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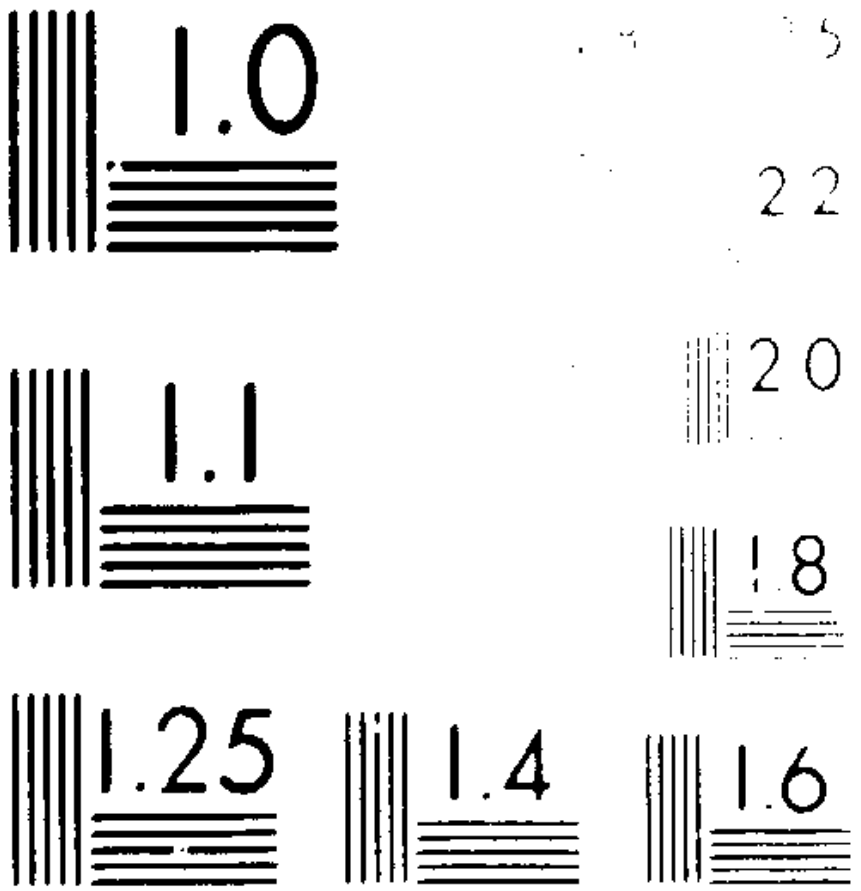
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Mexico. TERMINAL REPORT. (Technological infrastructure)

PROJECT DP/MEX/77/008

11 June 1979 - 31 December 1981

Jorge Gilgun
CTA Post 11-01

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PROJECT DP/MEX/77/008

TERMINAL REPORT

Introduction

1. The project document, approved towards the end of 1978, was designed to promote and to improve technological development and innovation through assistance to 4 Regional Technology Centres (CRIATS). With the concurrence of all concerned - The Government, UNDP and UNIDO - the project changed its orientation twice but without modifying the original document except for periodic revisions of the budget. During the last 14 months of the total 30 months duration, the new approach concentrated almost all the project inputs on CONACYT (The National Council for Science and Technology) which is the guiding and supporting authority for the CRIATS and other institutions, in order to strengthen the technological infrastructure of Mexico rather than assisting a few individual centres only. The basic development objectives have not been affected; the present programme, whose underlying philosophy has been preserved for the already approved 4-years extension of the project, offers an improved method for reaching these objectives.

2. About 10 months before the end of this project CONACYT obtained a 50 million US Dollar loan from the Interamerican Development Bank (BID) with a similar contribution by the Government. These funds are to be exercised over a few years and serve mostly to improve the scientific and

technological infrastructure and to increase the R + D capability and activities in the country. An effort was made, therefore, to seek a coordination and complementation of the combined resources of the BID loan and the project, which was amply reflected in project activities (and in the new project document prepared for the extension).

The Objectives and the logic of the Project

3. The development objective, namely: improvement of economic and social conditions in selected areas by promoting technological development and innovation in local industry, remained as a broad target during the implementation. A change in formulation or in emphasis regarding specific or immediate objectives promised a wider scope and benefits to many more institutions than the 4 CRIATs originally envisaged (CIATEJ, Guadalajara; CIATEG, León; CIATECH, Chihuahua; CIATEQ, Querétaro;) From developing and expanding the capabilities of the 4 centres to do more and better work and give improved and increased services to industry the immediate objectives were redefined as assisting CONACYT in establishing and strengthening the conditions and the proper functions, fully expecting that all the centres and other institutions supported in any way by CONACYT would benefit. For this latter purpose specific inputs were also provided directly to institutions through advice, orientation and some sectorial experts.

4. The rationale for the original approach as well as for the subsequent modification was the following: The project was designed to assist 4 existing regional technological institutions because of their particular character, possibly keeping in mind the pilot value of this type of institution. Then it became apparent that these centres were only a part of the general institutional infrastructure which needed strengthening. This, together with a policy change by CONACYT leaning towards sectorial centres rather than regional, multi-sector institutions, brought about the above mentioned change in approach.

5. The foregoing explanations are necessary in order to understand the difficulties a formal evaluation and comparison against targets and schedules would have to meet. Many of the "old" immediate objectives have been reached. Most of the redefined objectives are now, at the end of this project, being approached. (This justifies the extension for 4 years already incorporated in the III. Country Programme 1982-1986. The corresponding project document is nearing completion.)

Activities Carried Out; Their Outputs

6. Major project activities are listed as follows:

a) Experts (total approximately 98 man/months implementation plus 12 man/months preparatory assistance. 27 assignments have been carried out by 21 individuals).

During the first part of the project, activities were mostly oriented towards the CRIATs with occasional assistance provided to CONACYT. During the second part the experts worked with CONACYT - with the exception of 2 metalworking specialists engaged directly for CIATEQ -

assisting now and then individual centres, not only CRIATs, in specific problems or aspects.

* Assistance and orientation for the clothing department of CIATEJ in design. (5 weeks) Results: increased design capabilities; better contacts abroad; more systematic activities; recommendations for training on this field and for structural and functional improvements of the department; seminars.
* Survey of work programmes and proposed R + D activities of CIATEG (tanning and footwear). (2 weeks) Results: recommendations for improvement.
* Assistance to CIATEG, especially in their laboratory and pilot plant work. (10 weeks) Results: improved laboratory techniques; a new programme for the pilot plant; more contacts with industry and higher standing of the centre because of advice and services given by expert; seminars.
* Assistance to CIATEQ (analysis, advice and orientation). (4 months) Results: diagnosis of potential and limitations; recommendation for programmes, activities and services.
* Study of markets for institutional services to industry for CIATEJ. (1 x 2 plus 1 x 3 months) Results: identification of receptive sectors and of their demands for services.
* Advice and orientation to CIATEQ on planning and establishing services for the metalworking industry. (4 months) Results: detailed report with specific recommendations.

* Methodologies and practice regarding market research, marketing of services and application of research results for institutions CIATEJ, CIATECH, CIATEQ and CONACYT. (3 months) Results: extensive report.
* Advice and orientation for CIATEQ in the foundry sector. (1 month) Results: seminars; diagnosis of the state of the foundry sector; some problems solving; recommendations for resources to be acquired by CIATEQ.
* Diagnosis and recommendations in the field of industrial information for CIATEJ, CIATECH and CIATEG (2x). (4x2 weeks) Results: diagnoses made and recommendations given.
* Assistance to CONACYT in planning and programming (2 months). Results: report dealing mainly with planning and setting-up institutions.
* Assistance to CONACYT in systematic planning of manpower development. (2 months) Results: report on the state of the art as applicable to Mexico and transmission of methodologies.
* Orientation for CONACYT on scientific and technological infrastructure and policies. (2 weeks) Results: seminar and report.
* Assistance in the establishment and strengthening of information services within institutions. (4 months) Results: policy guidance to CONACYT; evaluation and advice regarding existing services, their resources, work methods, services and development plans and projects; seminars; outline of short course to train information officers.

* Assistance in the evaluation of infrastructural and applied research projects and in the development of criteria and methods for evaluation (3 months) Results: analysis of evaluation systems and procedures; preparation of forms for presentation of projects for support and for evaluation; a first evaluation model for future use.
* Analysis of the state of technology in the metalworking sector and assistance to CONACYT in the evaluation and development of its policies and its support systems. (5 months) Results: evaluation of specific project proposals;assessment of technological institutions and services; suggestions and recommendations regarding CONACYT's policies and procedures.
* Assistance to CIATEQ in the field of machining. (2 months) Results: report including observations, analyses and some recommendations; proposed structure of CIATEQ; proposed listing of bibliographical material; trouble-shooting activities for enterprises.
* Assistance to CIATEQ in the field of heat treatment. (2 months) Results: problem solving for enterprises; seminars; advice on development plans and on technical personnel; list of bibliographical material.
* Assistance to CONACYT in preparing and conducting courses related to technological development and its management; in formulating strategies for R + D; and in evaluation of CONACYT's Shared Risk Programme. (9 1/2 months) Results: a four months (2 days/week) course; seminars; evaluation of related projects; suggestions and recommendations regarding functions and operations of CONACYT.

* Assistance to CONACYT in the planning, establishment and/or development of technological centres for the metalworking industry; and participation in CONACYT's plans and programmes for developing this sector. (3 1/2 months) Results: programme for increasing the design capacity for capital goods; analytical diagnosis of the metalworking sector; assessment of institutions related to this sector; recommendations related particularly to the establishment of design groups.
* Analytical review of the agroindustrial (food) sector; and orientation of CONACYT activities and programmes in this area. (3 1/2 months) Results: report containing intended review and conclusions; assessment of technological centres and their activities and proposed improvements; recommendations on the planned "Indicative Programme" for agroindustry (food).
* Assistance to CONACYT in matters related to the administration of projects and programmes, especially concerning the activities of CONACYT and the systems used. (5 months) Results: new format for the presentation of projects by institutions; a modified follow-up system and newly designed forms for that purpose; seminars; evaluations of specific projects; some guidelines for evaluation.
* Formulations of guidelines for follow-up of projects by CONACYT. (2 months) Results: guidelines; recommendations for operational steps; forms.

b) Training Activities (2 fellowships and 2 study tours).

* Fellowship for a chemist from CIATEG in Argentina to take a course in Quality Control for leather and to learn specific analytical methods.
* Fellowship for an industrial engineer from CIATEJ in Brasil to learn from their training systems how to organize courses and to up-grade the level of operators and supervisors in the footwear industry.
* Study tour of the National Director of the Project DP/MEX/77/008, Ing. Jaime Parada Avila (Director of Promotion and Coordination of Technological Centres, CONACYT) to similar and related institutions in Europe.
* Study tour of the Associate Director of Technological Research (Department of Technological Development, CONACYT), Ing. Efrén Parada Arias (no kin) to European institutions in the field of Food Technology and related R + D.

c) Equipment

* Laboratory instruments (gas chromatograph and infra red spectrophotometer) have been provided to CIATEG to facilitate their laboratory work for the tanning and footwear industry (and ocassionally for other industries) and to promote their R + D activities.
* Equipment for the Clothing Department of CIATEJ to enable them to carry out training activities in that area, to produce models and prototypes and to increase their testing and consultancy work.
* Equipment for the jewellery Department of CIATEJ mainly for their training activities.

7. Above project activities during the first part of the implementation were following the original work plan. Then new elements (mentioned in paragraphs 3. and 4.) were guiding the rather ad-hoc programme, considering more the urgency of certain problems and situations than the long term importance of approaching the objectives. During the last 10 months, again, the implementations followed a rational and more or less stable plan and schedule.

8. The implementation of the project was greatly facilitated by the active interest, openmindedness and cooperation shown by the National Director of the project. It provided a good working atmosphere and facilitated the gradual development of the necessary awareness e.g. of the need for systematic planning and programming, for the proper role to be played by information, for improved internal structures, administration and follow-up procedures and for better defined objectives and functions. These were visible and, in part, measurable results of the project. Another favorable factor was the good team work among the experts. During the latter part of the implementation the fact that the new orientation helped to define the project in various aspects contributed to a smoother execution.

9. On the other hand, objective circumstances and factors produced some difficulties:

a) The original concept for the project had to be reexamined and somewhat modified;

b) The conditions given in the original project document were sometimes divorced from reality;

Most of these deficiences have improved during the second half of the project period.

Achievement of Immediate Objectives

10. The extent to which the objectives have been reached cannot be evaluated unequivocally as already indicated (see paragraph 1. and 3.). The budget was revised several times and with it budget lines have been suspended, cancelled, postponed and (re) introduced. This was due mostly to the shifting project orientation. While in the beginning the experts looked for, the equipment procured and the scant training activities foreseen were designed to improve capabilities of the 4 centres covered by the project, the important inputs during the last 15 months were provided to CONACYT in order to strengthen its own and the national technological infraestructure (see paragraphs 6. and 3.).

11. Some CRIATS have tangibly increased or improved their services to industry. Examples:

* CIATEJ has entered new areas with engineering consultancies and with laboratory testing and is preparing additional ones.
* CIATEG has improved its pilot plant (tanning) operations, has begun research activities and increased the scope and the quality of its laboratory testing.
* CIATEQ has delivered engineering and design consultancies and is acquiring more contracts. In addition, it is mounting its information services to industry.

12. The presence and activities of the experts was useful for some national directive and technical staff. In CONACYT exists now a better knowledge and understanding of the scope and the potential of international technical assistance. The exposure to the project personnel has also led to an amplification and clarification of concepts and criteria in the area of technological development and related fields.

13. The experts often visited institutions and thus , and through other contacts, got to know them. As a by-product, marginal from the intention point of view during the second half of the project but quite effective sometimes, various centres and departments were directly advised on specific problems and aspects of their structure, plans, projects and operations. In some cases a diagnosis was made (see paragraph 6.a.) and influenced changes already introduced or still being contemplated.

14. The most important improvements related to the immediate project objectives are in the area of attitudes and awareness. There is no controversy regarding the need for establishing clearly identified objectives, priorities and programmes; for defining demand (for services) by industry; for developing proper structures and functions; for increasing their own capabilities and for strengthening their services. It is also realized that in most cases the present personnel is not sufficient in number and preparation and steps have been, and still are being, taken to deal with the problem. In one CRIAT a new director general took office in May 1981. In another, a new technical director has been added; recently, its director general has resigned. In most CRIATS there are now full time officers responsible for manpower develpment.

15. With the change of orientation toward improving the national infrastructure for technological development rather than assisting individual centres the assessment of achieving objectives becomes more difficult. These modified (more by emphasis than by changing the essence) objectives have not been spelled out in detail. The main purpose of each activity was to strengthen one or the other aspect of the national technological infrastructure and tc assist CONCACYT in coping with the considerable increase of projects presented for support (the Interamerican Development Bank loan) and in its preparation for the future administration and follow-up of these projects and programmes. This should, and does, envolve some structural and functional adjustments within CONACYT, especially the Department of Technological Development (and to a certain extent, the one of Scientific Development).

The experts did, upon request, advise on these aspects, but their main contribution was directed towards specific planning aspects and implementation steps (information; institutional support; specific manpower formation; evaluation and follow-up techniques etc.). These were the immediate objectives formulated by the counterpart; all of them heve been approached during the reported period and are on the way to being achieved. Recognizing this, an extension of the project has been already approved in the III Country Programme, and the objectives will continue to be pursued.

16. Examples of achievements:

* The evaluation of project proposals has been systematized and tentative forms for pre-evaluation and evaluation of projects and for the follow-up of their execution are already in use. If experience indicates the need, the forms will be modified, with the assistance of UNIDO experts.

* CONACYT planned, and is now organizing the implementation of, programmes for a) a comprehensive short and medium range training of information officers at various levels and b) promotion and support of information services within technological centers. UNIDO has provided guidance, advice and drafts of policy and project papers and will continue to assist CONACYT in starting and monitoring these activities during the implementation of the extended project.

* A number of technological institutions and their services to industry have been assessed, mainly in the area of metalworking, design and food technology. Recommendations offered for policies and procedures for

improvements are being seriously discussed and will be, hopefully, applied. A new initiative, suggested and worked out by UNIDO experts, for the creation of Design Groups, has resulted in project proposals by centres supported by CONACYT and are being evaluated for early implementation.

* With the assistance of UNIDO experts and with a permanent full-time counterpart, an extended course for the Management of Technology was organized by CONACYT. The results seem to justify similar courses, at least two in 1982, as a part of a very ambitious programme for advancing the whole complex of administration of technology. This programme includes the courses and seminars, as well as consultancies to enterprises and institutions and research in this field. It is intended to envolve other Latinamerican countries and UNIDO expressed already its interest in internationalizing these endeavours by granting 5 fellowships outside of the project budget.

Utilization of Project Results

17. Some such applications have been already mentioned in former paragraphs dealing with achievements of immediate objectives. The very consideration of objectives achieved implies a certain degree of utilization. The development objective, by its very nature, could not be actually reached; this has been initiated by a still ongoing process which is expected to advance the objectives further during the implementation of the extended project over the next four years (1982-1985).

18. Nevertheless, specific aspects of project activities and of their results have been applied or used; others are under discussion, or their utilization is being prepared. Changes in attitudes and approaches (paragraph 14.) and clearer ideas and concepts reflect, perhaps the most important, applications of this kind. More tangible cases of utilization include (repeting some parts of paragraphs 6, 11, 13 and 16):

* The new, expanded and diversified work programme of CIATEJ, which now comprises a build-up of laboratory facilities, an up-grading of engineering and consultancy services and coverage of several new industrial sectors, as a direct result of a market study carried out as project activity with precisely this intention.

* More active interest and actual establishment and improvement of information activities within centres based on diagnoses made and advice given as part of the project activities.

* A training programme for information officers now being planned and organized by CONACYT together with INFOTEC and the i[illegible] of appropriate budget lines in the new project document to e[illegible] the availability of information experts to monitor this programme and to advise CONACYT (on promotion and support policies and programmes) and individual centres on practical planning and implementation of their own services; both based on draft projects, position papers and advice prepared as part of the project activities.

* The problem of the management of technological development and the administration of technology comprising: systematic training of manpower at all necessary levels through courses and seminars (already and

being organized); consultancies to enterprises and institutions; and research in the area of administration and management of technology (in the planning stage) has now been comprehensively approached.

* The participants in the Administration of Technology course have returned to their respective institutions and companies applying the knowledge acquired and the course itself has been now institutionalized.

* Project originated forms and instructions for evaluation of requests for support and for the follow-up and monitoring of the implementation are in use in CONACYT; other such methodologies are being studied.

* For the Shared Risk programme suggestions for the follow-up of projects have been implemented and are being applied; the respective contracts have been modified thus improving the programme.

* Two fellowships given for training in a) laboratory technigues (CIATEG) and b) in special manpower training systems in the footwear industry (CIATEJ and CIATEG) have resulted in improvements of testing methods and facilities and in applying new concepts for the planning and organizations of training courses.

* The equipment provided by the project has been immediately used (see paragraph 6.c).

19. Many of the proposals made and much of the advice and orientation given during the project implementation were of the kind which often needs sometime to sink in and to prove their feasibility and usefulness. Some of the project activities became obsolete before, or even while, the results were being applied, either because of changed orientations or priorities and sometimes due to more urgent needs.

20. An example of the first case (delayed impact) are the 2 study tours made by the National Director of the project and by the Assistant Director of Technological Research (both of CONACYT). The former has acquired a wide overview of technological institutions and learned more about their functioning and problems (and how they succeeded in solving those, if at all). He developed a new approach to local institutions and could better decide about possibilities to establish such institutions or not. He also was able to put in direct contact similar or complementary institutions in Mexico and abroad. The latter established personal contacts abroad and set up a number of cooperation agreements in principle between specialized institution in the area of food technology and research and a Mexican institute to be created now. He also will be in better conditions to eliminate, or solve conveniently, many problems encountered by the foreign institutions during their early stages.

21. Some of the results coming out of the project activities could not be applied and remain latent. The increase of clothing design capabilities, for instance, will have some effect when the professionals envolved, now working outside of CIATEJ, apply their new potential. The expertise in training methodologies will eventually be reflected in various training activities at all levels. Diagnoses made for structures, functions and operations of institutions have identified deficiencies and indicated possible solutions to problems; as of now the practical, measurable effects are small, although visible, but eventually these identifications will contribute to the improvement of institutions. In any case, directly or indirectly, these results, as the foregoing, promote the technological development.

22. Another example of what sometimes happens in this respect is the case of equipment purchased for the Jewelry Department of CIATEJ meant for better training of personnel and for the production of jewelry according to original designs. The equipment was delivered in summer of 1980; the department has been closed down recently because of lack of support by authorities and by industry and the equipment, after intensive use, now lies idle.

23. Paragraphs 19 - 21 mention project results not used (anymore) and not likely to be used, together with some of the reasons for the lack of application. Main factors affecting the proper use of project outputs are stated in paragraph 9.d) and 9.e). Perhaps the most important obstacle in this respect is insufficient manpower (in numbers and/or qualifications) available to the counterparts. In most of the centres and institutions it is critical, although some significant improvements are clearly apparent, especially at CIATEJ and CIATEQ. The awareness of the problem and of its seriousness is growing.

Conclusions

24. The following conclusions are drawn as a result of having participated in the implementation of the project. Some of them refer to specifics of this particular project; others to technical assistance in this country in general with possible relevancy to other countries.

25. The project document, originally formulated with a different programme and other operational counterparts in mind did not sufficiently define inmediate objetives and activities. For actual application, the work programme and budget were not realistic and required improvisations. Nevertheless, these difficultied improved with the implementation.

26. Above shortcoming can be obviated by paying close attention to actual conditions and evolving clear ideas about feasibilities. More difficult to solve is another problem, namely the expected government inputs. They are specifies in quantity and by and large provided more or less in time.

27. Some dicisions are based on political rather than on purely technical considerations. Suggestions and proposals by experts regarding aims, activities or modifications have to be formulated accordingly, keeping in mind the political appeal which would make them acceptable and further their effectiveness. This did not change substantially the project results.

28. Apparently - as happens in other projects - conditions and possibilities for implementation have not been sufficiently analyzed prior to the formulation of the project document. In some instances is seemed as if there was no clear understanding or full agreement during the first stage of the project between the counterpart the personnel of the centres and the UN experts regarding certain purposes and objectives, the means to reach them and the feasibility uf using theses means or of applying the results in view of the available resources. Many of theses diffi-

culties were overcome during the project implementation.

29. The new approach to the project adopted for the second phase seems more appropriate than the original one. The UN assistance could be more effective and oriented towards the formulation of plans, policies, strategies and programmes rather than towards an operational level. This should be taken into consideration for future projects, keeping in mind that the UN contribution should be of an intellectual character rather than operational.

Recommendations

30. The observations made in paragraphs 24 - 31, together with others not explicitly expressed, are the basis for the following recommendations concerning future approaches, attitudes and steps to be adopted in order to consolidate and utilize better results obtained so far and, perhaps more important, to improve the design, formulation and implementation of technical assistance project.

31. Project documents should be prepared with more attention to the real conditions and with a clear idea of what can be done (and how) and what not (and why). To this effect, a preparatory assistance going into all major or fundamental aspects of the programme components and carried out or, at least, monitored by responsible and knowledgeable people should be made mandatory before a project or a serious modification is finally approved. In our case the implementation of the extended project is just being organized and there would be time to try such a "feasibility study".

32. Objectives, programmes and activities stated in the project should, in full understanding and agreement by the counterpart, conform to existing conditions and especially resources, above all human resources. Should these not be available but necessary for objectives or activities recognized as

important, the creation or formation of such resources must be absolutely ensured, either within the project, allowing for adequate time and budgets, or outside.

- The main project inputs should be of an intellectual nature and oriented towards developing an appropriate climate enabling the experts and consultants to function as such and to participate, with advice, in the processes of planning and decisionmaking. An agreement at the highest level of the counterpart institution about the necessity for central planning of activities, programmes and functions expected from the project, prior to and during the implementation, would be very useful. In such an atypical case as the present project the assistance should produce mainly definitions, diagnoses, strategies, policies, plans and programmes and only to a lesser extent - perhaps 10 - 20% - operational improvements. (As originally designed the project was supposed to assist specific technological centres and the proportion would have been, and was during the first part, inverse.)

- A propitious climate for the proper functioning of experts could possibly be created by defining, in full agreement with the counterpart, formally and explicitly their role: advice, orientation, transmission of knowledge and experience, establishment of adaptation of methodologies and techniques and participation in deciding, planning and initial organization of activities in order to demonstrate how it is to be done so that others may be able to continue.

- Project inputs should be designed for possible coordination with, and complementation of, existing or planned national programmes and sources of funding.

- Government inputs, with a great emphasis on specific counterparts at all levels (including adequate support personnel), should be thoroughly specified and their delivery insisted upon, even though it may create some misgivings.

- At a higher policy level, training functions and responsibilities, taken out of this (extended) project (the Government requested officially to eliminate the training, equipment and support personnel component from the III country Programme), should be reinstated and duly emphasized.

A N N E X

Experts
(Name and duration of mission)

11-03	M. Cowell	5 weeks	Expert in clothing design
11-06/A	W.A. Vos	2 weeks	Expert in the field of tanning and leather production
11-06/B	B. Lunden	10 weeks	Tanning expert and shoe manufacturing
11-13/A	S. Musa	4 months	Industrial engineer
17-00	R. Michel	3 months	Jalisco market study
17-00	J. Chapoy	2 months	Jalisco market study
17-03	M. Rucker	4 months	Industrial engineer
11-17	F.M. Machado	3 months	Expert in researching markets for institutional assistance and services
11-13/D	S. Morawski	1 month	Expert in ferrous foundry
	J.L. Villar	2 weeks	Industrial information
	J.L. Villar	2 weeks	Industrial information
	J.L. Villar	2 weeks	Industrial information
	J.L. Villar	2 weeks	Industrial information
11-12	A.R. Apodaca	2 months	Expert in planning and programming
11-10	C. Kollmannsperger	2 months	Expert in training programmes and methodologies
11-53	J. Sabato	2 weeks	Expert in technological infrastructure and policies
11-11	E. Martindale	4 months	Information expert
11-21	A. Castaños	3 months	Expert in project evaluation
11-13/H	R. Truffello	5 months	Metalworking expert
11-18	F.M. Machado (II)	9.5 months	Expert in promotion of technological research
11-19	A. Castaños (II)	5 months	Expert in administration of projects and programmes
11-13/B	N. Tijonov	2 months	Expert in machining
11-13/C	M. Miladinovic	2 months	Expert in thermal treatment
17-00	M. Rucker (II)	2 months	Industrial engineering
11-13/H	E. Benado	3.5 months	Metalworking expert
11-09	U. Antinori	3.5 months	Expert in agroindustries
11-01	J. Gilgun	30.5 months	Chief Technical Adviser