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Department of Forest Mensuration and Management

FORESTRY AND FOREST INDUSTRIES DEVELOPMENT PLAN
IN THE STATE OF GUERRERO, MEXICO

Final Project Report

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Table of Contents

1.	BACKGROUND	3
2.	OBJECTIVES	3
	2.1. Development Objectives	3
	2.2. Immediate Objectives	4
3.	PROJECT SCOPE AND PROGRESS OF WORK	5
	3.1. Project Components	5
	3.2. National Framework	6
	3.3. Background Studies	8
	3.4. Prefeasibility Studies	9
	3.5. Feasibility Studies	9
	3.6. Pilot Projects	11
	3.7. Other Projects	11
	3.8. Plan Integration	12
	3.9. Project Training Activities	13
4.	PROJECT TIME-SCHEDULE	14
5.	EVALUATION OF THE PROJECT	18
	5.1. Objectives and Their Achievement	18
	5.2. Problems	19
	5.3. Organization	20
	5.4. Time-Schedule	21
	5.5. Impact on Project Parties	21
6.	PENDING ACTIVITIES	23

1. BACKGROUND

In July 1982 the Governments of Mexico and Finland signed an agreement to prepare jointly a development plan for forestry and forest industries in the state of Guerrero. The executing agencies were Subsecretaria Forestal (SF) of Secretaria de Agricultura y Recursos Hidraulicos (SARH) and the University of Helsinki, Department of Forest Mensuration and Management.

This report explains briefly the objectives and the main components of the project and the various activities carried out during the project from July 1982 to December 1985 containing general evaluation of the project.

Guerrero is one of the poorest and least developed states in Mexico. Forestry is believed to have an important development potential in Guerrero because of the existing resources which still remain largely unutilized. On the other hand, the difficult physical and social conditions represent obstacles which have not been easy to overcome and therefore a detailed planning effort throughout the project at hand was justified to improve the forestry sector's performance in Guerrero.

2. OBJECTIVES

2.1. Development Objectives

The development plan of the Guerrero forestry sector was aimed at contributing to the achievement of the following main development objectives:

- (1) increasing sectoral production thereby diversifying the State's economy which heavily relies on two main activities, agriculture and tourism;
- (2) improving the social and economic conditions of the rural population in Guerrero, including disposable income, employment, infrastructure, the availability and standard of social services, etc.;

- (3) improving the State's environmental conditions as increased forestry activities would reduce rate of deforestation and forest degradation, and result in better watershed management and amelioration in the living conditions of forest fauna.

The planned activities were also congruent with the following national development objectives:¹⁾

- recover the nation's capacity
- satisfy the basic needs of the population (notably housing and firewood)
- generate employment and improve the quality of human resources
- improve distribution of income by social classes and regions
- decentralize economic and social activities.

2.2. Immediate Objectives

The main purpose of the project was to prepare a development plan for the forestry sector in Guerrero which would

- (1) define the qualitative and quantitative objectives;
- (2) specify activities, inputs and outputs in order to reach these objectives; this would include material, human and other aspects;
- (3) identify, appraise and prepare industrial and other projects which would be implemented during the plan period;
- (4) make recommendations how public forest administration and other related regulating and acting bodies could contribute to the achievement of the plan objectives including the organization Forestal Vicente Guerrero (FOVIG);
- (5) evaluate the effects of the plan at state and national level with regard to economic, social and environmental aspects; and
- (6) suggest measures to finance the various activities.

1) Plan Nacional de Desarrollo 1983-1988. Secretaria de Programacion y Presupuesto. Mexico 1983.

The preparation of the Guerrero development plan was a pilot project which can serve as a basis for similar efforts in the other states of Mexico.

The project also aimed at considerable transfer of know-how from Finland to Mexico through

- the introduction and application of integrated planning of forestry and forest industries, including various analytic methods to be applied in forest inventories, management plans, project appraisal, etc.;
- training of Mexican key specialists;
- the provision of technical expert services to SARH and FOVIG; and
- exchange of research and development information and experience.

3. PROJECT SCOPE AND PROGRESS OF WORK

3.1. Project Components

The preparation of the Guerrero forestry development plan was based on a study of the national framework of the sector, i.e. a long-term outlook of demand and supply trends and related geographical aspects. No comprehensive national development plan of forestry and forest industries exists as yet and therefore the framework study was deemed necessary to put development in Guerrero into perspective.

Based on the national framework, the overall objectives were derived for Guerrero. Having decided these objectives, a series of background studies was carried out together with a number of technical supporting activities. Then a number of industrial projects were identified for prefeasibility studies while the work continued on various forestry aspects.

Pilot projects were formulated to study the development alternatives and preparation of integrated forest management plan at ejidal level, and projects for industrial feasibility

studies were identified. A forest inventory and management plan at regional level was also included in the work programme. The work continued on other development aspects, e.g. forestry training.

When these efforts had been completed, the various project components were integrated into a comprehensive development plan and plan effects were evaluated. The implementation of the planned activities started in 1985.

The project components are summarized in Figure 1.

3.2. National Framework

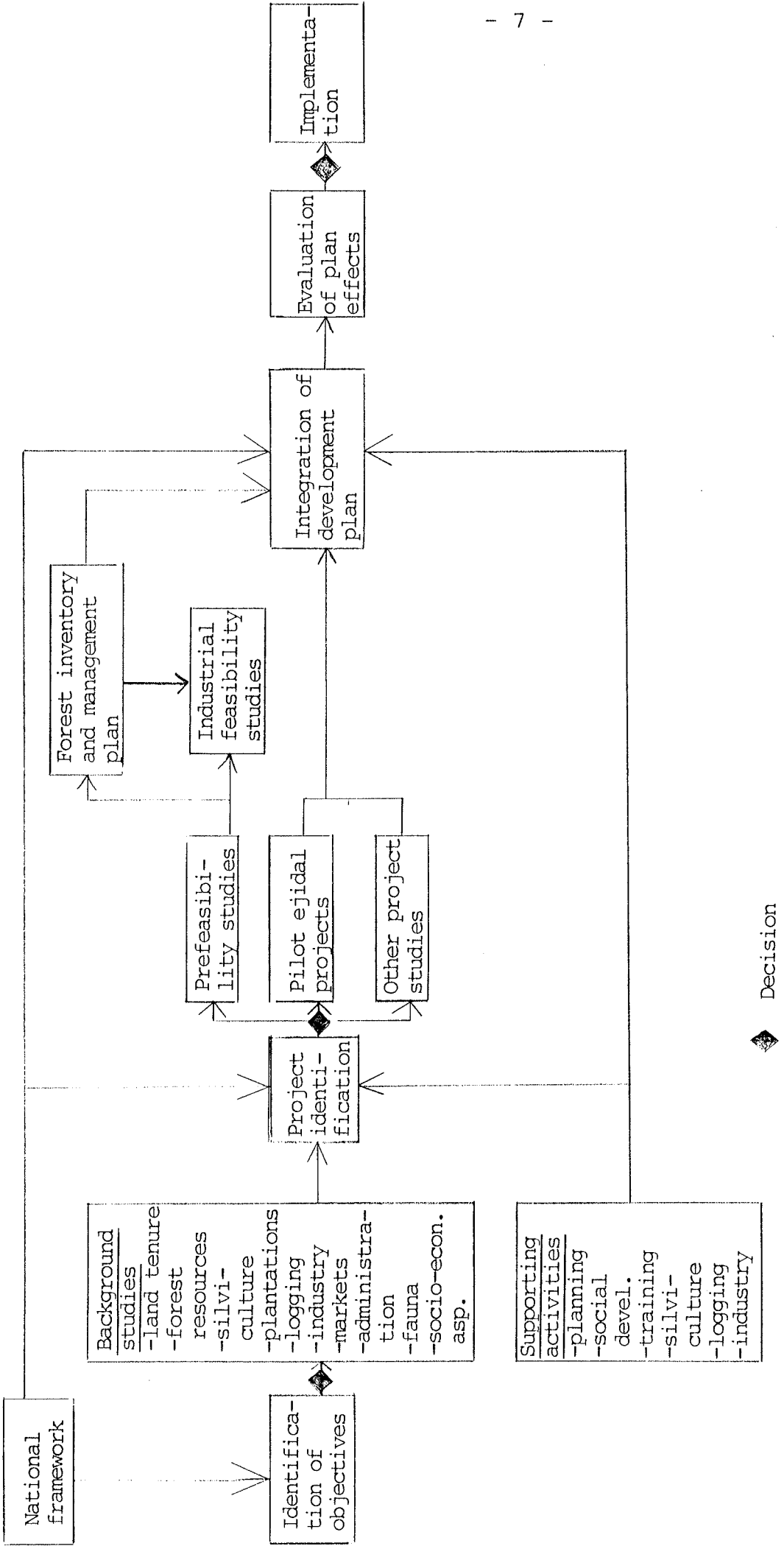
The objectives of the study of National Framework were to prepare a long-term (up to year 2000) demand and supply outlook for individual forest products at regional level; to study other input needs of the industry than wood (non-wood fibers, recycled paper, labour, energy, capital etc.); to study geographical aspects of future capacity development based on demand, supply and cost considerations; and finally to suggest guidelines for national development strategy.

The study was prepared in cooperation between the Dirección General de Programación y Presupuesto of the Subsecretaría Forestal and the University of Helsinki. Because of difficulties in obtaining background data the scope of the study was revised to cover on the supply - demand outlook only.

The most important conclusions of the study were:

- 1) The natural forests of Mexico have a greater production potential than their present production and with intensive forest management, it is possible to increase the production immediately.
- 2) Mexico has a theoretical surplus of the production of large-sized logs of about 22 million m³ (1980).

Figure 1. Project Components - Forestry Sector Development Plan in Guerrero



On the contrary, the deficit of the production of pulpwood is 3.5. million m³. The future demand for pulpwood can only be satisfied with commercial plantations. In the year 2000 Mexico should have 320.000 ha of plantations while the existing area is only 85.000 ha (1982).

- 3) Deforestation caused by socioeconomic reasons and the basic needs for arable land by the rural people is a severe problem for forestry and environmental development. It was estimated that the present area of forest land (41.0 millions of hectares) will decrease to 25.8 millions of hectares in 2010, if action to change this tendency is not taken.
- 4) The principal product of forestry sector is firewood with an annual demand of 20 million m³ which corresponds to 72 % of the total wood demand in Mexico. In the future, the consumption of firewood will gradually decrease because of limitations in production and socioeconomic reasons.

3.3. Background Studies

The objective was to collect and analyze available information on forestry and forest industries in Guerrero including field investigations on such subjects as land tenure, forest resources, silviculture and forest management, plantations, logging and transport, markets, industry and production costs, administration, fauna and socio-economic aspects.

The background studies were carried out by Subsecretaria Forestal. They served in the identification of industrial development projects and the design of measures to improve the efficiency and effectiveness of forestry administration in Guerrero. A series of further studies (land tenure, plantations, silviculture, training, etc.) were also identified and designed at this stage.

3.4. Prefeasibility Studies

The techno-economic viability of seven industrial projects at prefeasibility level were analysed to find the possible solutions for utilization of Guerrero forest resources and in particular, the use of small-diameter logs from thinnings. The purpose was to identify viable forest industry projects for feasibility studies.

The cases studied were an ejido sawmill, a medium-size sawmill, a plywood mill, a particle board mill, a newsprint mill, a market pulp mill and an industrial paper mill.

It was concluded that the sawmills and plywood would warrant feasibility study. The cases of newsprint, market pulp and industrial paper mill at Zacatula at the frontier of Guerrero and Michoacan would not be viable. Furthermore, the mill would have to partly use forest resources in Michoacan but the viability of this option was not possible to be confirmed.

The industrial projects studied did not offer any major solution to the two key forestry problems, the utilization of oak and small-sized softwood logs. Moreover, the available data on forest resources were insufficient for investment decisions.

3.5. Feasibility Studies

The main objective of the feasibility studies was to prepare an integrated plan for the management and utilization of the forest resources in the Costa Grande region. For this purpose a forest inventory was carried out on those resources that were relevant as a raw material base for the proposed industrial units to be studied at feasibility level.

The techno-economic feasibility of a small ejidal sawmill, a medium-size sawmill, a plywood mill and a medium-scale pulp and paper mill were also studied.

A study on the impact of mill size on the economics of mechanical pulp-based paper production and chemical market pulp production in a more suitable location in Guerrero was carried out, and a subsequent feasibility study was prepared. The results of this study also served the formulation of the overall development strategy of pulp and paper industry in Mexico.

As a result of the forestry studies it was noticed that there exists a great need to improve the existing cutting methods and to start intensive management of the forest resources of the region. Still, the use of small-diameter wood from thinnings was a problem.

The Costa Grande zone has a theoretical annual production possibility of about 514.000 m³ which is about seven times the present annual cut. The forest roads leading to the mountain area are in a very poor condition and their density is low in relation to the needs of logging and forest management. This is one of the main bottle necks of forestry development in Guerrero.

The following projects were found viable for industrial implementation: ejido sawmills, a medium-sized sawmill and a medium-sized plywood mill.

The pulp and paper industry was studied at different capacity levels and for alternative products. The only feasible location would be Tecpan de Galeana and an integration with mechanical wood industry was highly recommended in order to benefit from the use of wood residues, joint maintenance services and better energy management.

The profitability of the market pulp production was insufficient in commercial terms but it is possible that it could be justified based on national economic considerations and social development. Moreover, the pulp mill project would enable a change in the current forest management practice into a more intensive one resulting in subsequent increase in sawlog production. However, it appears that the wood supply of the natural

forests would not be sufficient for the pulp mill and plantations would be required. Additional studies would be necessary to promote the project.

3.6. Pilot Projects

The objective was to study various combinations of economic forestry activity at different levels of intensity and participation by local population in an ejido to establish suitable project profiles for financing and to study various socioeconomic aspects of development at grassroot level. For this purpose, a group of twelve Finnish forestry students spent about four months in the ejido Las Compuertas and prepared an integrated forestry development plan for the ejido.

The most important conclusions of the study were: It is imperative to increase the participation of the local population in the production process. Forestry education and training are necessary to increase the interest of the people in forestry and to improve confidence between ejidatarians, the local authorities and the industry. With intensive forest management the production possibilities can be multiplied (from 13.000 m³/year to 39.000 m³/year in the case of Las Compuertas), as well as the rural income from forestry.

3.7. Other Projects

A number of special problems related to forestry development in Guerrero were studied and solutions were suggested. The topics included forest administration, land tenure, social development, training, silviculture and management, logging and transport, fuelwood and charcoal, utilization of oak. These activities were mainly carried out by Subsecretaria Forestal.

During the project period, the clarification of the land tenure situation advanced, improved rural ovens were introduced in villages, permanent sample plots were established and the utilization of Guerrero oak was started by the existing industry.

3.8. Plan Integration

The results of the various studies were incorporated into a comprehensive development plan which specified the present situation, the suggested long-term output targets, investment and training requirements, the suggested rationalization of organization and administration, etc.

According to the study the forest resources of Guerrero are subutilized. The annual allowable cut is 1 million cubic meters of which less than 20 % is cut. The main limitations for increasing the use of the forests are socioeconomic by character. The poor condition and scarcity of the forest roads as well as the old and ineffective existing forest industry are the main physical bottlenecks in developing forestry sector in Guerrero.

The strategy of forestry development in Guerrero is based on finding adequate use for every type of roundwood, establishing sufficient infrastructure and moving into intensive forest management with strong participation by the owners of the forest resources.

According to the plan the investment projects of two small-scale ejidal sawmills, one medium-scale sawmill, and a plywood mill can be realised immediately, but other industrial projects need more detailed studies. Furthermore, the existing mills could be substantially improved by training and minor investments.

All the activities for the development of forestry sector have to be supported by forestry education and training which has been programmed to include about 2000 persons by 1990.

The reorganization and rationalization should begin by the decentralization of FOVIG to Guerrero. Also the definition of responsibility areas between Programa Forestal and FOVIG and their smooth cooperation is necessary in the future. These measures started late 1985.

The plan effects were quantified with regard to main economic and social criteria. It was evaluated that SARH and other involved institutions need an average of MEP 1250 millions annually for the supporting activities in the forestry sector. One justification of the programme is the direct generation of permanent employment for about 3400 people (three times the present amount), six times better income for the rural population than the present level and a positive impact of MEP 10.350 millions to the balance of payment and other positive impacts on the integral rural development and the protection of environment.

3.9. Project Training Activities

The objective of training during the project period was to strenghten the capability of Mexican specialists working in the preparation of the Guerrero development plan in selected skills related to forestry and forest industries.

For this purpose four study groups visited Finland to get acquainted with various solutions related to forestry and forest industry planning, silviculture and forest management, social forest development, forestry administration, and forest education.

Several missions of Finnish specialists were made to Guerrero to give on-the-job training on such aspects as forest inventory, silviculture and forest management, logging and transportation, sawmilling, sectoral and industrial planning.

Moreover, three training events were arranged in Mexico during the project covering logging, integrated forestry planning and preparation of forest management plans. Furthermore, a manual was compiled for the preparation of forest management plans at ejidal level. A computer programme on the evaluation of forestry and forest industry projects was prepared to be regularly used by the Mexican authorities. Project documents were in general designed with the aim of serving as a model for similar studies to be carried out elsewhere in Mexico.

4. PROJECT TIME-SCHEDULE

The project began officially in the year 1982 when the project organization was created and the background studies started. The first meeting of the Coordinating Committee was held in Mexico August 1983. During the project period there was a meeting of the Coordinating Committee or another project coordination mission to Mexico on an average every five months. The general progress of the different studies of the project is presented in Figure 2.

Most of the background studies were completed by Subsecretaria Forestal and delivered in Finland by the end of 1982.

The prefeasibility studies of the forest resources and forest industry were started October 1982 and the reports were delivered both in English and Spanish in March 1983 by the consultant, Jaakko Pöyry International Oy.

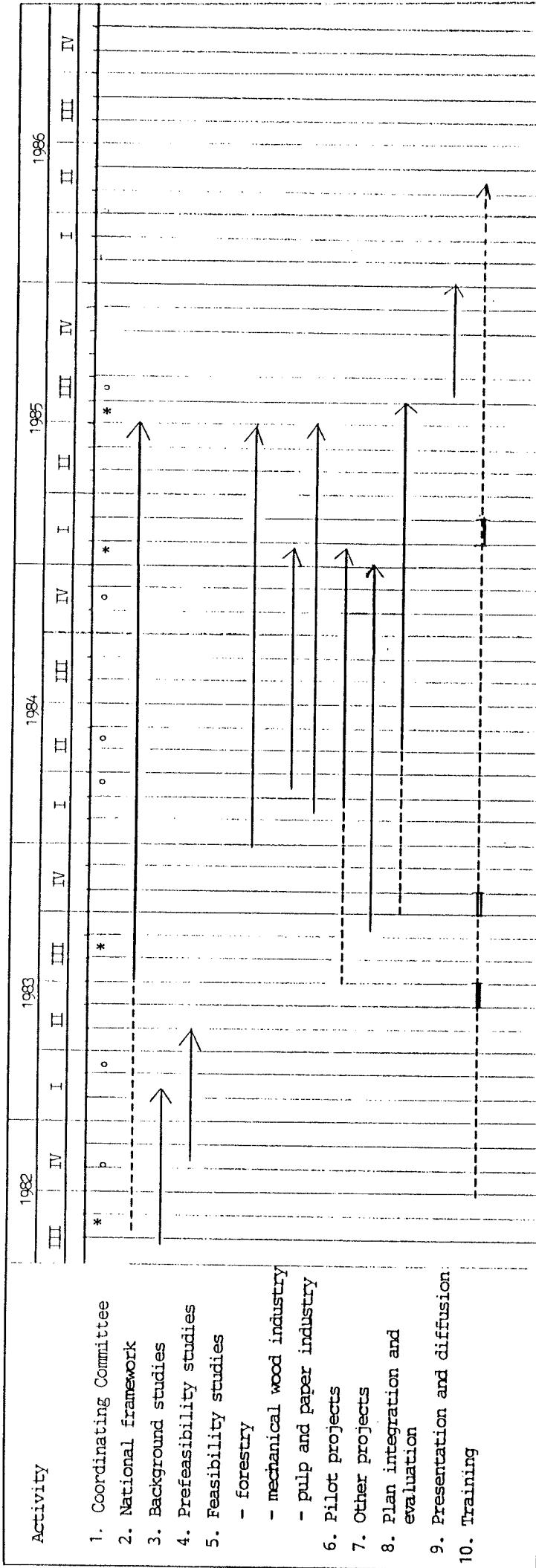
During the year 1983 four training missions of Mexican specialists (totally 13 persons) were carried out to Finland and the two/three week programmes were arranged to each of them by the University of Helsinki. The specialization fields of the groups were:

- Forest management, silviculture, plantations and logging & transport (29 May to 12 June 1983);
- Social forestry development and forestry administration (9 to 30 October 1983);
- Forestry education (9 to 23 October 1983);
- Forestry and forest industries planning (9 to 30 October 1983).

The formal training events in Mexico were arranged as follows:

- a logging course for forest technicians in Tecpan de Galeana, Gro (13 to 28 February 1985);
- a seminar "Forestry planning for integrated development" in Taxco, Gro (16 to 18 April 1985);

Figure 2. Project Progress



* Meeting of the Coordinating Committee
 ° Project coordination mission to Mexico

▬ Training mission to Finland
 - - - Training course in Mexico

- a training course "Preparation of forest management plans at ejidal level" in the Costa Grande region, Gro (9 September to 4 October 1985).

On-the-job training was an important part of the project during the whole project period, most effectively in the fields of forest inventory and plan integration.

The inventory of the forest resources of the Costa Grande region was originally planned to be started in late 1983 but because of some delays in mapping the fieldwork was started in February 1984 and finalized by June 1985. The inventory report was delivered by the end of 1985 and the forest management and road construction plan for the region prepared by June 1985.

The feasibility studies both in mechanical forest industry and pulp & paper industry were started in the first quarter of 1984 by Schauman Engineering and CTS Engineering respectively. The study of mechanical wood industry was completed by the end of 1984, and the pulp & paper study by July 1985 because an extension was deemed necessary. The delays in the information of forest resource data were reflected on the progress of these works.

The pilot study for the preparation of integrated forestry development plan for the ejido Las Compuertas by twelve Finnish forestry students was started in Mexico February 1984, the fieldwork was finalized in June 1984 and the three-volume report delivered in January 1985.

The plan integration started already in 1984 both in Finland and Mexico, but it was finalized by Ing. Victor Sosa Cedillo with the help of Mexican and Finnish specialists by July 1985. The second edition of the integrated plan document was delivered September 1985 in Mexico. The printing and diffusion of the document was planned to start in Mexico by the end of 1985.

The study of National Framework was started already in 1982 by Subsecretaria Forestal in Mexico, but because of some delays and difficulties in data processing, the final report was completed only by June 1985.

The contents of the integrated plan are outlined in Appendix 4.

5. EVALUATION OF THE PROJECT

Evaluation of the project means the comparison between the objectives of the project and their fulfillment. Also the impacts of the work effort on both parties, in this case the Mexican forest administration and the University of Helsinki in Finland, have to be evaluated. At the moment, the time is not very appropriate for the evaluation because the effects of the project can be observed only in the long run. The Guerrero project is only a time-slice in integrated forestry planning and its final evaluation can only be done after a long time period when the realization of the objectives and subprojects can be seen. For that reason, the final evaluation should be done after 2-5 years.

5.1. Objectives and Their Achievement

By and large, all the immediate objectives of the project were completed with regard to the preparation of the plan and the transfer of know-how.

One of the main aspects of the plan was the introduction of the intensive forest management methods. This task had been started as a less formal Finnish-Mexican cooperation effort in some states of Mexico already in the 1960s.

The integrated plan was aimed at serving long-term forestry planning in Guerrero. Its implementation began already in 1985 while the latest activities of the project were still going on. The plan outlines the activities of the state's forestry policy in the long run. It is a pilot study and the Mexican forestry administration has plans to initiate similar planning exercises in a selected number of states following the methodology developed in Guerrero.

The project did not succeed in one of its objectives: to find immediate solution for the problem of small-diameter logs from thinnings. This would still require more studies. On the other hand, it could be proved that, from the economic point of view, the problem is not a restrictive factor to move towards intensive forest management.

The aim of the study of the National Framework of forestry sector was mainly to stimulate integrated forestry planning in the country. For that purpose, basic information on forestry sector had to be collected at state and national levels. This revealed deficiencies in the basic information on the sector. The study outlined the basic methodology of forestry planning at the national level and was partly contributing to the plans to start the preparation of the national forest policy programme called PRONABOSE 2010.

It goes without saying that the Guerrero plan has to be continuously revised and updated because of the changing situation in markets, administration, etc. Such revisions would be relatively easy to carry out by the Mexican authorities.

During the 9th World Forestry Congress in July 1985, the Government of Finland was given a prize for the development of Mexico's forestry sector, thanks to the Guerrero project.

5.2. Problems

During the early stages of the project, the existing information on the forest resources of Guerrero was considered better than it was. As a result, the industrial prefeasibility studies were carried out early in view of the availability of reliable information on the supply of raw material.

Were the project redone, better information on forest resources would be collected before carrying out industrial studies at project level. The main reason why the prefeasibility studies were carried out so early was the pressing need to obtain viable industrial investment projects as early as possible which is a typical situation in this kind of planning effort. These projects were considered one of the main rationales of the project.

The number of viable industrial investment projects (4) was smaller than originally expected, in spite of the use of the know-how of three different consultants. This reflects difficulties related to the development of forestry sector in Guerrero. However, the progress is possible if the organizational and financial efforts are combined to achieve the objectives of the development plan.

On the other hand, it was supposed that the prefeasibility studies could have been like catalysts for the same kind of projects in other states of Mexico. This has not yet been the case although some indirect influence on industrial planning can be noticed.

Technically the Guerrero project probably met the general standards of this kind of studies. The most severe problems and bottlenecks were found in socioeconomic and administrative aspects which can only be solved by local specialists. The main task of foreign know-how can only be to give methodological support in project management, to carry out specialized technical and economic analysis and to train the local staff in the necessary fields.

5.3. Organization

For the preparation of the plan, an ad hoc project organization was created on both sides. The local Mexican authorities including the line organization were all the time deeply involved in the work.

The purpose of the forestry development plan for Guerrero was not only to list objectives, tasks and various improvement measures but to create changes in attitudes and skills. The activities were carried out at the same time in all organizational levels. This was very important and fruitful and should be considered in the implementation of similar projects in the future.

5.4. Time-Schedule

The Guerrero project was an arduous task and required a rather long time period, because training and transfer of knowledge cannot be absorbed by the recipients during a short period. Partly because of unexpected organizational changes and delays in the execution of some studies, the project period was finally six months to one year longer than what was planned. The study required also much greater effort by both Finnish and Mexican parties than originally planned but the budget was exceeded only slightly.

Because of the long time period of the project it was ideal that the work was supervised by an educational organization (University of Helsinki) and not by a consultant. Therefore, the project costs remained also at a moderate level if the achieved results are considered.

5.5. Impact on Project Parties

The preparation of the forestry development plan for Guerrero was a challenging task which substantially contributed to the knowledge and experience of both the Mexican and Finnish parties. The project was a unique effort in the history of Mexican forestry administration. For the Faculty of Agriculture and Forestry of the University of Helsinki it was the largest international cooperation project executed until today.

The most effective impact of the project in Mexico will possibly come indirectly through training and by changes in the attitudes at all organizational levels. The emphasis was to reorientate the attitude of forest administration from protective to productive, i.e. a change from traditional to intensive forest management.

The emphasis was to keep the Mexican participation at the highest possible level and to concentrate the Finnish executing agency on the transfer of methodology through on-the-job training and

advice, study trips of the Mexican personnel, courses, seminars etc. The integrated Plan document will be printed in Mexico for the diffusion to the whole country.

At the University of Helsinki and in Finland in general the project had a great positive impact on the training of specialists through professional on-the-job training in a foreign country. It goes without saying that directly or indirectly, thanks to the Guerrero project, Finland will double forestry experts in command of Spanish. In the field of research, eight thesis based on the data collected during the fieldwork period are in the progress. One thesis has already been completed.

New forest management methods, forest inventories, industrial pulpwood plantation experiments and forestry training require a long time period to be adopted by the host country. The Guerrero project has accelerated this process. Mexican forest authorities are now largely capable to carry out the majority of these tasks and they only would need some external assistance.

The Mexican party has already expressed its wish for the continuation of the Finnish-Mexican cooperation in forestry sector in the form of another project at national level.

6. PENDING ACTIVITIES

The project was officially terminated in the meeting of the Coordinating Committee in July 1985 but a number of activities still continued until the end of 1985.

As a result of the project, Mexico is in the process of ordering a Finnish-made small-scale sawmill as a pilot unit for ejidal sawmills. If the mill is successful several dozens of such units would be needed in the whole country in the long run. It is necessary that when the pilot sawmill is established, Finland provides development assistance to train the personnel of this unit as this training cannot be arranged on a commercial basis.

Even in case the overall technical assistance programme would not continue, the training related to the pilot sawmill should be arranged. Two Finnish specialists would be needed for about 2-3 months in Guerrero to provide assistance, perhaps including two missions.

PROJECT ORGANIZATION

<u>Activity</u>	<u>Executing agency</u>
1. Project coordination	SF/UH ¹⁾
2. National Framework	SF-Dirección General de Programación y Presupuesto/UH
3. Background studies	SF
4. Prefeasibility studies	Jaakko Pöyry International
5. Feasibility studies	
- forestry studies	UH/SF
- mechanical wood industry	Schauman Engineering
- pulp and paper industry	CTS Engineering
6. Pilot projects	SF/UH
7. Other projects	SF/UH
8. Plan integration and evaluation	SF/UH

1) SF = Subsecretaria Forestal
UH = University of Helsinki

The main reports of the project

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CONTENTS OF THE INTEGRATED PLAN

EXECUTIVE SUMMARY

SUMMARY

1. INTRODUCTION
2. PLANNING METHODOLOGY
3. NATIONAL FRAMEWORK (Potential of development)
4. FORESTRY DIAGNOSTIC OF GUERRERO
 - 4.1. Social aspects
 - 4.2. Land tenure
 - 4.3. Forest resources
 - 4.4. Forest production
 - 4.5. Logging and transport
 - 4.6. Forest industries
 - 4.7. Principal observations
5. OBJECTIVES
6. DEVELOPMENT STRATEGY
7. DEVELOPMENT OF THE FOREST RESOURCES
 - 7.1. Land tenure
 - 7.2. Land use
 - 7.3. Silviculture and forest management
 - 7.3.1. General aspects
 - 7.3.2. Production possibilities
 - 7.3.3. Forestry production at predial level
 - 7.3.4. Forest plantations
8. DEVELOPMENT OF INFRASTRUCTURE AND LOGGING
 - 8.1. Infrastructure
 - 8.2. Logging
9. DEVELOPMENT OF THE FOREST INDUSTRIES
 - 9.1. General aspects
 - 9.2. Actual industry
 - 9.3. Investment projects
 - 9.3.1. Mechanical forest industry
 - 9.3.2. Projects for pulp and paper
 - 9.4. Wood balance and possibilities of industrial development
10. SOCIAL DEVELOPMENT
 - 10.1. General aspects
 - 10.2. Incorporation of the forest owners in forestry production
 - 10.3. Rural kilns for firewood
11. FORESTRY TRAINING
 - 11.1. General aspects
 - 11.2. Training needs
 - 11.3. Programme
 - 11.4. Organization
 - 11.5. Financing
12. PROTECTION; FOMENTATION AND RESEARCH
 - 12.1. Protection and fomentation
 - 12.2. Research
13. ADMINISTRATION AND ORGANIZATION
 - 13.1. Regulation, support and control
 - 13.2. Logging and transport
 - 13.3. Industrialization
 - 13.4. Participation of the state

- 13.5. Functions of forestal Vicente Guerrero
- 13.6. Participation of private industry
- 14. FINANCING
 - 14.1. Investment projects for forest industries
 - 14.2. Supporting projects
 - 14.3. Distribution of the responsibilities
- 15. EVALUATION OF THE PLAN
 - 15.1. General aspects
 - 15.2. Employment
 - 15.3. Income
 - 15.3.1. Salaries
 - 15.3.2. Wood price in the forest and utilities
 - 15.3.3. Total rural income
 - 15.3.4. Income for the transporters
 - 15.3.5. Income for technical forest services
 - 15.3.6. Indirect income
 - 15.4. Payment balance
 - 15.5. Rural and regional development
 - 15.6. Technological aspects
 - 15.7. Ecological effects
 - 15.8. Financial and economic analysis
- 16. RECOMMENDATIONS

APPENDIXES

- 1. THE MAIN REPORTS OF THE PROJECT
- 2. PARTICIPANTS