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PRODUCTION OF PESTICIDES IN HONDURAS

by

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## I BACKGROUND OF THE PROJECT

At the time the request for assistance was submitted by Honduras no pesticides were being manufactured within the country, and all pesticide needs were being supplied by import, largely from North American and some other Central American countries.

Imports of pesticides in Honduras fall into two classes: (A) pesticides used by the banana companies which are authorized by concession from the Honduran Government to import, and if they so desire, to formulate their own pesticides; (B) pesticides used for agricultural, public health, and household purposes for the sector of the economy lying outside the activities of the banana companies.

There is no evidence that any revision is contemplated in the method of supplying pesticides described under class (A) (those used by the banana companies) which comprise at present about 75 per cent of total imports of pesticides (one newspaper report noted during the mission stated the concession could be reviewed in 1971).

The mission, therefore, was concerned with a study of the feasibility of manufacturing pesticides within Honduras for the remaining 25 per cent of the total market which lies outside the activities of the banana companies.

Very little definitive information on the project was in the hands of UNDP in San Salvador; hence the preliminary briefing prior to the visit to Honduras was largely limited to supplying names of contacts in Honduras through whom information could be obtained. The numbers presented above for relative amounts of pesticides used by "banana" and "non-banana" sectors were actually obtained in Honduras.

## II SCOPE AND NATURE OF THE MISSION

On arrival in Honduras it was learned that the Consejo Superior de Planificación Económica, an agency of the Honduran Government at ministry level, had already made a preliminary economic study of the desirability of insecticide formulation in Honduras. The Consejo also advised the author that an Honduran firm, Químicas Dinant, has equipment which might be used on a part-time basis, for initial limited production of pesticide formulations. It was learned further that

many activities are in progress in Honduras which may lead to increased production of agricultural products. These include expanding the area of cultivated land and intensification of the use of land suitable for agriculture. Both could lead to increased markets for pesticides.

The further study therefore logically divided itself into the following areas:

1. A review of the preliminary study prepared by the Consejo Superior de Planificación Económica.
2. An examination of facilities already available which could be used for initial small scale production of insecticide formulations.
3. A study of available Honduran materials which could be incorporated in insecticide formulations.
4. A review of possible future trends in Honduran agriculture which could lead to changes in amounts or types of pesticides and pesticide formulations in Honduras.

The areas are discussed in the sections which follow.

### III STUDIES MADE DURING THE MISSION

#### 1. Review of Honduran study on pesticide formulation

A study of pesticide formulation had been completed shortly prior to the author's arrival as a joint effort of the Consejo Superior de Planificación Económica de la Republica de Honduras and the Programa Interamericano sobre Formulación y Ejecución de Proyectos. The title of this study was "El Proyecto de Insecticidas" and will hereinafter be referred to as "El Proyecto".

Volumes and prices of pesticides used in Honduras were obtained from import records for 1966 - 1969. The same source provided a basis for estimating relative amounts of pesticides used in the "banana" and "non-banana" areas. Only the "non-banana" area was considered a potential market for Honduran produced pesticides and the study was limited to formulation of pesticides, the volume being too small to justify manufacture of the basic pesticides themselves. Since the major use of pesticides in the "non-banana" area is in the form of liquids, the simplifying assumption was made that all product would be liquid formulations. Product volume would rise from 250,000 gallons per year in the first year of operation to a total of 400,000 gallons per year in the third year, remaining at that figure thereafter.

The combined total of investment and working capital was estimated at \$299,250, 57 per cent of which was to be direct private investment and 43 per cent obtained through a loan from the Banco Nacional de Fomento of Honduras. Spot checks of costs of imported equipment indicated costs used were low but such equipment was a small part of the total investment so that the net effect on total investment due to these higher prices was only of the order of 5 per cent. Furthermore, part of the equipment proposed was larger than necessary for the volume of manufacture proposed, suggesting that if the plant were built an investment relatively close to that calculated would appear reasonable.

With the market volumes and prices assumed return on the total investment rose from about 10 per cent in the first year of operation to about 25 per cent in the third year.

The only serious question about the viability of the project lay in the assumption of the initial volume of product and its rate of growth. Sales representing roughly 80 per cent of present imports were assumed for the first year and these were to be made by replacing imports with identical products in an open market. In all probability it would take several years to approach this figure; in fact it might take several years to reach the break even point of the plant (about 55 per cent of design capacity). This problem was recognized by members of the Consejo Superior de Planificación Económica who suggested to the author that existing chemical processing equipment might be available which might be suitable for pesticide formulation; they arranged visits to the facilities of Químicas Dinant in Tegucigalpa.

## 2. Availability of facilities in Honduras for insecticide formulations

Two visits were made to Químicas Dinant, a chemical manufacturer in Honduras, on the first visit the author was accompanied by Ing. Norman García and Lic. Matamoros of the Consejo Superior de Planificación Económica.

Químicas Dinant has a large chemical plant in Tegucigalpa devoted largely to production of various chemicals for the household market, particularly detergents. They manufacture a non-ionic surfactant among their other products. Ing. Elwin Hándal of Químicas Dinant advised that some months ago his company had started to manufacture liquid formulations of the pesticides methyl and ethyl

parathion, Toxaphene and DDT. Ing. Hándal preferred not to quote figures on the volume of their sales; he did say sales are yet at a low level. This he ascribed to the problem of promoting a new product in competition with known brands of the same insecticides sold by established distributors. This is the same problem anticipated in section III, 1. Ing. Hándal stated that Químicas Dinant expects its market to grow and is prepared to install specific equipment for insecticide formulation as soon as sales warrant this. He also stated that Químicas Dinant is prepared to install new facilities if required near major markets - an important consideration in a country with limited transportation facilities.

On this visit it was possible to tour plant and laboratory facilities of Químicas Dinant. Equipment for liquid formulations was excellent, largely of stainless steel. Capacity, were the equipment to be used solely for insecticide formulation, was at least five times that of the plant envisioned in El Proyecto by the Consejo Superior de Planificación Económica. Excellent housekeeping also suggested to the author that this company was a very efficient chemical manufacturer. The same impression was given by the laboratory which was well equipped. Samples of the formulations the author was able to see in the laboratory had a very good appearance. With the exception of ventilation facilities, which Químicas Dinant expects to improve now that it is working with toxic pesticides, the plant compares very favourably with pesticide plants the author has visited in more highly developed countries and is far better than many he has seen.

A second visit was made to Químicas Dinant after the President and General Manager of the company, Lic. Miguel Facussé B. had returned from the consultations currently in progress among the five Central American republics in San José, Costa Rica. At this time, Lic. E. A. Mendoza F. of the Consejo Superior de Planificación Económica was also present. From other contacts, described in a later section, it had appeared very likely that future production of dust and granular pesticide formulations would become important in Honduras. The author wished to be sure that adequate technology was available to Químicas Dinant so that it could undertake such formulations. Lic. Facussé stated that he has close relations with Monsanto and he felt that Monsanto would supply the technology if required. The author assured him that Monsanto possessed completely adequate technology for such operations.



In view of the present size of the pesticide market in Honduras it would appear to be a questionable venture to construct a competitive formulating plant. Members of the Consejo Superior de Planificación Económica were asked whether they were satisfied with Químicas Dinant being the vehicle through which their proposal was being implemented. They expressed satisfaction. Indeed, it appeared from various sources that Químicas Dinant is sold in high-strength form by the agencies of Honduras, but also by other Central American organizations. Comments on which this latter statement is based were received from AIBCA and I AIII in Guatemala.

### 3. Honduran materials for insecticide formulations

Only one of the components comprising the liquid formulations is now manufactured in Honduras; this is a non-ionic surfactant manufactured by Químicas Dinant. All other components must be imported. A greater advantage to the Honduran economy would of course ensue were more of the basic materials used in preparing formulations manufactured in Honduras. In the case of liquid formulations, since the market is not large enough to recommend manufacture of basic pesticide, and since Honduras has no petroleum industry and of course no plant for highly aromatic solvents, this advantage cannot be realized.

When the market develops further for solid formulations, particularly dusts and granulars, a greater advantage will accrue. Discussions with Ing. Reiniero Elvir of the Dirección General de Minas e Hidrocarburos revealed that deposits of kaolin and of finely divided diatomaceous earth are known. While these deposits appear not to have been developed they are a potential source of the inorganic diluent of insecticide dusts; in such formulations the diluent frequently comprises 98 per cent or more of the formulations.

Ing. Elvir stated that to date no clay deposits are known which would be suitable for granular formulations. Here, however, Honduras has a plentiful supply of maize cobs. Ground maize cobs are being used successfully in other parts of the world (eg. the Philippines) as the absorbent diluent for granular pesticides. As currently used in Honduras granular formulations contain about 95 per cent of clay. This could be replaced entirely by the ground maize cobs when sufficient market develops to justify installation of the necessary equipment for formulation of granulars.

4. Probable future trends in Honduran agriculture and effects on pesticide demands.

The future demand for insecticides and acaricides is directly related to agricultural developments, and to increased requirements for public health purposes. Guimaras Dinant is presently considering the introduction of Honduran manufactured household insecticides. On balance there seem to be forces at work which will expand and intensify agriculture at least as expected. It is expected that agricultural demand will increase and that types of formulations used (now mostly liquids) will become more varied. These opinions of the author are based on many discussions with individuals in Honduras including members of the staff of Honduran Government agencies, representatives of UNDP, representatives of OAS, a representative of AID, a representative of the Banco Nacional de Fomento, representatives of the private development contractor, Sir William Halcrow and Partners working with the Consejo Superior de Planificación Económica, staff members of La Escuela Agrícola Panamericana, and certain private individuals. As would be expected, opinions were quite varied, some individuals being pessimistic while others were probably over-optimistic. But on balance it appears there are enough factors active in expanding and intensifying agriculture that an expectation of substantial growth is reasonable.

At the present time it is impossible to predict accurately the size of this expected increase or the time when it will occur. It is reasonable to assume that the banana companies have definite future plans, but since they are operating under an independent concession they were not contacted during the mission, and the opinions expressed herein do not reflect any changes in their operations. Outside the banana area, the greatest demand will be for insecticides, followed by fungicides. There is a question as to when and if herbicides will be important. They would become so only if rice cultivation, using the newer high-yield types developed in the Philippines, were instituted, or if intensification of agriculture results in labor shortage in specific areas of Honduras. The latter possibility was actually suggested to the author by one of those with whom he spoke.

It is possible and desirable to present several developments which qualitatively support the opinions presented above, even though at present they cannot be converted to quantitative predictions. The following paragraphs cover examples of such developments.

The Comayagua valley in central Honduras comprises some 45,000 hectares of relatively flat land, some of which is now known to be of high quality and about 4,000 hectares of which is presently being irrigated. With irrigation, cultivation of various crops including maize, bananae, vegetables, tobacco, and many others may be carried out throughout the year. The British firm of Sir Basil Halcrow and Partners, under contract with the Honduran Government, is making a comprehensive survey of the possibility of development of the entire valley. It seems reasonably certain that the irrigated area can be extended and there will be a sizeable additional area which can be used less intensively without irrigation. The development plans are not limited to agriculture alone, but envision a comprehensive study of the overall use of the area. Mr. Andrew Koper of the consulting firm stated that the study, scheduled for an 06 week duration, had not yet proceeded far enough that he could present quantitative figures on the potential of the valley.

Other areas in the country are either being more fully developed at present or are projected as sites for future development. Some of these lie in the heart of the country or near either the Caribbean or Pacific coasts. In the north, (Caribbean) specifically mentioned were the Sul valley and the Aguán valley. In the south (Pacific) there are at least two major areas near the Gulf of Fonseca in which agriculture can be intensified. This is the area where cotton growing was a major activity; cotton acreage has fallen by about 75 per cent. Some individuals are hopeful it will regain its former level; others feel that a more realistic figure for the future will be about 50 per cent of the previous maximum. However, according to Walter Koone of AID the rice growing potential here is great, particularly if the newer varieties of rice are planted.

A significant, although uncertain, factor in the development and intensification of agriculture throughout Honduras is the organization known as INA (Instituto Nacional Agrario) which has in various stages of development about 150,000 hectares of land in the form of small cooperative farms. The programme calls for optimum inputs of seeds, fertilizers, and pesticides, along with joint use of agricultural machinery, extension service, and development of infrastructure. Lic. Sandoval, the present head of INA has plans for extension of this operation and projects an area of 350,000 hectares in 1973. The INA programme, as Lic. Sandoval himself told the author, is a controversial one in Honduras. It un-

doubtedly is having a significant impact, but its future cannot be predicted with any certainty.

A new forestry school has been built at Sigatopeque in the heart of Honduras and significant developments are in progress to increase the forest products industry. Severe damage from forest insects has been reported. However, at the present stage of development it would appear that this problem would be considered of lesser priority in the overall development of insecticide production in Honduras.

As more intensive use of land occurs in the agricultural sector it will not be possible to rely on cultivation solely during times when activity of soil insects is at a minimum, as the author understands is often the present practice. It will be necessary to control these insects at other times with soil applied insecticides which is usually accomplished with granular products. Similarly the more intensive cultivation of crops subject to insects which attack plant foliage should lead to a greater use of dusts. These facts lead to the opinion that these types of formulations will become more important in the future.

#### IV SUMMARY

Honduras has an adequate requirement for pesticide formulations to justify their manufacture within the country, and has demonstrated this by a study prepared by the Consejo Superior de Planificación Económica which analyzes the market, cost of a suitable plant, and profits which could accrue through such a venture.

An Honduran chemical company, Químicas Dinant, has begun preparation of liquid pesticide formulations and is in the process of developing the market for such formulations. For the present, the manufacture is being performed in existing equipment, the major use of which is to produce other chemical products of the company. Use of existing equipment is an ideal solution to the problem of introducing locally produced products in a country where these must compete with well established imports, and where it will be some time before the locally produced product can replace a substantial portion of the imports. Significant new investment can thus be avoided until an adequate market for the Honduran product has been established. Members of the Consejo Superior de Planificación Económica have indicated they are satisfied with this approach.

Químicas Dinant now operates modern equipment and has an excellent laboratory for control of product quality. They now manufacture one of the two surfactants necessary for emulsified liquid formulations. Representatives of Químicas Dinant have stated they are prepared to add new facilities specifically for pesticide formulation at such time as their level of market penetration makes it impossible to supply required amounts with existing equipment. They will also consider locations other than that of their present plant in Tegucigalpa at such time as markets in areas not readily supplied from Tegucigalpa become sufficiently important. Further, Lic. Fagnassé, president and general manager of Químicas Dinant, has indicated that Químicas Dinant has access to the necessary technology for preparation of insecticide dust and granular formulations through their relationship with Monsanto. Sources of suitable diluents for the solid formulations are available in Honduras; these can be developed as the need arises and as the required volume reaches levels which would make such development economical.

The initial projection of ultimate market in Honduras made by the Consejo Superior de Planificación Económica appears to be adequately conservative. Agricultural developments now in progress and under study suggest not only that the market will expand considerably, but will diversify to include greater use of granulars and possibly dust-based products than in the past. These developments have not yet reached a stage where quantitative projections beyond those presented by the Consejo Superior de Planificación Económica can be established. As presented qualitatively in the body of this report, they offer an attractive picture for future development of pesticide formulation in Honduras.

#### V ACKNOWLEDGEMENTS

This mission would have been impossible without the complete co-operation of all individuals with whom the author was able to meet in Honduras. A comprehensive listing of names of all those who assisted will not be attempted; in particular the many names of very helpful representatives of the United Nations and its constituent agencies, both at the Regional Office for Central America and in Honduras will be omitted for sake of brevity.

Of the greatest assistance were the members of the Consejo Superior de Planificación Económica who not only provided much information directly, but also

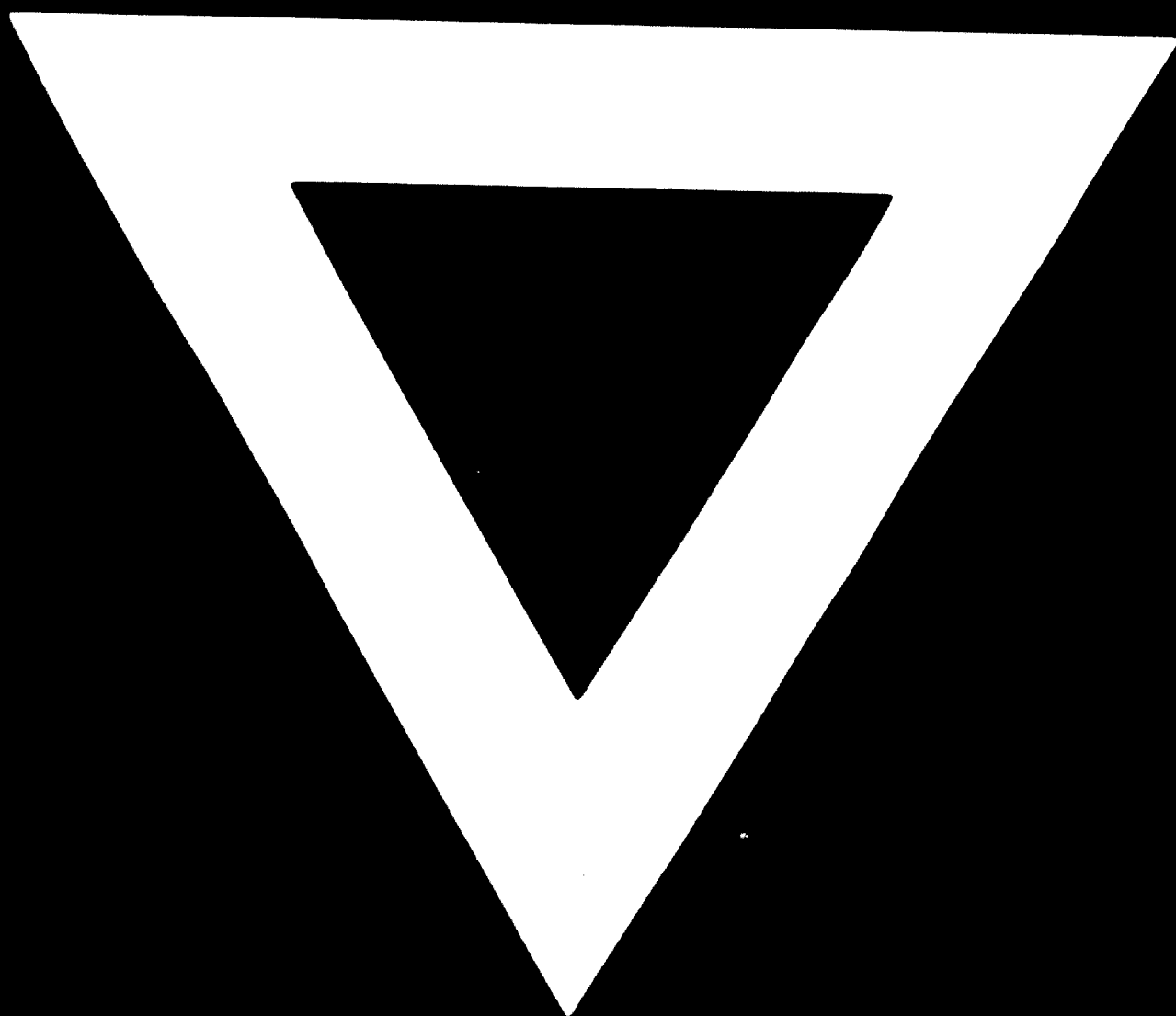
arranged interviews with people outside the Consejo and in many cases provided transportation. Specifically should be mentioned Lic. Florentino Alvaréz who, in the absence of Lic. Valentín Mendoza, introduced the author to key personnel in the Consejo. Within the Consejo should be mentioned Lic. Mario Mendoza, Ing. García and Lic. Matamoros of the Sector de Programación Industrial as well as Ing. Díaz of the Agropecuaria section. Ing. Hieniero Elvir of the Dirección General de Minas e Hidrocarburos provided valuable information on sources of inorganic diluents for pesticides. Lic. Roberto Sandoval, director of the Instituto Nacional Agrario, took valuable time from a crowded schedule to describe this organization and his hopes for its future.

At the Banco Nacional de Fomento, Ing. Umberto León also took time from a crowded schedule to discuss agricultural and other projects in Honduras. The staff of the Escuela Agrícola Ipanamericana in Zamorano were most gracious in discussing their views of agriculture and agricultural pests and diseases in Honduras. Mr. Harold Koone of AID provided very useful information. It was also of considerable help to discuss problems related to the project with Wayne Ringling and Edgar Sevilla of the Comité Interamericano de la Alianza para el Progreso.

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To all of the above, and to the many others in Honduras who helped make this mission a very pleasant assignment, the author wishes to express his appreciation.





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