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**CamBioTec as a vehicle to promote biotechnology in the Americas**

Final report of a consultancy for IDRC

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## **Summary of conclusions and recommendations**

1. CamBioTec has developed into a successful network of persons, with good capabilities to promote biotechnology through support to policy design and management and brokering of joint ventures between companies and governmental agencies, which has had a significant impact in its short lifetime. It has been less successful till now to promote research into the socio-economics of biotechnology and in promoting direct applications of biotechnologies.
2. To continue and improve their role as "biotechnology champions", CamBioTec focal points need to institutionalize, that is, broaden their political legitimacy, improve their services and generate the funds needed to cover their core costs. This means the creation of new organizations, with participation of industry, governmental agencies and research centers, in Chile, Colombia and Mexico, as well as closer integration of the Argentinean focal point with the Foro Argentino de Biotecnología.
3. The feasibility of such an step is high in all countries, if IDRC supports CamBioTec during a two year transition period, with guidance and challenge funding for some core costs of the focal points.
4. The network as such also has to formalize, creating a governing instance and developing a common workplan.
5. It is therefore recommended that IDRC approves a second phase of the CamBioTec project, with the objectives of institutionalization of the focal points where needed, formalization of the network, and use of CamBioTec capabilities to develop the socio-economic research and environmental biotechnology activities pending from the first phase.

## Introduction

CamBioTec is a project, approved by IDRC in January 1995, to "promote, facilitate and support collaborative activities among Latin American and Canadian researchers, entrepreneurs and key institutions to expedite the introduction of biotechnology-based products and applications in the agrifood and environmental management sectors of selected Latin American countries, in critical areas of socio-economic and environmental need" (IDRC, 1994). Coordinated by Dr. Jose Luis Solleiro of the Technological Innovation Unit of the Engineering Institute (former Centre for Technological Innovation, CIT) of the National Autonomous University of Mexico (UNAM), it includes national coordinating institutions (Focal points) responsible for local activities in Canada (BioteCanada), Mexico (Instituto de Ingenieria, UNAM), Argentina (Foro Argentino de Biotecnologia), Chile (Conicit-University of Chile), Colombia (Fundacion Tecnos) and Cuba (Biotechnology and Genetic Engineering Institute), integrated into a network with a common program of activities, with a budget of Can\$ 1,000,000 financed by IDRC and significant contributions by local institutions.

After three years of existence, an extensive list of activities have been carried out. As originally planned, an external review has been contracted to assess the different actions, their impacts and to make recommendations on "the future strategic orientation and activities of the network, with attention to the overall goals of the network, key clients and services, organizational structure, financing strategy (local and international) and cost-recovery mechanisms, and priority actions over the next 6-12 month" (IDRC 1998).

To this end the consultant has reviewed the documentation on the project provided by IDRC, the Project Coordinator and the Focal Points and has interviewed, directly or telephonically, 64 persons in Canada, Mexico, Colombia, Chile and Argentina (See Annex 1). Extensive discussions have been held with IDRC staff, the Project Coordinator and each of the Coordinators in Mexico, Colombia, Chile and Argentina. IDRC decided not to include Cuba in this assessment, given that its Focal Point has been inactive.

A two-day meeting was held in Mexico with IDRC staff, the Project Coordinator and the coordinators of the focal points (excluding Cuba) to discuss the conclusions and recommendations of the consultant and to devise a strategy for the consolidation of CamBioTec.

## Concept and design of CamBioTec

The general objective of CamBioTec comprised the following four specific objectives: 1) To implement technology foresight and priority-setting methodologies; 2) To strengthen public policy in the field of biotechnology; 3) To promote improved management of innovation in biotechnology firms; and 4) To foster Canada-Latin America technology partnering arrangements.

The specific objectives were conceived as sequential phases in a logical order leading from the identification of what should be done (priority setting), definition of how to do it (policy research), promotion of specific alternatives to do it (partnering) and finally, strengthening of capacities to do it (support in management of biotechnology).

This conceptual design is based on the idea that, very schematically, biotechnology research in Latin America lacks an adequate strategic focus, as it is basically academic, disconnected of the productive sector; that government policies promoting biotechnology are basically science policies responding to an academic constituency; and that producers and industry to be impacted by biotechnology have yet to realize the opportunities and threats posed by it.

Underlying the proposal are several hypothesis and proposals more or less explicitly exposed in the background considerations of the project document, which are the following:

- Biotechnology will have a large and profound impact on all economic sectors based on the exploitation of living beings and their products.
- Latin American countries will be affected in an important way, given the importance of traditional, biologically based, sectors in their economies.
- The only way Latin American countries have to face these challenges is to take the most advantage of the developments being done in leading countries, that is, access intelligently available technologies, given the weakness in local research capabilities.
- Public policies towards this end should encourage the development of some science capabilities so to understand, monitor and select the most relevant developments, but principally should facilitate the access, i.e. transfer of, to the relevant technologies and support the incorporation of biotechnology by industry.

The diagnostic and strategy proposal for Latin American biotechnology made by CamBioTec is basically correct, leading to its focus on policy and technology management issues. This approach stands out among the rest of regional or national

initiatives to promote biotechnology in the region, which typically are oriented towards research promotion and support.

On a more specific level of analysis, there are some problems with the design and with some of the chosen strategies.

First, the proposal of sequential development of the phases does not correspond to about 15 years of different policy, research and industrial initiatives and actions in biotechnology in every country, which have produced a certain level of development in biotechnology capabilities and uses. This scenario calls for a much more practical and flexible approach of strengthening or creating activities tailored to the different situations in each country.

Secondly, the strong emphasis on planning activities and their specific design (i.e. concentration on national priority setting) is based on a conception of the role of central, state-led planning of the economy and development typical of the past import-substitution period of development policies in Latin America which is out of favor in most, if not all, countries of the region. If these exercises are initiated and run out-side of the responsible science or industrial policy organizations they are specially problematic.

A more realistic and effective approach to this planning question would have been explicitly acknowledge the limitations of the more dirigistic alternatives, and design activities to help develop a basic consensus on the different policy questions related to biotechnology development. An effective public policy in the new political and economical environment in Latin America has to be based on a shared view of the importance and role of biotechnology in the countries. This view is both general for biotechnology, but also specific for the different sectors to be impacted by biotechnology.

Thirdly, the promotion of specific biotechnology applications and uses through feasibility studies, as proposed in the project, has clear limits for organizations without investment capabilities, such as the focal points. They should not go much further than the identification of opportunities, and leave specific feasibility studies to the interested parties, such as industries, investors or some governmental organizations, so to reduce the risk of waste of resources.

These problems in the design of the project clearly affected the operation of some of its activities.

## Operation

### Summary of activities

The CamBioTec project has carried out an important number of activities, as shown in Annex 2, in the three years it has been operative in Canada and Mexico, two and a half in Argentina and Colombia and one year in Chile.

The activities concentrated in general on the planning objectives and on partnering:

- **Argentina** developed a priority setting exercise in close cooperation with the governmental science policy agency (Secretaria de Ciencia y Tecnica), supported the discussion on biosafety issues, did a survey to gather information on organizations and companies involved with biotechnology and supported several companies interested in partnering with Canada.
- Given the advanced stage of biotechnology promotion and planning in **Canada**, the Canadian focal point concentrated in partnering activities, both of companies and of public organizations interested in linkages with Latin America in the field of biosafety and environmental applications of biotechnology. An international seminar on socio-economic impacts of biotechnology was held in this country.
- **Chile** was included latter than the rest of countries in the project and concentrated in policy issues (biosafety) and partnering. The focal point decided not to do an priority setting exercise given the unfavorable climate to such activities in the country. A biotechnology industry directory was just finished.
- In the case of **Colombia**, a priority setting exercise was initiated, which still has to conclude, in support of Colciencias, the governmental science policy agency. A seminar in the area of intellectual property was organized and partnering activities have been carried out.
- The **Mexican** focal point combined the general coordination of the project, which included the organization of several common activities between the participating countries, and the specifically national activities. The project being an out-grow of a previous IDRC project with the CIT, it carried out the most complete range of activities of all participating countries. It developed a priority setting exercise in one of the states of Mexico (Chihuahua), did a serie of technology monitoring studies, supported the formulation of a national policy for regulating the access to genetic resources as well as in biosafety, up-dated a biotechnology directory, contracted three socio-economic impact studies, organized seminars on biotechnology management issues and supported several partnering initiatives. It also promoted the application of a specific biotechnology,

the production of a biopesticide, through a market study, a feasibility study, the selection of a interested industry and the negotiation of the financing of this venture.

Very rapidly in the execution of the project it became clear that the sequential order of the activities envisioned in its design was not practical, and activities were developed depending on the interest and possibilities in each case. Particularly the studies on socio-economic impacts of biotechnologies were left for latter stages, and it is only very recently that three case studies have been selected to be initiated soon.

All focal points did activities in planning, support to policy development, information and brokering of partnerships. Socio-economic research and promotion of the application of specific biotechnologies were only done in Mexico.

### Performance

This flexibility in the execution of the project is very evident in the comparison of the expected outputs included in the project document with the real outputs three years latter, as shown in Table 2. There are significant variations in the results compared to the initial vision of the project. They are the consequence of unrealistic expectations, on the one hand, and of loose follow-up and control of some activities in other cases.

In the first case, some of the problems stem from the original design of the project. These problems were recognized during its execution leading to changes in the workplan. The example of the feasibility studies of specific applications of biotechnology in priority areas has already been mentioned. Another similar case is the proposed bioindustrial R&D fund, which seems at the least a too advanced or ambitious idea for the typical situation of biotechnology or, even more generally, science and technology in the region.

Some of the activities would have benefited from a tighter organization and follow-up. Several proceedings of seminars, for example, still haven't been published. One of the priority setting exercises is not finished, endangering its impact and usefulness, since its client organization is advancing more rapidly and could therefore not use its results.

The events done by CamBioTec have generally being well organized. Selection of participants, design of agenda, logistics, media coverage, etc. have been, in the opinion of interviewed persons, good. Proceedings are lacking for some of them, and others are weak.

The quality of products of the studies and information activities have being uneven. Some of the technology monitoring studies are excellent, but their value and impact have been reduced because of their focus on only one country. The directories need to improve in relation to their coverage and presentation of data. Data bases on



different aspects of national biotechnology in each focal point with a common structure, which eventually would permit the interchange and sharing of data, are lacking.

It has to be pointed out that some of the variations are due to new initiatives, that is, not envisioned originally, which is considered a very positive variation. For example, the project negotiated a new activity with separate funding to strengthen regulatory bodies in Argentina and Chile. A CamBioTec prize to stimulate interest in research on socio-economic aspects of biotechnology was created in Mexico.

**Table 2: Performance of CamBioTec**

<u>Expected out-puts</u>	<u>Real out-puts</u>
<b>Priority setting</b>	
3-4 foresight activities	9 monitoring studies
4 quarterly reports	No
Priority setting exercises (3?)	2
Report of exercises	1
<b>Policy research/Public policy</b>	
Background studies	1(?)
9 bimonthly policy briefs	No
Consensus building exercises	7 (seminars)
-	Institutional strengthening (new)
<b>Socio-economic impacts</b>	
2 international meetings	1
1-2 pilot studies	3 initiated
-	CamBiotec prize in Mexico (new)
<b>Partnering</b>	
Brokering mechanism	Focal points and Network
5-10 feasibility studies	1 (?)
Bioindustrial R&D fund	No
6-10 collaborative ventures	8
10 executive seminars	3

The variations between the planned and real out-puts is not necessarily negative. It reflects a high degree of flexibility in the execution, which permitted to overcome shortcomings in the original planning and the concentration on the more demanded and feasible propositions.

### Co-funding

One important indicator of success of the project, as explicitly acknowledged in the project document, is the generation of institutional commitment in the participating countries, which can be measured by the co-sponsorship of project activities. The co-funding generated by CamBiotec activities in each country is presented in Table 3.

**Table 3**  
**Co-funding generated by CamBioTec activities (CAD)**

	In-kind	Cash	Total
Argentina	105000	20720	125720
Canada	409000	12000	421000
Chile	?	?	?
Colombia	?	70000	70000
Mexico	?	?	?
<b>Total</b>	<b>514000</b>	<b>102720</b>	<b>616720</b>

The project generated a total co-funding of, at least, CAD 616720, 83 % of it in kind (value of the time dedicated by the coordinator and other key persons, travel costs, physical facilities, publishing, promotion costs, secretarial support, etc..) and 17 % in cash. This represents 61 % of the IDRC contribution, which is considered a significant amount.

This co-funding was generated through co-sponsoring of activities by other organizations or agencies and as matching funds, in kind put-up by the host organization of the focal points. No attempt was made to generated revenues to cover the costs of some activities, as originally planned.

### Relations with other biotech programs

CamBioTec is only one of several regional or global biotechnology promotion or coordination initiatives. The collaboration between them is a crucial factor of their success, as it permits the amplification of limited capacities and a more effective use of limited resources. The following are examples of these collaborative activities:

- Joint seminar on planning, priorities and policies in agricultural biotechnology with the Intermediary Biotechnology Service (IBS) of the International Service for National Agricultural Research (ISNAR), The Netherlands.
- Joint meeting with the Biotechnology Policies network of the CYTED, an Iberoamerican cooperation initiative.
- Organization of workshops within REDBIO, which is the periodic plant biotechnology congress in Latin America, supported by FAO.
- Organization of brokering meetings within different technical and commercial congresses.

This policy of CamBioTec and its results is considered very positive. As a consequence, CamBioTec is viewed as a valuable partner by other international agencies and research centers.

## Organization

The organization of CamBioTec is based on focal points in each participating country and a general coordination, in the hands of Jose Luis Solleiro. The focal points are essentially a coordinator, with some technical and administrative support by some host institution. Coordinators and support personnel have a high level of personal commitment to the CamBioTec initiative, which has been a crucial factor in its performance and success. CamBioTec is, in this sense, basically a network of committed individuals. The exception to this is the Canadian focal point which, in addition to a committed coordinator, has a clear and effective institutional support by BioteCanada.

The network functions quite informally as it lacks a clear government and management structure. The general coordinator as well as the focal point coordinators have a high level of discretionary power. The annual work-plans have been discussed in coordination meetings held as adjuncts of other gatherings.

Each focal point presents particular characteristics reflecting local circumstances and realities, as shown in Table 4. The most important elements in the effectiveness of the focal points are its institutional basis and the dedication by coordinator and other technical personnel.

**Table 4**  
**Organization of CamBioTec focal points**

	<u>Argentina</u>	<u>Canada</u>	<u>Chile</u>	<u>Colombia</u>	<u>Mexico</u>
<b>Host instit.</b>	Biotech association	Biotech association	Acad.	Private	Acad.
<b>Coordinator</b>	Part time	Full time	Part time	Part time	Part time
<b>Assistant</b>	Part time	No	Part time	No	Part time
<b>Secretary</b>	Full time	Shared	Shared	Shared	Shared
<b>Office</b>	Own	Shared	Shared	Shared	Shared
<b>Advisory Committee</b>	Yes	No	No	Yes	No
<b>Regionalization</b>	No	No	No	Yes	Yes

The focal points of Argentina and Canada are the most solid as they are based in existing biotechnology promotion associations formed by industry and research organization. This gives CamBioTec in these countries a high level of legitimacy and political leverage. CamBioTec has strengthened significantly these host organizations, specially the Foro Argentino de Biotecnologia, giving it a technical capacity and dimension which it lacked and needed.

The focal points in Chile and Colombia are quite weak. as they are based on agreements between IDRC and the national science policy organizations, which then delegate or subcontract with private or academic organizations. These are not specifically biotechnology promotion organizations. The case of Mexico is also quite weak, as the focal point responsibility rests with the UNAM, which has no special commitment or interest in the project. Recent changes in the policy of the University related to CIT have highlighted the risks this situation entails.

With the exception of Canada, each focal point is a group of mostly three persons, generally only dedicated part-time to CamBioTec. This group includes a coordinator, an assistant and a secretary. In Mexico it is larger, as the general coordinator is located there and other professionals dedicate part of their time to CamBioTec activities, through specific contracts.

Argentina and Colombia have created advisory committees integrated by biotechnology leaders from research, government and industry. In the case of Argentina it is very active, practically providing governance and steering to the project. It has been an important factor in the legitimacy and prestige on the project in this country.

Mexico and Colombia have regionalized the project to some extent, signing agreements with interested organizations in other cities. So an regional focal point exists in Chihuahua and in Cali. In the case of Chihuahua, a highly motivated group has taken up the CamBioTec concept, and developed an effective workplan with autonomy. In the case of Cali, collaborative activities between the focal point and the regional origination have been carried out. This strategy has to be viewed with care as it could dilute the focus and image of CamBioTec in the countries as well as increase the complexity of managing the project.

Effective communications between focal points are crucial for the operation of the network. It has not been easy to link them electronically, but now they are. Remaining difficulties are consequence of operative problems in some focal points.

The informality of the organization of focal points and the network has been an important reason in the success to date, as it permitted the incorporation of highly motivated individuals and a high degree of flexibility. But this informality cannot be maintained forever, if the permanence and institutionalization of the network is sought.

## Impacts of CamBioTec

The impact of any research, promotion and coordination program like CamBioTec depends on the type of activities, that is, on the concept and the strategy of the program, on the size or scale of the program and on the performance or effectiveness of its executing agents, in this case, the focal points. Using a combination of indicators (use of CamBioTec generated information or decisions in official documents and positions, number of partnerships brokered, number of participants in CamBioTec organized meetings) and the opinion gathered in the interviews, the impact of CamBioTec in the participating countries has been assessed. The results are presented in Table 5.

**Table 5: Impacts of CamBioTec in countries**

	Planning	Policy	Information	Partnering	Applic.
Argentina	High	High	Good	High	No
Canada	-	-	High	High	No
Chile	-	Good	Good	Good	No
Colombia	Good	Low	Low	Good	No
Mexico	Low	Good	High	High	Yes

Scale used: High-Good-Low

- = not applicable

The best impacts have been in the partnering activities, although they are limited to the participating companies. This activity has a differential impact on biotechnology industry development depending on the size of the industry. In Canada, for example, only a small percentage of companies have shown interest in cooperative activities with Latin America, but this percentage is much larger in Latin American countries given the small number of the local biotech industries. So a high percentage of the Latin American biotechnology industry has been exposed to Canadian opportunities and many of the leading biotechnology companies in the participating countries have taken advantage of them. Examples include Biosidus in Argentina, BiosChile in Chile, Meristemos in Colombia and Biogenetica, IASA and PROQUISA in Mexico.

The partnering activities have had a high impact also from the perspective of Canadian-Latin American relations. Although CamBioTec build on previous efforts to improve them, it has been quite successful in building a channel of communications and relations between Canada and Latin American biotechnology industry, strongly helped by the more general Canadian interest in the region.

The provision of basic information on the local biotech scene has had also a very good impact, followed by the biosafety and planning activities. CamBioTec (or its focal point institutions) is recognized as a valuable source of information in most countries. Support to public policy in biotechnology has had a good impact in the case of biosafety oversight in Argentina and Chile and the definition of a national policy for access to genetic resources in Mexico. The priority setting exercises have had a high direct impact only in Argentina where the CamBioTec contribution is explicitly acknowledged in the national biotechnology plan. But these exercises have had also indirect impacts, particularly in Mexico, as they have been a crucial element in the progressive crystallization of a shared vision of key actors of the role of biotechnology in development.

The promotion of specific applications of biotechnology was only done in Mexico, where a strategy for the local manufacture of Bacillus-thuringensis-based biopesticides was pursued, with potentially high impacts.

From a country perspective, the best impacts and influence of the project has been in Argentina, because of a very good relationship with policymaking bodies, a solid institutional basis and a balance workprogram. The impacts in Mexico have been good, reflecting the prestige and respect won by the focal point institution in many years of activities. The impacts and influence of the project in Canada are smaller, since its activities are only a small part of a large program of biotechnology promotion and coordination. The short time the project has been operative in Chile has limited its impact. In Colombia, the reason of the relatively smaller impact of the project has been the performance of the focal point.

In Argentina, Canada and Mexico many interviewed persons did not clearly perceive the difference or identity of CamBioTec against its focal point institutions. So many identified the Foro Argentino de Biotecnologia, the CIB and the CIT as responsible for CamBioTec activities, which is positive. In general, CamBioTec has a very good image in the countries, as a effective and well organized program.

In conclusion, the general impact of CamBioTec is judged very good, given the relatively small scale of the program, compared with the size and difficulty of the addressed problem, which is the development of biotechnology in the region.

## Conclusions on CamBioTec

The balance of first phase of CamBioTec can be summarized as follows:

### Strength

- Functioning focal points and network
- Basic information on national biotechnology
- Good image in most countries
- Work on biosafety
- Partnering activities
- Relations with Canada

### Weakness

- Institutional basis in some countries
- Certain dispersion of activities/lack of focus
- Socio-economic research and promotion of direct applications of biotechnology
- Lack of sustainable development activities
- Lack of activities to enhance public awareness of importance of biotechnology
- Information on CamBioTec/Relations with media
- Programming and follow-up

### Opportunities

- Need for national biotechnology "champion"
- Broaden political base of focal points through incorporation of important actors
- Interest in helping countries in awareness of new trends in biotechnology
- Exploit synergies of net-work
- Need in countries of capabilities to articulate and negotiate projects
- Increasing importance of environmental issues
- Continuing importance of free trade in hemisphere

### Threats

- High dependence on coordinators in some countries
- Difficulties of institutionalization of network
- Lack of interest by key actors
- Perception of "too Canadian"
- Competition of other similar initiatives (nationally and regionally)



In summary, CamBioTec has developed into a successful network of persons, with good capabilities to promote biotechnology through support to policy design and management, as well as brokering of joint ventures between companies and governmental agencies, which has had a significant impact in its short lifetime. It has been less successful till now to promote research into the socio-economics of biotechnology and in promoting direct applications of biotechnologies.

## Issues in CamBioTec's future

### What should CamBioTec's mission be?

CamBioTec was designed as an ambitious mechanism to promote and foster biotechnology in some Latin American countries through planning activities, socio-economic research, support to policy design and management, negotiation of direct applications of biotechnologies, and helping in the transfer of technology from Canada to local companies. The experience of three years has shown that some of these activities are needed and feasible, and the success of the project has been based on its concentration on those.

The capabilities to plan and execute these more limited set of activities conform a specific institutional model, which is a biotechnology promotion organization or, more generally, an association of any group of organizations to further some shared interest or goals. This group will perhaps need to develop or strengthen a shared vision of its common interests; need expand its coverage, that is, spread its vision; lobby or pressure other organizations to do something in its interest; and help its members with services of interest to all and that do not affect the possible competition between members; and towards this, effective associations governed by its members or founders are needed.

If the institutionalization of CamBioTec is sought, understanding as such the transformation of the current project into a self sustained organization and work program, capable of existing without financial support from IDRC, this reality has to be built on. The successful elements of the CamBioTec project point towards its future. There is a need in all CamBioTec countries, excluding Canada, either to strengthen existing associations like the Foro Argentino de Biotecnología, or to create biotechnology promotion organizations. CamBioTec already is a national reference on biotechnology information and advice in these countries, making this step feasible. In this way, the "national biotechnology champions" envisioned in the project document could become a permanent reality.

The focus of these associations will be first of all providing basic services to its members and to a broader clientele. Since its members have to be principally the biotechnology industry, as the most directly interested parties in the development of biotechnology, these services have to be necessarily in the area of commercial biotechnology, that is, information on industry, regulatory and legal requisites, opportunities, etc., brokering services and lobbying capacities to influence the development of a favorable environment for biotechnology. Once these basic services are in place, other services or activities, not so directly related to the biotechnology industry, can be pursued like, for example, fomenting research into socio-economic aspects of biotechnology.

The mission of the envisioned biotechnology promotion associations, in the long run, will depend on who governs them. If these organizations are created exclusively as industry associations its mission will be restricted to promoting more limited industry interests. It is highly recommended that other organizations interested in biotechnology participate in the creation of these type of organizations which will permit a broader national development oriented mission, as is the case with BioteCanada and Foro Argentino de Biotecnología, in which industry teams up with research centers and government agencies.

The preceding analysis has several important implications. One is that, in the long run, CamBioTec probably will lose its Canadian orientation, to be substituted by a more general one of linking similar organizations in the Americas or even globally. Another one is that such organizations and network will have a own dynamic, which will be different from IDRC policies and objectives. This does not mean that it will be still very useful for IDRC purposes.

#### Role of research vs. other activities

The role of research in the kind of organizations and network CamBioTec is evolving into, is clearly secondary. This means that IDRC will have to establish a special and explicit way of maintaining a research component in a possible second stage of the project, to guaranty that its activities conform closer to IDRC's central mandate.

#### Feasibility of creation of biotechnology promotion associations

If it is true that CamBioTec is evolving towards a network of national biotechnology promotion associations, the feasibility of creating these type of organizations in the current CamBioTec countries or in others is crucial in the future of the project. The basic condition for these creations would be the interest and willingness of leading companies, research institutes and governmental agencies to associate with these purposes. Based on the opinions gathered in the interviews done, it is judged in the following way:

Chile: Important Chilean institutions like the Sociedad Nacional de Agricultura, the Fundacion Chile and key companies, like BiosChile, have recently been sensibilized to the need and possibilities of creating a special biotechnology promotion organization, very similar conceptually to CamBioTec, by Pablo Valenzuela, an influential businessman and researcher. This project is too ambitious and costly and is now stalled, but it opens the way for a more modest and practical proposal by CamBioTec. The feasibility of creating such an organization in Chile is judged therefore high.

Mexico: There is an explicit interest by ASEMBI , a dormant biotechnology industry association, to team up with CamBioTec as a way of reactivating this association. This would also be of interest to other influential companies and

organizations. It seems highly feasible to create a special organization to capitalize the CamBioTec prestige, with a broader political base and therefore legitimacy than the UNAM.

Colombia: The situation in Colombia is complicated by the existence of three biotechnology promotion organizations, stimulated and supported by the government, with theoretically very similar objectives as CamBioTec. These organizations are still in a consolidation phase, but have to be taken into account in any strategy for the institutionalization of CamBioTec in this country.

### Financing of CamBioTec

A crucial issue in the future of CamBioTec is the possibility of generating alternative sources of financial support or revenues to the current dependence on the IDRC grant. As the experience of the project shows, it is relatively easy to generate co-funding for specific activities. The problems lies in the financing of the basic costs of the focal points and of the network, as most agencies have limitations to cover core personnel and administrative costs.

There are at least three ways of solving this problem. If the focal point is an association of several organizations, membership contributions or fees can normally cover its basic costs. Secondly, these associations could also secure special generic contributions by governmental agencies, specially for good work programs, at least for some consolidation period. Thirdly, a cost recovery strategy can generate resources for covering the basic cost of the organization, if the concept of overheads is used.

Since the basic costs of a focal point are rather modest, it should be possible to generate the needed funds by a combination of these strategies. Nevertheless, the focal points need some time for developing these strategies and their corresponding skills. Therefore, a limited support by IDRC for a short period is crucial to permit these adjustments and learnings.

### Expansion and broadening of the network

Many of the interview persons brought up the questions of the expansion of the network to other countries and of broadening the focus of activities from the agricultural, agroindustrial and environment sectors included now to all impacted by biotechnology and particularly human health. Interest to include Brazil and to solve the problems faced in Cuba is great.

An attempt to create a focal point in Brazil failed. This country has a biotechnology industry association, ABRABI, which apparently has been recently reactivated. This opens a new opportunity to incorporate Brazil into CamBioTec, which is judged very important by other members of the network. Other institutional alternatives could be explored also to this end. In a similar way, there are several

alternatives of focal point institutions in Cuba which could overcome the current problems faced in this country.

The issue of broadening the focus of CamBioTec must be discussed in relation to specific activities. Actually, current brokering and information activities do not exclude any sector. But the maintenance of the current, more limited focus in research and policy activities is considered convenient, so to concentrate limited resources.

### Organization

As concluded before, the informal organization of CamBioTec has until now being very useful in the search of an adequate concept and mission. But the institutionalization of CamBioTec, and particularly the development of an independent financial basis, requires a more formal organization. The crucial issue in it will be the governance of the focal points and of the network.

If the focal points will be basically associations of interested parties it is straight forward that its governance should be in the hands of its member organizations, probably through a board and a general assembly of members. The network would be an association of national focal point institutions, and therefore its governance should be these institutions. They could meet periodically to this end or delegate in a board designated by them.

The experience in Latin America and elsewhere shows that it is very difficult of maintaining functioning regional organizations of the kind proposed above, because of the involved costs. This will depend very much on the interest of the national organizations and on the effective use of all opportunities offered by modern communication technologies to overcome these costs.

For a transition period, covered by a possible second phase of the IDRC support, an ad-hoc steering committee, board or advisory committee could take up the governance of the network.

## **Proposal on the future of CamBioTec**

The success of CamBioTec in the more direct promotion of biotechnology, as presented above, shows that currently there is a need for such type of organizations in the Americas. This need will conceivably be more important in the future because of the increasing importance of economic and environmental issues that by definition are hemispheric or global and therefore need effective multinational coordination and communication structures, which currently exist only in a limited way. A structure like the one built up by CamBioTec offers great opportunities to further free trade goals, on the one hand, and address environmental problems and opportunities on the other.

### Vision and mission

In such a favorable regional context, the following vision of CamBioTec is proposed:

Network of small, agile, effective and highly regarded organizations, which are the best informed on national biotech scene, promoting the rapid and efficient incorporation of biotechnologies into national or regional social and economic development strategies

The focal points or its supporting institutions should have the following missions:

- Promotion of biotechnology in country
- Support the development of a favorable legal, regulatory, financial and science policy climate for biotechnology
- Promote the transfer of adequate biotechnologies

### Objectives of a second phase

Given the success of CamBioTec, its current dependence of the IDRC support and its great potential in the future if it institutionalizes adequately, a second phase of IDRC support, designed to help in the transition towards an institutionalized and self-supporting network of national associations is essential. In this respect, a second phase of an IDRC supported CamBioTec project, should have the following objectives:

#### **1. Institutionalize focal points where needed**

- In the case of Argentina integrate CamBioTec closer into the Foro Argentino de Biotecnología, turning it into the technical direction of it.

- In Chile, Colombia and Mexico new organizations, with participation of industry and research organizations, should be created to carry on with the CamBioTec program of work.

- Define a policy for auto-financing the focal points

## **2. Consolidate and expand net-work**

- Formalize a structure and governing body for the network
- Support technically creation of focal points in Brazil and Venezuela
- Create website for CamBioTec linking national websites

## **3. Strengthen basic service capabilities of focal-points**

- Systematize and improve the quality of information on national biotech like:

Directories  
Compendia of regulations, laws, financing opportunities  
Documentary data bases

- Develop skills in brokering of partnerships
- Systematize relations with media to inform on CamBioTec
- Create virtual network of experts in biotechnologies

## **4. Develop capabilities to negotiate cooperative projects**

- Create seed-money fund for design and negotiation of cooperative projects in priority thematic areas for the development of biotechnology in the countries. These funds would permit finance the design and negotiation costs, as well as provide some limited matching funds for the project as such.
- Selected areas will depend on IDRC, national and other agency interest in each country or in the region. Examples are the following:

Socio-economic impact studies  
Public awareness/attitudes on biotechnology  
Harmonization of regulations  
Strengthening of institutional capabilities for overview of biotech  
Sectorial analysis of biotech opportunities  
Policy issues in biodiversity use and conservation

## References

IDRC, Project Summary: Canada-Latin America Initiative on Biotechnology, Environment and Sustainable Development, File #0081, December 1994.

IDRC, Terms of Reference of external evaluation of CamBioTec project, April 1998.



Annex 2

ACTIVITIES CARRIED OUT BY CAMBIOTEC 1995-1997

Activities	ARGENTINA	CANADA	COLOMBIA	CHILE	MEXICO
Seminars/Workshops	4	0	4	1	11
organization					
co-organization	3	3	0	2	finished: 4
Studies					in process: 6
Directories	1	0	0	0	1
survey					
Expert Missions	2	2	0	2	0
Partnering Meetings	0	3	1	0	2
Support to Partnerships	7	10	0	5	34

Sources: Progress reports of focal points in Canada, Chile and Argentina  
 Report "Logros 1995-1997" prepared by General Coordinator of CamBioTec  
 \*Interviews

## ANNEX 1: LIST OF INTERVIEWED PERSONS

### Argentina

#### Industry

Dra. Valentina Carricarte, Chief, Biotechnology Department, GADOR S.A. and Secretary General of Foro Argentino de Biotecnología.

Dr. Juan Carlos Repetto, General Manager. Laboratorios BIOTAY S.A.

Dr. Marcello Criscuolo, Executive Director, BIO SIDUS S.A.

Mr. Jorge Gianbiaggi, President, Sintesis Quimica SAIC

Ms. Maria Marta McCarthy, Manager, Foro Argentino de Biotecnología

#### Government

Ing. Carmen Vicien, Director of Agricultural Production, Secretaria de Agricultura, Ganaderia y Pesca

Ing. Perla Godoy, Technical Secretary of CONABIA

#### Research

Dr. Eduardo Charreau, Director of Instituto de Biología y Medicina Experimental, CONICET

Dr. Eduardo Palma, Coordinator, Advanced Biotechnology Program, INTA

Dr. Eduardo Trigo, Executive Director, Fundacion ArgenInta

#### CamBioTec

Drs. Juan Dellacha and Juan Carlos Carullo

### Canada

#### Industry

Dr. Peter McCann, President, Ag-West Biotech

Mr. John Cross, President, Philom Bios

Ms. Joyce Groot, President, BIOTECCanada

Mr. Rick Walters, Vice-President, BIOTECCanada

Dr. Paul Kolodziejczyk, Head, POS Corp.

#### Government

Dr. John Jaworski, Senior Industry Development Officer, Industry Canada

Dr. Terry McIntyre, Head, Biotechnology Advancement Program, Environment Canada  
Ms. Margaret Kenny, Associate Director, Biotechnology Coordination Office,  
Agriculture and Agri-Food Canada  
Mr. Bernard Badani, Deputy Director, Grain & Oilseeds Division, AAFC  
Dr. Paul Mayers, Head, Office of Food Biotechnology, Health Canada  
Ms. Karen McIntyre, Office of Food Biotechnology, Health Canada  
Ms. Andre Potvin, CIDA

#### Research

Dr. Charles Davis, University of New Brunswick

#### CamBioTec and IDRC

Dr. Bill Edwardson, IDRC  
Dr. Brent Herbert-Copley, IDRC  
Mr. Carlos Yuste, IDRC  
Dr. Scott Tiffin, IDRC  
Dr. Javier Verastegui, CamBioTec

### **Chile**

#### Industry

Dr. Arturo Yudelevich, Vice-President, BIOS CHILE  
Dr. Eduardo Bitran, General Manager, Fundacion Chile  
Ms. Lidia Vidal, Manager, Marine Resources, Fundacion Chile  
Dr. Pablo Valenzuela, President, BIOS CHILE  
Ms. Loreto Gardeweg, Manager, Laboratorios Linsan  
Mr. Manuel Bacigalupo, General Manager, Semillas SNA

#### Government

Dr. Ramiro Trucco, Director of Regional Cooperation, CIDA  
Dr. Mauricio Sarrazin, President, CONICYT  
Ms. Ximena Gomez, Director, International Relations, CONICYT  
Mr. Eduardo Santibañez, FONDEF  
Mr. Christian Gonzalez, FONTEC  
Dr. Carlos Piña, Coordinator, International Relations, CONAMA  
Ing. Carmen Cabrera, Chief of Department, SAG

#### Research

Dr. Carlos Muñoz, General Director, INIA

Dr. Juan Izquierdo, Coordinator REDBIO, FAO

CamBioTec

Dr. Lionel Gil and Mr. Carlos Irrarrazabal

**Colombia**

Industry

Dra. Miriam Sanchez, Director, Corporacion BIOTEC  
Mr. Francisco Ramirez, Manager, Productos VITA  
Mr. Mauricio Lleras, General Director, MERISTEMOS  
Dr. Francisco Palacios, Manager R&D, Coltabacos  
Dr. Gabriel Cadena, Director, CENICAFE

Government

Dra. Elizabeth Hodson, Chief, National Biotechnology Program, Colciencias  
Dr. Jorge Ahumada, General Director, Colciencias

Research

Dr. Gustavo Buitrago, Director, Instituto de Biotecnologia, Universidad Nacional  
Dr. Luis Alejandro Barrera, Director of Postgraduate Studies, Universidad Javeriana  
Dr. Andres Laignelet, Manager, Plant Biotechnology Program, CorpoICA

CamBioTec

Dra. Marta Emilia Rueda

**Mexico**

Industry

Dr. Alejandro Gallegos, President, Biogenetica Mexicana  
Ing. Alejandro Romero, General Director, IASA  
Ing. Luis Medina, General Director, PROQUISA

Government

Dr. Eduardo Benitez, Director, Seed Department, SAGAR  
Dr. Jaime Martuscelli, Director Adjunto, CONACYT



Ing. Marco Antonio Coter, Subdirector Plant Health, SAGAR  
Dr. Victor Villalobos, Subsecretario, SEMARNAP

Research

Dra. Suzanna Aspiroz, Chief of Biotechnology Laboratory, INIFAP  
Dr. Jorge Kondo, Executive Director, INIFAP  
Dr. Rodolfo Quintero. UNAM

CamBioTec

Ms. Rosario Castañon and Dr. Jose Luis Solleiro