.

2.2 Status of *Phaseolus* bean biotechnology networking

The concept of a biotechnology research network for *Phaseolus* beans has been received with a wide general acceptance by the scientific community in developed and developing countries. This latter recognition is evidenced by the number of participants to both of the Workshops held at CIAT: 40 participants from 10 developed and 9 developing countries in the 1990 workshop, and 60 from 7 developed and 9 developing countries attended the 1993 workshop; and by the increasing number of research papers presented in these meetings: from 25 papers in the workshop of 1990 to 60 papers in the 1993 workshop.

2.2.1 BARN Founding Workshop

(CIAT, September 1990)

The workshop drew together participants from CIAT, FAO, IPGRI, IICA, IDRC, EC, GTZ, The Noble Foundation, and from advanced research laboratories in West and East Europe, North America, Central and South America, Australia and Africa. The underlying objective of the workshop was to discuss the creation of a *Phaseolus* beans biotechnology research network (BARN) to focus on the resolution of priority constraints. Through the mobilization of international cooperation to exploit, wherever possible, new biological techniques leading to economically identifiable goals. The group highlighted the most important biotic, abiotic, nutritional and methodological factors which limit our ability to overcome production and utilization constraints.

Other issues identified by the participants included: biosafety in biotechnology research in developing countries, intellectual property rights as they impinge upon biotechnology research/products and technology transfer to developing countries.

A network Steering Committee of 10 scientists, representing institutions in developed and developing countries, was elected to guide the organization of the network.

The SC members include:

W. Bushuk, Univ. of Manitoba, Winnipeg, Canada
D. Debouck, CIAT/IBPGR, Cali-Colombia
M. Dron, Univ. de Paris-Sur, Orsay, France
P. Gepts, Univ. of California, Davis, USA
L. Herrera-Estrella, CINVESTAV, Irapuato, Mexico
J. Izquierdo, FAO, Santiago, Chile
J. Kornegay, CIAT
D.P. Maxwell, Univ. of Wisconsin, Madison, USA
W.M. Roca, CIAT
E. Vallejos, Univ. of Florida, Gainesville, USA

2.2.2 First scientific workshop of the BARN

(CIAT, September 1993)

While the 1990 Workshop assessed the need of biotechnology in approaching bean constraints, and established the BARN, the 1993 Workshop, co-sponsored by BMZ/ GTZ and CIAT, was called to set the state of progress in research, further identify technological bottlenecks, identify the most important constraints deserving concerted efforts at the international level, and strengthen current and develop new, collaborative links.

Organizational and technical highlights of this workshop include:

(i) The BARN provides a forum for *Phaseolus* bean biotechnology issues. To fulfill its bridging role between advanced research institutions and developing country national programs, a major activity of the BARN will be the training of developing country scientists in biotechnology.

Other, equally important, BARN activities will include developing effective communication among network members through the organization of scientific meetings and workshops, and the production of a network newsletter. The tackling of critical research will be facilitated by identifying funds (seed moneys) to bridge such research needs. These network activities will need a level of management with the guidance of the Steering Committee.

(ii) Vis-a-vis the 1990 founding meeting, the 1993 BARN Workshop further increased and refined the focus in the selection of research areas for priority attention by the network. On the other hand, outstanding technological constraints identified in 1990 have been tackled, and some solved, e.g., a molecular map of the common bean is now available, a common bean core germplasm collection was developed, and *Phaseolus* gene pools were defined by using molecular markers. Several bean genes of agronomic importance have been tagged with mapped probes, e.g., photoperiod, seed size, BCMV, and rust.

2.2.3 Priority topics for *Phaseolus* beans biotechnology

The participants to the 1990 and 1993 Workshops identified several research areas and projects for priority attention. These topics will be further evaluated and presented to the donor community for support work in network organizations.

(i) *Phaseolus*, genetic diversity and genome structure and mapping

- Use of molecular marker technology to assess the genetic variability in the *P. vulgaris* "core" collection vis-a-vis the "reserve" collection.
- Merging of the two currently available common bean molecular maps and make the resultant map available to the network.

(ii) *Phaseolus* transformation and regeneration

- Development of a non-destructive reporter gene system to allow early detection and propagation of living transgenic *Phaseolus* material.
- Development of efficient somatic embryogenesis system to facilitate handling of large numbers of putative *Phaseolus* transformants.

(iii) Innovative strategies for plant protection

- Priority pathogen: *Xanthomonas campestris pv phaseoli* (causal agent of common bacterial blight: CBB).
  - Use molecular marker technology to identify and tag resistance genes.
  - Identify molecular probes e.g., primers, for effective diagnostics of CBB.
- Priority virus: Bean golden mosaic virus (BGMV).
  - Develop resistance using pathogen-derived genes by genetic engineering.
  - Assess the biological consequence of the diversity of virus isolates in Latin America.
- Priority insect pest: *Acanthoscelides obtectus* (the bean weevil)
  - Characterize biochemical-molecular basis of natural resistance to the bruchid in *P. vulgaris* wild relatives and other more distant sources such as *P. acutifolius* and *P. lunatus*.
  - Use molecular marker technology to tag genes of resistance to the bruchid; and develop methods for resistance-gene introgression from *P. acutifolius* and eventually *P. lunatus*.

(iv) Water deficit, Phosphorous uptake efficiency, BNF

- Adaptation to water deficit in *Phaseolus* beans.
  - Use molecular marker technology to identify traits, and characterize their inheritance, involved in variation to adaptation to water deficit.

- Biological Nitrogen Fixation.
  - Use molecular marker technology to identify traits, and characterize their inheritance, involved in variability of host plant-*rhizobia* interaction.

- Phosphorous uptake and efficiency.
  - Use molecular marker technology to identify traits, and characterize their hesitance, involved in variation in P uptake and efficiency.
  - Use molecular marker technology to characterize Vesicular Arbuscular Mycorrhiza associated with P acquisition in the *Phaseolus* rhizosphere.
  - Characterize the biochemical-molecular mechanism and function of root exudates in relation to P uptake and efficiency.

(v) Root traits and root ecology.

- Develop methodologies for evaluating variation in root architecture and anatomy, and in root biochemistry related to osmotic adjustments, nutrient uptake and exudates.
- Develop DNA-based fingerprinting to monitor Rhizobia and VAM dynamics in natural systems (ecology).

(vi) Bean quality

- Study the effects of cell wall structure/dissociation on the hard to cook phenomenon of beans and bean digestibility.
- Explore protein engineering technology to improve bean protein digestibility.
- Develop methods to assess genetic differences in fiber, cholesterol contents; and Fe availability vis-a-vis tannin composition of beans, as they relate to human health.

3.0 Program Objectives

3.1 Overall program goal

The goal refers to the broad program or sector objective to which this project and others are expected to contribute. The goal in this case is:

> ***To contribute to the development process in developing countries, by furthering the well-being of the rural poor and increasing the availability of low cost food to the overall population.***

3.2 Specific project purpose

The project purpose refers to the anticipated effect which is expected as a result of producing and actually utilizing the project outputs. The purpose for this project is:

> ***To increase the productivity of beans though cooperation between developing and developed countries in a biotechnology research and training network.***

3.3 Expected project outputs

The outputs are the specific kinds of results that can be expected from the good management of the project inputs and activities. The expected outputs for this project are:

3.3.1 The catalyzing of biotechnology research towards priority bean research needs of small farmers.

3.3.2 The transfer of technology to the NARS of developing countries through the training of scientists and students and through short-term support of research projects dealing with priority needs.

3.3.3 The establishment of a communications exchange system for *Phaseolus* beans biotechnology, including:

- development of a data base of institutions, scientists, research projects;
- publication of a newsletter to inform network members and other interested parties including end-users, donors, policy-markers;
- organization of bi-annual scientific meeting and workshops;
- increased awareness and actions about critical issues of biotechnology: public acceptance including food safety, and biosafety, Intellectual Property Rights (IPR), access/exchange of genetic resources.

3.3.4 Increased collaboration in bean biotechnology research between CIAT and German university partners

4.0 Work Plan of Activities

The Work Breakdown Structure linking project activities to specific outputs and the project purpose and program goal is shown in Figure 1.

4.1 Training of developing country scientists

Short-term training of developing country personnel is considered a major component of the BARN activities. The network will allow scientists and students from developing country institutions involved in biotechnology and related disciplines, to spend short-term research periods in advanced laboratories of developed and developing countries.

Topics for training will depend upon the priorities of the national institutions involved, but it is expected to include the use of technologies such as *in vitro* culture, genetic transformation and genome mapping for addressing selected constraints in bean production and utilization.

All training programs will invariably include discussions on biosafety in biotechnology research and development and on the implications of IPR legislation in biotechnology research and genetic resources exchange.

Trainees will be selected on the basis of:

(i) current involvement in biotechnology research in their home institutions;

(ii) acceptance of the appropriate laboratory for the short-term training;

(iii) commitment of home institution to continue activities at the end of the training period;

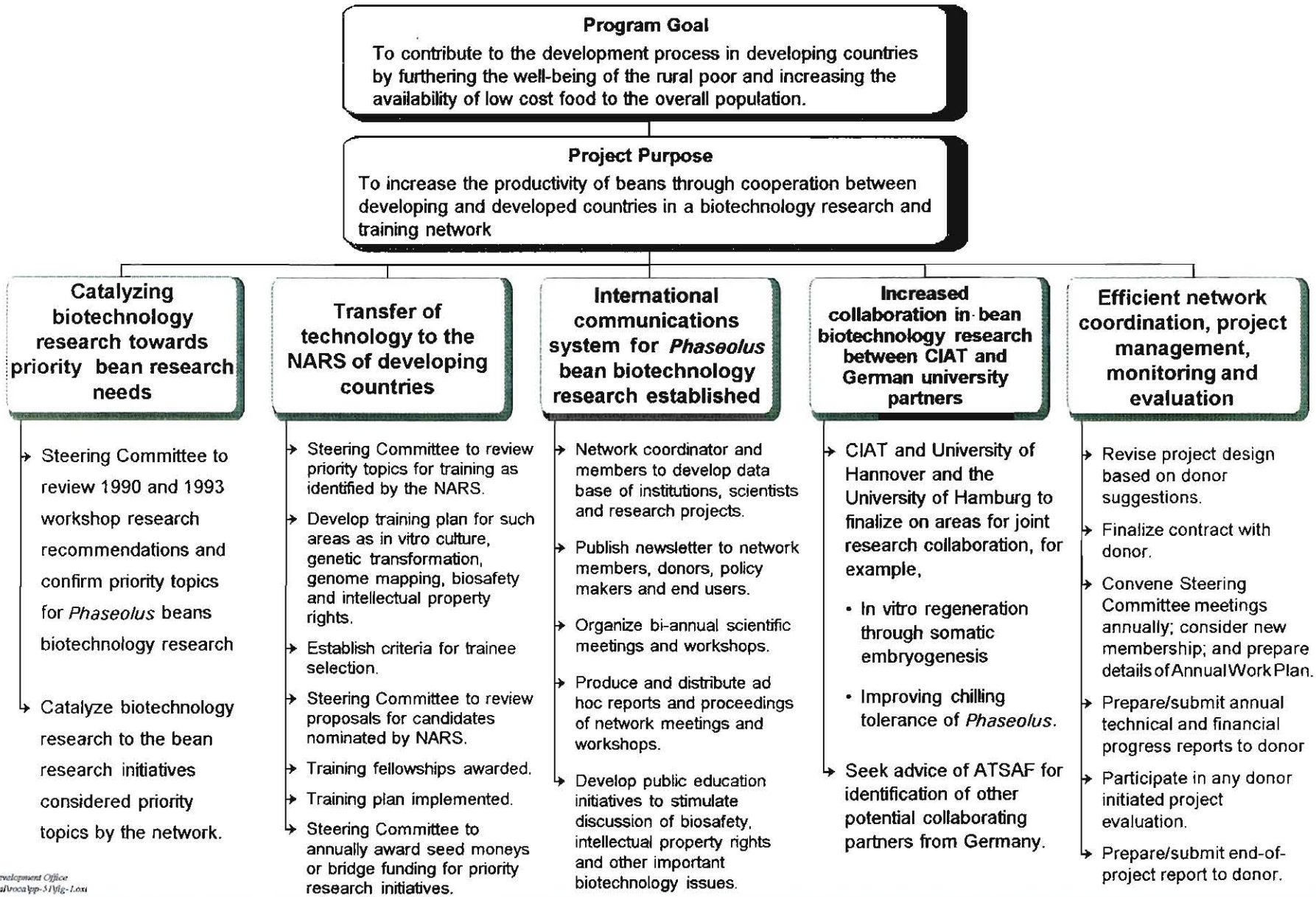
(iv) identification of additional funding, if necessary.

Selection of candidates for short-term training will take place once a year with proposals from the developing country organizations to the network; review and decisions on fellowships will be carried out with the advice of the network Steering Committee (SC).

Figure 1

Project Description

Work Breakdown Structure Linking Project Activities to Project Outputs



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4.2 Bridging critical research

The network will selectively provide financial support to research initiatives on topics of high priority. Flexibility to support such projects for periods of time not longer than one year is proposed, either at the beginning of the research or as a bridge to later funding. The SC will advise on the allocation of "seed" moneys; applications for support will be reviewed and decided upon once a year. Only modest amounts are envisaged for research support by the network.

4.3 Communications

The network will strive to gather, and make available information dealing with research activities on *Phaseolus* beans biotechnology and related activities, including topics of research, institutions, researchers, funding source, amount of funding, cooperation, achievements and needs.

To make effective its communications role, the network will

(i) publish a *newsletter*, to be distributed twice a year to network members, policy makers, donor agencies, etc.;

(ii) organize *network meetings*. It is proposed to organize one overall network meeting, in the form of a workshop, every two years.

The objectives of the meeting include:

- promoting interactions between developing and developed country scientists with NARS personnel, policy makers, etc.
- identifying issues requiring further, or new, attention by the network, etc. The founding workshop and the first scientific meeting of BARN took place in CIAT. The SC recommended to hold the next scientific meeting in Mexico, in 1995;

(iii) produce ad-hoc reports and proceedings of network meetings and workshops.

4.4 Network Steering Committee (SC)

The general role of the SC is to provide advice to the BARN on the functioning of the network, including: funding, scientific meetings, training, etc.

The composition of the SC will be reviewed at the outset of the project following approval from the donor agency. The SC will be subjected to staggered replacements to include new disciplines and activities as needs mandate; and to provide a wide geographical representation. Particular emphasis will be placed on increasing the NARS institutional participation and encouraging new membership from German universities. The SC will meet approximately once a year.

The members of the SC will represent the stakeholders in the BARN. Stakeholders include institutions and persons who have invested in the network with their time, research, leadership or funds. These include organizations such as CIAT, the NARDS, researchers and policy makers from developed and developing countries, the agencies whose funding allocations to the BARN make the network functions proceed.

4.5 Project Management and Monitoring

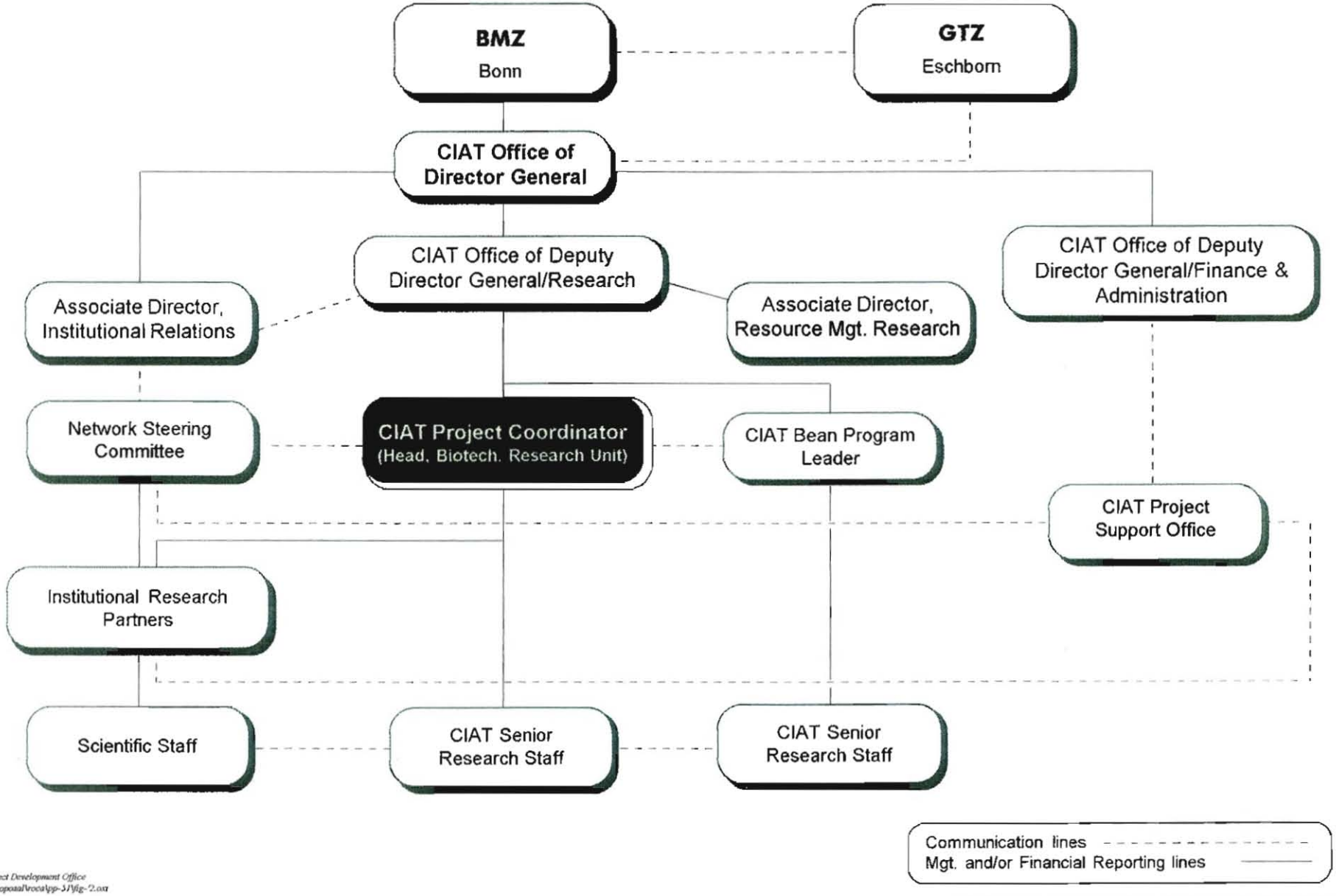
The project organization chart is shown in Figure 2.

4.6 Implementation Period

This is a three year project with proposed implementation to commence in 1995.

Figure 2

Project Organization Chart



Project Development Office
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5.0 Training

The training activities for the project have been previously described in Section 4.1 of the Workplan.

6.0 Expected Patentable Results

According to its current policy on Intellectual Property Rights, CIAT will not seek any type of appropriation of the results of its research activities. Results will be put quickly into the public domain by means of publications and/or through actual transfer of technologies and material to its partners in the NARS. Under certain circumstances, CIAT will engage in strategic alliances with partners who decide to protect the results of the research. In these cases, CIAT will apply preventive protection to avoid undue appropriation by third parties and making the products accessible to the intended partner in developing countries.

Regarding other members of the network, the BARN will make sure that research results obtained with public funding will be kept in the public domain. Both CIAT and the latter parties will implement material transfer agreements (MTAs) as a mechanism for making their research products available to national partners in developing countries.

7.0 Proposed Budget

Funding is requested to support the activities of the BARN for three years, beginning in 1995. Table 1 shows the line items of the proposed budget and the required amounts for each year.

7.1 Justification of budget items

7.1.1 Training of developing country scientists

The amount budgeted would cover the cost of 4-5 training participants from developing countries per year. A 6-12 month training period per fellowship is envisaged, at an average rate of US$ 12,000 per fellowship, including airfares.

7.1.2 Communications

The budget includes the publication of a newsletter, twice per year, and the organization of one scientific meeting every two years. Major costs of meeting include: airfares of developing country participants, invited speakers, board and lodging, preparation for the meeting, and publication of the proceedings. The next BARN meeting has been planned to take place in 1995 in CINVESTAV, Irapuato, Mexico.

7.1.3 Bridging research

The amount shown as "seed money" are estimates based on current experience. The amount proposed decreases with time in the assumption that critical, non-funded research initiatives will be more numerous at the beginning, i.e., 3-4 projects per year, to gradually decrease at a later stage. The funds allocated would cover mostly operational costs, and priority funding allocation will be based on network priorities.

7.1.4 Steering Committee meetings

The network SC will meet approximately once a year in a strategic location, according to cost convenience and opportunity to carry on business effectively. The amount shown includes airfares and room and board of SC members. It is expected that SC meetings will not last longer than 2 days.

7.1.5 Management support for the Network

The activities of the network will require close coordination. A major function of the Coordinator will be to support information exchange and stimulate bean biotechnology research by bridging the SC recommendations with the operational aspects of the BARN.

Activities designed to include the perspectives of end-users in the BARN priority setting will receive special attention. Specifically, the network coordinator will facilitate information flow through a newsletter, reports and proceedings; ensure the distribution of research material such as genetic stocks, markers, libraries, etc.; organize network and SC meetings, manage the training activities and the allocation of bridging support to research projects identified as priority by the network SC.

The budget item includes salary and benefits at the level of a CIAT Research Associate scientist, and travel expenses to carry out duties of his/her function.

7.1.6 Contribution by CIAT

It is proposed that the base of the network be located in CIAT for the initial phase of its activities. The move of the network's base to another organization shall be considered at a later stage on the basis of a review of the BARN, and the perspectives for funding availability and other logistical aspects.

CIAT's contribution to the activities of the network includes the following:

(i) CIAT offers an international forum for the analysis and debate of agricultural issues for the benefit of the world scientific community.

(ii) As a public, international development-oriented research organization, CIAT has the mandate to hold in trust the world *Phaseolus* beans germplasm collection.

(iii) An inter-disciplinary research team on *Phaseolus* beans, involving socio-economics, and biological expertise exists at CIAT; the team activities are linked to the NARS of developing countries.

(iv) The strategic research of CIAT is also linked to advanced research institutions, and CIAT research Units (Biotechnology, Virology, Genetic Resources) provide the necessary backup in the monitoring, development and application of modern biological technologies to *Phaseolus* beans.

(v) The conditions and facilities at CIAT will give the coordination a comparative advantage to build upon the experience gained in the running of similar networks such as the Cassava Biotechnology Network established since 1988. While being strategically located in a typical developing country situation, the network Coordinator will have access and use CIAT's modern communication systems, and logistical support for all activities, including ease of travelling to any part of the world.

Table 1

Centro Internacional de Agricultura Tropical – CIAT

BMZ – Funding the activities of the *Phaseolus* Beans advanced Biotechnology Research Network (BARN)

Proposed Budget in US$ dollars

Line item	1995	1996	1997	Total
Training of LDC's scientists				
Fellowships	50,000	52,500	55,125	157,625
Total training of LDC's scientists	**50,000**	**52,500**	**55,125**	**157,625**
Network communications				
Newsletter	5,000	–	5,512	10,512
Scientific meeting	70,000	5,250	73,500	148,750
Total network communications	**75,000**	**5,250**	**79,012**	**159,262**
Bridging projects				
"Seed Moneys"	60,000	50,000	40,000	150,000
Total bridging projects	**60,000**	**50,000**	**40,000**	**150,000**
Network steering committee				
Meetings	15,000	15,750	16,537	47,287
Total network steering committee	**15,000**	**15,750**	**16,537**	**47,287**
Network management support				
Coordinator	38,000	39,900	41,895	119,795
Support	15,000	15,750	16,537	47,287
Total network management support	**53,000**	**55,650**	**58,432**	**167,082**
Indirect costs	**50,600**	**35,830**	**49,821**	**136,251**
Total	**303,600**	**214,980**	**298,927**	**817,507**

BMZ-BARN
23-Feb-96
PROPOSED

Juan A. Garafulic
Financial Controller

Appendix 1

CIAT C.V.

Centro Internacional de Agricultura Tropical
International Center for Tropical Agriculture

William M. Roca

Position in Project:

Project Officer

International Research Experience:

Centro Internacional de Agricultura Tropical (CIAT)
Cali-Colombia. 1985-Present
Senior Scientist, Head, Biotechnology Research Unit,

Research Activities: *Gene transfer through in vitro culture-aided inter specific hybridization with Phaseolus, and through genetic transformaiton and plant regeneration with cassava (Manihot esculenta). Also research on cassava cryopreservation in liquid nitrogen is included.*

Centro Internacional de Agricultura Tropical (CIAT)
Cali-Colombia. 1978-1985
Senior Scientist, Genetic Resources Unit

Research Activities: *In vitro Culture for germplasm collection, international exchange and conservation of cassava (Manihot esculenta)*

Centro Internacional de la Papa (CIP)
Lima-Peru. 1973-1978
Physiologist Cell Tissue Culture

Research Activities: *Biochemical and morphological analyses of flower induction and tuberization in potato, and in vitro culture pathways to regeneration.*

Cornell University, Ithaca
N.Y., USA. 1972-1973
Post-Doct Fellow, Lab. for Cell Physiology

Scientific Memberships:

- Member of Scientific Society SIGMA Xi, Cornell University Chapter.
- Member of the Panel on Cell Biology and Biotechnology of the International Cell Research Organization (ICRO) of the UNESCO.
- Member of Scientific Advisory Board of the International Foundation for Science (IFS), Stockholm, Sweeden.

- Member of the Permanent Committee, Interscience Association, San Jose, Costa Rica.
- Member of Editorial Advisory Board of Ag. Biotech News and Information, CAB International, U.K.
- Member of the Steering Committee of the Cassava Biotechnology Network, CIAT - Cali.

Education:

Postdoctoral: Plant Cell and Tissue Culture
Cornell University, Ithaca, N.Y., USA, 1972-1973

Ph.D. Major: Plant Cell Physiology. Minor: Cytogenetics
Cornell University, Ithaca, N.Y., USA, 1972

B.S. Major: Plant Physiology
Universidad Nacional Agraria, La Molina, Lima-Peru, 1967

Languages:

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Relevant Publications:

Mejía-Jiménez, C. Muñoz, H.J. Jacobsen, W.M. ROCA, S.P. Singh. 1994 Interspecific hybridization between common bean and tepari bean: Increased hybrid embryo growth, fertility, and efficiency of hybridization through recurrent and congruity backcrossing. Theor Appl Genetics (in press).

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