RECONNAISSANCE SURVEY REPORT
AGRIBUSINESS INVESTMENT OPPORTUNITIES
IN THE DOMINICAN REPUBLIC

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TABLE OF CONTENTS

I. INTRODUCTION

The reconnaissance mission to the Dominican Republic was funded by a grant to the American Society of Agricultural Consultants International (ASACI) by the Trade and Development Program (TDP) of the International Development Cooperation Agency. Team members were Dr. Kelly Harrison, Annandale, VA; Michael Hurley, McLean, VA; and Arthur (Toby) Orr, Annandale, VA. The purpose of the mission was to discover and evaluate promising opportunities in agribusiness for U.S. private investment. A corollary effort was to find additional markets for U.S. products. The team spent from June 3-21 in the Dominican Republic.

This report, of necessity, needed to be written for readers with a varying range of knowledge of overseas investment and the country in question. To those who already know a great deal about the Dominican Republic, some facts may appear superfluous, but to others who have little knowledge of the situation, almost anything stated herein may add to their information. It is hoped that the report includes neither too much nor too little information.

While the team recognized the importance of the economies of scale in the investment picture, it also remembered that Xerox began in the inventor's garage and that the first Ford was built in a bicycle shop. Many small scale agribusinesses are beginning to operate in the Dominican Republic. Wherever very close management and precise attention to quality control are of overriding importance, small size is perhaps desirable. Small ventures, if they are profitable, can either grow big or be replicated over and over again. In either case, the end result could well be large scale investment. The team, in evaluating prospective ventures, found that the most promising opportunities did indeed range from small to large scale operations.

Under the TDP Grant, a second team will return to the Dominican Republic in September, 1985, to study further the prospective ventures recommended by the reconnaissance team, and prepare project investment profiles on the selected few opportunities that show the most potential.

II. SUMMARY AND CONCLUSIONS

The team, after preliminary examination of the studies on the economic situation in the Dominican Republic, realizes that things while difficult are certainly not hopeless. It is obvious that the unfavorable balance of trade seems likely to continue, that dollars will be in short supply to pay for imports, that equity or operating funds will be hard to find, and that the difficult transition from traditional to non-traditional export crops will have to be made. The value of all the leading exports is falling on the world market, and while petroleum seems likely to be less costly, still its increased consumption for electricity generation and industry insures that the total import cost will remain high.

Considering that government mandated prices can be changed with little notice and taxes can be capriciously applied to benefit special interest groups, the team has come to the conclusion that potential U.S. investors would be well advised to avoid producing for the domestic market in the Dominican Republic.

However, there are certainly bright spots in the investment picture. All the physical ingredients for successful agribusiness abound in the Dominican Republic. What is there? There is available land, ample rainfall or where rain is lacking, abundant ground or surface water, a mild frost-free climate, proximity to one of the world's largest and most affluent markets, adequate infrastructure and transport facilities, and a populace that is hard-working and trainable. It is hard to imagine a more prepossessing set of pluses for agribusiness.

In addition to the aforementioned advantages for the Dominican Republic is the attitude of its political and business leaders. Oftentimes an established mind set in a developing country inhibits change. However, in this nation the team sensed an acceptance of the facts, that things must change, that old values must make way for the new.

From President Salvador Jorge Blanco down to the colonos (small cane growers) working their sugar acreage, everyone seemed ready for change and the new risks and opportunities that it entailed. Several new laws have been passed or are under consideration that will actively encourage foreign investment. Tax write-offs, duty exemptions, Free Zones, provision for profit repatriation, value-added benefits, and perhaps most important, the de facto devaluation of the peso and currency convertibility all add up to important new incentives for outside investment.

As a result of its potential project evaluation efforts, the team feels there are several excellent opportunities for overseas investment in the Dominican Republic. To begin the evaluation process, team members developed a set of selective criteria and then proceeded to identify and examine over 200 prospective investment opportunities. From the original list, they narrowed the number of projects to twenty of the most promising and then to the best five. These five had all the elements required of a good investment opportunity: good return on capital, a history of similar success in the Dominican Republic, available expertise, and a U.S. market that is nowhere near saturation. The five prime project opportunities involve the production of winter fruits and vegetables, cut flowers, fresh pineapples, fresh-water shrimp, and alternate sugar cane processing. Only one of the four requirements of a successful business - markets, management, money and material resources - cannot be provided by the potential agribusiness investor and that is the final one - material resources. Land, water, climate and infrastructure must exist to begin with. This final and most important necessity exists in abundance in the Dominican Republic, and opens the way to the successful pursuit of potential project opportunties.

III. GENERAL BACKGROUND

A. Geography and Climate

The Dominican Republic occupies the eastern two-thirds of the Island of Hispaniola and is slightly smaller in size than the state of West Virginia. Lying some sixty miles east of the Island of Cuba and forty miles west of Puerto Rico, Hispaniola, at least the part occupied by the Dominican Republic, is the most richly endowed island in the Caribbean, both in terms of natural resources and because of its proximity to the markets of the eastern United States. It is a country of physical changes - in altitude, from below sea level to the 10,206 foot elevation of Mt. Duarte, and in climate from hot coastal plains to cool mountain elevations. Blessed by a mild, sub-tropical climate where frost is unknown, about the only weather hazards are the very infrequent threat of a hurricane, or the torrential rains that accompany tropical storms. The island is transected by four parallel mountain ranges running from NW to SE, each with broad valley basins and rivers between, fed by numerous tributary streams from the hills on either side.

The wide variations in elevation, annual rainfall and ambient temperature, produce micro-climates with an extraordinary diversity of ecological characteristics. From the semi-arid southeast and southwest coastal plains covered with cactus and mesquite to the northeast coast with heavy precipitation and pre-montane rain forests, to the valley floors, lower foothills, and mountain slopes with valuable stands of pine and hardwoods, the changing kaleidoscope of climate, rainfall and soil types is a most valuable asset to this island nation. With this variety comes a potential to produce almost everything man can use in his diet except for those few perennial fruit and vine crops that require seasonal cold stress and dormancy periods.

The 18,700 square miles of the republic include miles and miles of beaches with great tourist potential, some of which have been and

are being developed to attract vacationers. Tourism is growing by leaps and bounds and has overtaken sugar as the leading foreign exchange earner.

B. History

Christopher Columbus made his second landing in the New World on the north coast of Hispaniola in 1492. After running hard aground in his flagship, the Santa Maria, he used her timbers to construct a fort at La Navidad. The garrison of 44 men he left behind did not survive the four years that elapsed before his return on his second voyage with seventeen ships and 1800 men. These newer arrivals, a motley group of adventurers, priests, and released criminals, founded the city of Santo Domingo on the south coast and set the tone for the future development of Spain's new colonies. They ruthlessly exploited and oppressed the Indians, but they brought with them seeds and new crops from the Old World and in places where gold or silver did not exist for the taking, settled down to farm and colonize.

As time passed, the importance of Hispaniola and Santo Domingo waned as trade ships used the ports of San Juan de Puerto Rico and Havana which offered easier access for the sailing ships of the day.

With the conquests of Cortes in Mexico and Pizarro in Peru and their discoveries of vast new treasures, Santo Domingo was neglected and lapsed into a colonial backwater menaced by the many pirates that abounded at that time. As the native Arawack Indians were decimated by overwork and disease, slaves began to be imported from Africa to provide labor in the cane fields, and the production of sugar reached an importance lasting to modern times. Various insurrections by black slaves and conquests by the French led to the domination of the colony until in 1861 it was returned to Spain. In 1864 it gained its independence, with the French and the blacks holding the western third of the island which is modern day Haiti.

The period from independence until 1916 was marked by over-borrowing of the various rulers and power struggles between them. U.S. interests finally required the safety net of the U.S. Marines who came in 1916 and stayed until 1924. Their influence was beneficial since they were able to restore order and public confidence and put the country's finances on a firmer footing. By 1930 when Rafael Trujillo was elected president, the Dominican Republic began to enjoy some aspects of modernization and increased production. However, his increasingly cruel and oppressive regime ended in his assassination in 1961, and the confiscation of his huge family holdings. When Marxist forces aided by Castro threatened in 1965, again the Marines intervened to halt a civil war, and democracy and order were restored. Popularly elected presidents have since ruled the Dominican Republic, the current chief of state being Salvador Jorge Blanco who will hold office until August of 1986.

C. Legal Structure and Government

The legal structure of the Dominican Republic resembles that of the United States to a superficial degree with a bi-cameral legislature which initiates law and passes on an annual budget proposed by the president and the executive branch. The judicial branch does not interpret the constitution as it does in the United States, since all laws are codified and their intent is unquestioned. Judges and the Supreme Court mete out justice in civil and criminal matters, usually with three sitting judges and without the jury system. Innocence of the defendant is not presumed.

The Supreme Court acts as the appellate tribunal in cases where appeal is permitted. This is the Napoleonic system which traces back to Roman days, and is employed in most Latin American countries.

It is evident that there are fewer checks and balances on the power of the president than in the democracies that are founded on the

interpretation of the law. Since elections for both houses and the president are held simultaneously at four year intervals, a popular winning presidential candidate often carries majorities in both houses with a mandate to do frequently as he pleases.

The Dominican Republic is a young democracy. Only since 1965 when elections were held after the U.S. Marine intervention have the Dominicans enjoyed free elections. This explains, in part, the enthusiasm, the acceptance of the need to change and the go-ahead attitude of the people interviewed by the team. Older democracies seem to get a hardening of the arteries or an acceptance of the "way things have always been done" as a result of the stifling influence of special interest groups.

National elections will be held in June, 1986. Two principal parties will be competing for legislature seats and the election of a new President. In the opinion of political observers, the winners will be those who capture the centrist votes, neither radically left nor reactionary right oriented. The Communist party will be vocal and will make small gains, but does not have a real chance to win. The Dominican armed forces are a force for stability rather than a threat to constitutional government. Civilian elective power and constructive change is accepted by the people as the answer to economic troubles. Until the elections are held, decided, and the new government takes the reins in August, 1986, the time can be used for planning, investigating and searching out markets for new project opportunities, since this interim period will be one of delays and relative uncertainty.

D. The Economy

The Dominican Republic is a lower middle-income developing country with a 1984 Gross Domestic Product (GDP) of some eleven billion Dominican pesos and a per capita income of 1,777 pesos (at current

exchange rates = US $592.00). (For these and other key economic indicators, see Appendix A, Table 1.) Long an agrarian society, the Dominican nation began in earnest its industrial development in 1968 with the passage of key legislation which encouraged the import substitution industry. Heavy industrial investment along with expanding world trade and high prices for traditional agricultural exports accelerated economic growth at an average annual rate of 11% for the first few years. But the limitations of the relatively small domestic market slowed the average GDP growth rate to some 5% during the seventies. Even with a constantly growing manufacturing sector, agriculture maintained its leading role in the Dominican economy, still representing in recent years some 20% of the GDP and 70-80 percent of export earnings. (See Appendix A, Table 2, for statistics on the GDP.)

The economy is loosely based on the free enterprise system with the largest government-owned entity being the Dominican sugar parastatal. Prices and wages are mandated for domestic production and consumption. This centrally planned market situation has led to price distortions and in the case of agriculture, lower prices for the producer of basic crops. As in many third world countries, ruling politicians, in order to curry favor with urban majorities, have attempted to keep the prices of staples artificially low for the consumer. When the time comes, as it can, when the lack of incentives for the farmer threatens supplies of staples, prices are raised and civil unrest ensues. World recession, rising oil prices, low world prices for sugar, and the over-long insistence on pegging the Dominican peso to the U.S. dollar have caused a financial burden for the Dominican Republic from which it is barely beginning to emerge. (See Appendix A, Table 3, for trade statistics). However, with its almost untapped potential for producing non-traditional high value export crops for the U.S., the mood of Dominican entrepreneurs is optimistic. These new products will be more completely examined later in the report.

E. Infrastucture

Vitally important to any agribusiness project is infrastucture -- those facilities for communication that a country possesses that make possible the shipment of products within, or export from, the area of origin. Other necessary elements are electrical energy, fuel, port facilities, telecommunications and dependable mail service.

The Dominican Republic has some 360 miles of paved highways that reach north from Santo Domingo to Puerto Plata and Monte Cristi and east to La Romana and Puerto Cana on the east end of the island. West to Azua and Barahona the road is paved and in good shape. Penetration roads to the principal production areas are deemed adequate but can and are being improved. Thus, shipment of products from mid-island areas to either the north seaport of Puerto Plata or south to Haina (Santo Domingo), La Romana, Barahona or Puerto Viejo is easily made by truck service. Several shipping lines offer competitive refrigerated container service and have responded with available vessels whenever the need existed.

Two international airports, one at Santo Domingo on the south coast and the other at Puerto Plata handle all passenger and air freight needs for the country. Eastern Airlines flies daily out of Miami to and from Santo Domingo, and Dominicana de Aviacion lands and departs from Puerto Plata.

Electric power is produced by oil-burning steam generators and is perhaps an Achilles heel of Dominican agricultural and industrial development. The high percentage increases in the Gross National Product in the sixties and seventies carried with them enormous increases in the demand for petroleum and resultant huge increases in the costs of importing fuel. Energy imports as a percent of merchandise exports were 7% in 1965 and 71% in 1983. The power

supply experiences outages occasionally, either to conserve fuel, or because of distribution problems. Whatever the cause, hotels, businesses and operations that require constant power must have back-up generator capacity.

Canals for irrigation water exist in most areas where they are needed, but some require more maintenance than they are receiving. Enormous funds have been spent in earlier years to build and line canals with cement, but comparatively little is being expended to maintain them. Water availability for irrigated projects must be carefully examined.

Fuel, gasoline and diesel are readily available at about twice U.S. prices. Mail and cable services are dependable with telecommunciations much better than in most developing countries. Agencies of high technology equipment companies are in Santo Domingo to service their equipment.

All in all the infrastructure for agribusiness in the Dominican Republic is in place to a greater extent than in most other less-developed countries. There are no glaring lacks of vital links in the infrastucture chain that would tend to inhibit new operations - only small deficiencies that can be overcome once they are identified.

F. Human Resources and Employment

The human resource base in the Dominican Republic is adequate for rapid expansion in foreign trade and agricultural production. The total population is about 6.4 million. The literacy rate is estimated at 70% and is growing. Several excellent trade and technical schools turn out graduates ready to provide expertise in industrial and agricultural fields. But experienced managers are in short supply.

At present and due to the last two years of financial difficulties, unemployment runs at 25% and under-employment at about 20%. Minimum wage laws place the daily wage at $8.00 pesos or US $2.60 per day, but the scarcity of jobs has led to employers paying, and unskilled workers accepting, lower wages. The proportion of workers in agriculture runs at about 47% of national employment, with ample labor available in most rural areas.

G. Dominican Development Strategy

Government development strategy has changed markedly in the last few years. The over-production of basic cash exports of sugar, coffee, and cocoa, now accompanied by low prices on the world market, in addition to low mandated prices for domestic consumption of rice, beef, dairy products and other staples, have created increasing interest in non-traditional exports. These are aimed at the huge potential market that lies east of the Mississippi River in the United States. Among items now being produced and exported are winter vegetables, okra, plantains, yucca, tomatoes plus fruits such as pineapple, citrus, mangoes, and papaya. Juice concentrates, fruit candy and cashew nuts are also expanding exports. Cotton is grown for domestic consumption and export. However, the major agricultural adjustment is to improve the economic productivity of sugar cane land. Two alternatives are being considered: co-generation of electricity and ethanol production, and diversification to other crops. The change to other crops is perhaps the more difficult since it will require careful research into the agronomic potential of sugar cane property, as well as cultural and social changes.

A profusion of Dominican government agencies has been created to solve the problems of changing crop patterns, investment availability, and marketing of these new potential exports. Both the Agency for International Development of the United States

government (USAID), and the American Chamber of Commerce of Santo Domingo have concentrated their efforts along these lines. New banking entities are coming into being to address the problems of scarce capital for new ventures. Funds for both equity and operating finance will be increasingly available for new crop production.

The investment climate for U.S. companies or individuals who wish to expand overseas appears excellent. The Dominicans are at last realizing that they must change from a sugar-based economy to one of wider scope and they are eager to begin the change.

IV. AGRICULTURAL SECTOR SURVEY

A. The Role of Agriculture

Agriculture is the most important sector of the Dominican economy in terms of employment, output for domestic consumption and export earnings. Agriculture produces about 19 percent of the gross domestic product, employs about 45 percent of the labor force and accounts for about 75 percent of all exports.

Raw sugar production is the traditional backbone of the agricultural economy. Probably as much as 20 percent of the cultivatable land is devoted to sugar cane. Raw sugar and derivatives represent about 35 percent of total exports. The value of sugar exports has been declining steadily for the past several years as a result of declining world sugar prices and a declining sugar quota to the U.S. To illustrate, sugar exports in 1984 were US$290 million compared to about US$560 million in 1981.

Other traditional exports include coffee, cocoa, and tobacco. Together they represent another 30 percent of the cultivated acreage. In 1984, they generated nearly US$200 million in foreign exchange earnings. Rice is the principle domestic food crop followed by cassava, plantains and corn.

1. Land and Water Resources

While the Dominican Republic does not have huge reserves of high quality land, it does have room for significant agricultural expansion. And for the most part, where rainfall is limited, there is an adequate supply of water for irrigation.

Total land area in the Dominican Republic is about 11.9 million acres with about 20 percent suitable for agriculture and another 24 percent suitable for pasture (For Land Capability Classification, See Appendix A, Table 4). About 2.4 million acres are considered acceptable for cultivation but only about 1.9 million acres are currently being cultivated. Much of the unused balance is under government ownership, though a considerable amount is privately owned.

Approximately 20 percent of the arable land requires irrigation and another 15 percent is in an intermediate zone where supplemental irrigation is desirable. For the most part, water resources are available in those areas. The government placed heavy empnasis on new irrigation systems in the seventies. Consequently, nearly 500,000 acres now have irrigation water available (For Actual and Potential Land for Irrigation, See Appendix A, Table 5). The National Hydrology Institute estimates than an additional 867,000 acres could be irrigated.

Most of the land which is currently being irrigated is planted to rice. Sugarcane, plantains and pasture also occupy sizable quantities of irrigated land. Relatively small quantities of irrigated land are used to produce such high value crops as processing tomatoes, vegetables, cotton and grain sorghum.

2. Land Tenure and Reform

There are nearly 300,000 farms in the Dominican Republic. Over 80 percent of those have less than 13 acres and 16 percent have 16 to 533 acres. Only 2 percent of the farms control over 64 percent of the land. Most sugar is produced on 14 large estates, two of which are privately owned and twelve of which are government owned and operated by the State Sugar Council (CEA). A large number of small and medium sized growers produce sugarcane and sell it to nearby estates. Much of the pasture land is controlled by large absentee owners. This land ownership pattern presents a major problem in the planning of major agro-industrial business ventures which require significant amounts of contiguous good quality land.

The problem has been exacerbated somewhat by the government's political need to pursue a land reform program. Modern land reform began when Trujillo's death in 1961 put over 650,000 acres into government ownership. By 1982, most of that land had been distributed to private individuals or to groups of farmers with collective ownership called "asentamientos". Prior to 1972, the Dominican Agrarian Institute (IAD) titled land exclusively to individuals. Since 1972, the primary mechanism has been the creation of collective farms made up of several farmers under the guidance and management of an IAD agronomist. Recently there has been considerable dissatisfaction with the collective farms. A recent development is a kind of hybrid of the two systems where the individual farmer has an identifiable plot of land which he is responsible for and from which he receives the production. Yet he cooperates with other farmers in the "asentamiento" for purchase of inputs, marketing, land preparation and pest controls.

While the Dominican government has had a continuous land distribution program, the source of most of the land has been old Trujillo holdings, purchased or donated lands. Relatively

little land has been confiscated from large land holders. As a result, the land distribution program has helped produce the dispersion of land in relatively uneconomical units.

3. Agricultural Production

Dominican agriculture has traditionally been dominated by the export crops: sugarcane, coffee, cocoa and tobacco. (For Harvested Areas, See Appendix A, Table 6). More recently, rice acreage has increased significantly. Other food crops such as corn, beans, plantains, cassava, sweet potato, tomatoes, potatoes, lettuce and others are produced on small farms often for home consumption with the excess being marketed. Scattered around the country are more specialized high technology and larger scale producers of melons for export, cucumbers for processing, fresh flowers for export, pineapples for export, bananas, and other tropical fruits mostly for the local market. Natural stands of coconut palm in the eastern part of the island are harvested for the local market and a few firms are beginning to produce desiccated coconut for export. African palm plantations are also a fairly recent development as a substitute for imported vegetable oils.

Over 2.5 million acres of tropical pasture has permitted the country to sustain a beef cattle herd of about one million head. The cattle are predominantly crosses of native breeds with Brahma intermingled with Swiss and German types. These result in dual-purpose animals producing both meat and milk. The country has exported beef in some years.

4. Agricultural Trade

Because of its sugar, coffee, cocoa and tobacco exports, the Dominican Republic has a strongly positive agricultural trade balance. In 1984, exports were US$552 million while imports were US$190 million. The fastest growing export category in

recent years has been fruits and vegetables with a 55 percent increase between 1982 and 1984.

Major agricultural imports include wheat and soybeans, which are not grown in the Dominican Republic, vegetable oils, soybean meal, corn, tallow and dairy products. Most of those products (except possibly wheat) could be competitively produced in the Dominican Republic if price distortions were removed and if efficient production practices were used on economically sized farms.

5. Agricultural Prices, Policies and Subsidies

The Dominican government has made an adequate supply of low cost basic foods a primary policy objective. A single government agency, the Price Stabilization Institute (INESPRE) has the power and the resources to set domestic prices through import controls as well as price controls. In addition, it can control farm prices and purchase surplus commodities. INESPRE's marketing controls cover rice, beans, corn, grain sorghum, vegetable oils, onions, garlic, sugar, potatoes, wheat, flour, pigeon peas, eggs, poultry and milk.

The net effect of these policies has been a cheap food supply which has kept food price inflation below the general inflation rate. But it has also resulted in low farm prices and in distortions in price relationships. As a consequence, food imports have been increasing steadily. Agricultural imports increased sixfold from 1970 to 1980 and are projected to double again by 1990.

Another aspect of the government's policy has been the occasional prohibition of certain food exports. In recent months a ban has been placed on plantain and beef exports.

The government has attempted to stimulate the export of traditional export crops as well as non-traditional exports in order to help increase scarce foreign exchange earnings. Several recent foreign investment and export incentives are part of that policy.

Rice has received special attention in recent years as the government has provided special price supports, input subsidies, special credit, technical services, priority use of newly irrigated land and a substantial research and extension budget. Rice production has responded accordingly. But most other production has grown very little.

The policy mix described above has produced a very unattractive and unpredictable environment for most domestically consumed food products. On the other hand, the recent de facto devaluation and the apparent free market exchange rate policy has created a very attractive situation for production of export items where the country can be competitive.

6. Rural Employment, Migration and Wages

In 1981, the World Bank estimated the Dominican work force at 1.73 million with about 47 percent employed in agriculture. Of these, approximately 40,000 are employed in the sugar industry. Independent small farmers number about 250,000 and the balance are rural workers.

While the population growth rate has been averaging about 2.7 percent, the economically active population has been growing at a rate of 3.5 percent per year due to the age distribution of the populace. The rural economy has not been able to generate jobs at that rate. Consequently, migration to urban areas has been significant. In 1970, about 39 percent of the total population resided in urban areas. Recent figures show the population about evenly divided between urban and rural areas.

It is estimated that unemployment levels are as high as 30 percent for the economy as a whole. In 1982, the World Bank estimated the total number of unemployed Dominicans at 357,000. In addition, there is widespread underemployment, probably on the order of 20 percent for the economy as a whole, with much higher rates in the more remote areas.

Although there are labor unions in the Dominican Republic, there have been no significant labor problems. The typical Dominican worker has little formal education but is reasonably intelligent with a willingness to work. Most businesses agree that the workers can be trained for skilled positions. Rural wages are extremely low. The minimum wage is US $2.60 per day. And many rural workers accept even less.

The conclusion is that labor is readily available anywhere in the country at very low cost.

7. Agricultural and Agro-Industrial Credit

Commercial banks in the Dominican Republic generally lend at maturities of less than one year. Very tight credit policies by the Central Bank, legal ceilings on bank deposit interest rates and high reserve requirements have handicapped the banks' capacity to mobilize domestic savings. As a result, no capital market exists to provide investment funds for anything but small projects.

Agricultural credit is provided by two types of lenders, private commercial banks and government banks. Several commercial banking companies have a total of over 100 branches located throughout the country. Private banks have been supplying about 35 percent of the total agricultural credit in recent years. But most of that has not come from deposits but from rediscount lines from the Economic Development Fund (FIDE). Most private bank loans are for short term working capital to medium and large scale farmers.

Government banks include an agricultural credit bank (BAGRICOLA), a cooperative credit bank (IDECOOP), a community development bank (ODC), a development foundation (FDD) and several development banks. The Agricultural Credit Bank places heavy emphasis on small scale farmers and land reform collective farms. Application procedures are burdensome and slow. Very little medium or long term credit is available for larger farmers. In practice, credit for agro-industry is limited to short term credit for established firms. The Economic Development Fund (FIDE) has not even come close to responding to credit needs of agro-industry borrowers in recent months.

The Agency for International Development is currently negotiating a loan to the Dominican government for financing agro-industry projects for expansion of non-traditional exports. The loan would be for US$18 million and would be used to provide long term loans to private borrowers for equipment and for working capital. The loans will probably be channeled through the development banks at unsubsidized interest rates. Financing would not be made unless there is at least 40 percent Dominican ownership. The maximum size loan will be US$2 million for any one project and funding will not be available for sugar, citrus, african palm and pesticide projects.

A recent study by AID has shown strong demand for the proposed credit line. At present, the InterAmerican Development Bank is also considering a Dominican Government loan to provide agro-industry credit.

8. Input Availability

Most agricultural inputs are either imported directly or raw materials are imported for local mixing. Fertilizers and pesticides seem to be readily available as are imported seeds. Import licenses must be obtained and will take time for

approval, but commercial importers and distributors seem to maintain a fairly steady supply of special input requirements.

Packaging materials produced in the country are generally considered of poor quality and very expensive. This is especially true for bottles, cans and cardboard materials. Most plastic and cellophane materials are apparently imported but import licenses could be a problem.

B. Implications for Foreign Agro-Industrial Investment

The Dominican government has two priority policies which affect the agricultural sector. The first is to maintain low domestic food prices in order to appease the large numbers of low income and unemployed people. The second is to use its land, water and labor resources more efficiently to increase agricultural exports and help increase foreign exchange earnings. They have decided to encourage foreign investment to help achieve both policy objectives.

Because of government price controls, import controls, subsidies and related market price distortions, foreign investment in projects for domestic markets is not very profitable and carries high risks that government policy will suddenly render a major investment unprofitable. Two exceptions could be in the production of grain sorghum and cotton. Both are currently imported in sizeable quantities, so increased production would save foreign exchange. Government interventions could also make investments in certain exports unprofitable. For example, the government sometimes becomes concerned about shortages of certain foods and imposes an export ban. Beef and plantain exports have been suspended recently for that reason.

The second government policy objective, however, creates some interesting opportunities for foreign investors. The Dominican government is genuinely interested in having foreign investors provide the capital, technology and market access to expand

exports of non-traditional agricultural products. The recent drop in sugar prices and in the U.S. sugar quota has provided additional impetus toward diversification away from sugar to other more profitable uses of the land.

V. INVESTMENT CLIMATE REPORT

A. Economic, Social and Political Stability

A potential investor looking at the Dominican Republic will find a country which began in January of 1985 the full implementation of a bedrock International Monetary Fund (IMF) economic adjustment program. This makes it the first country in Latin America to permit its currency to float freely against the dollar; a country which has agreed to and then weathered the bite of austere economic measures, regaining its social equilibrium; and a nation whose populace, both civilian and military, has shown over the last twenty years its respect for democratic principles and freely-elected governments. In essence, it offers the basic economic, social and political stability that an investor would require of a country before looking further. In fact, total registered foreign investment in the Dominican Republic added up to $250 million in 1984. (For statistics by sector, see Appendix A, Table 7.)

B. Dominican Laws and Government Policy Affecting Foreign Investment

Even though the Dominican Republic is relatively stable, there are risks in committing money to a venture outside the United States. These must be minimized and more than compensated for from the point of view of potential investors. Does Dominican Law and its application extend sufficient incentive and protection to a venture capitalist in the area of agribusiness?

The answer is yes, but with some important cautions.

The policy of the Dominican government, as established by fairly recent legislation, is to welcome foreign investment especially in certain priority areas that include agro-industry and industrial Free Zones. The four fundamental laws affecting agribusiness investment: The Law on Industrial Incentives and Protection, Law No. 299; Law No. 69, the Export Promotion Law; Law No. 409 for the Promotion, Incentive and Protection of Agro-industry; and The Foreign Investment Law, Law No. 861, all do what their titles indicate, that is, promote and protect investment in agro-industry, especially as regards commercial production for export. The cautions arise from some limitations on the repatriation of profits, the sometimes tedious and confusing application procedures for obtaining various governmental approvals, recent uncertainty of the convertibility of Dominican pesos for foreign exchange, and governmental price controls on food products marketed locally.

In balance, a potential U.S. venture capitalist would be well advised to seek experienced legal counsel to structure his business or place his investment in such a way as to skirt the mentioned pitfalls and take advantage of the considerable fiscal incentives available, as many foreign companies have recently done. Let's consider in some detail the basic investment laws, the pitfalls, and suggested ways to avoid them.

1. The Law on Industrial Incentives and Protection, Law No. 299

Responding to the need to promote the quickest and most effective development of the national economy, the Dominican Government enacted this law in April of 1968 to provide incentives for both import substitution and for Free-Zone industries.

An agro-industry that manufactures new products, engages in a new process through the transformation of raw materials or semi-manufactured products, and is set up to operate in one of the many Free Zones, qualifies for the benefits of this Law.

Many potential agro-industries would qualify for the maximum advantages as listed below:

a. The company's total retention of all foreign exchange earnings it makes;
b. 100% exemption from income taxes;
c. A 100% exoneration from duties on machinery, fuels and lubricants, equipment, and raw materials needed and used for manufacturing;
d. Total exoneration of the tax on patents and all municipal taxes in force on production and exports; and
e. Total exemption from the capital tax and tax on capital increase relative to the formation of stock companies and limited corporations.

Depending on the geographical location of the industrial plant, an agro-industry can enjoy these incentives from eight to twenty years, with outlying rural areas qualifying for the longest terms. For the application of this law, there was created a Directorate of Industrial Development located in the Secretariat of State for Industry and Commerce.

2. Law No. 69, Export Promotion Law

To generate additional foreign exchange to meet increasing financial obligations, on November 8, 1979, the Government enacted this law which establishes a special incentive to benefit exporters of non-traditional products, directed basically to products with a high content of national value added.

For firms operating outside of the Free Zone, this law provides special incentives, such as:

a. The exemption from entry duties on imported inputs destined for export within 12 months; and

b. A Tax Payment Certificate of up to 25% of the sales price of products with a high domestic agricultural content. The certificate may be used to pay national taxes or other obligations to the State. Application for benefits under this law are made to the Dominican Export Promotion Center (CEDOPEX).

3. Law No. 409 for the Promotion, Incentive and Protection of Agro-industry

In January, 1982, the Dominican government made a significant effort to encourage increased production and export of agricultural exports especially in rural areas through this piece of legislation.

For those agro-industries processing non-traditional products and having no more than 49% ownership by foreign shareholders, this law offers a 40-100% exemption from income tax and import duties on machinery, fuels, and lubricants except gasoline, and semi-manufactured products and packaging materials.

Qualification for top benefits is gained if an agro-industrial enterprise is fully integrated (production, processing, and marketing), uses agricultural products of Dominican origin, generates a high level of employment for the local labor force, and is located in areas of lesser economic and social development. These benefits will extend from ten to twenty years depending on the respective rating. Non-traditional products exclude crude sugar, final molasses, furfural (a commercial solvent), common alcohols, alcoholic beverages, cigars, cigarettes, and coffee by-products, milled rice, carbonated drinks, and cocoa products. An Agro-industrial Promotion Directorate, created by the present law, handles the application of its benefits.

The evaluation of applications of enterprises and projects is handled by an Agro-industrial Technical Department assigned to

the Directorate. The director of this department indicated that 28 projects obtained due classification for the law's benefits in 1983-84, and 19 so far in 1985. Nearly half of these show equity participation by foreign investors - an indication that the law offers real incentives.

4. The Foreign Investment Law, Law No. 861

Recognizing that foreign investment and technology were a necessary contribution to Dominican economic development and that both foreign and national investors must be protected by measures establishing their rights and obligations, the National Congress passed Law 861 in November of 1969.

Under this law, the registration at the Central Bank of a direct foreign investment grants the right to exchange local currency for freely convertible foreign exchange for transfer abroad of the value of the registered investment and the profits generated thereby, provided they do not exceed 25% of the value of the investment. The Directorate of Foreign Investment, which administers the law may authorize the registry of reinvestments of annual profits above the 25% level, if such reinvestments are made in export, tourism or substitution-industry companies. The law, however, prohibits unauthorized foreign investment in public utilities and services, mass media communications, minerals including hydrocarbons, national defense industry, internal transport, and forest exploitation. Furthermore, national or mixed companies (51% Dominican ownership) are the only ones authorized to engage in these activities: agricultural, poultry, and cattle exploitation, fishing, commercial banking, and insurance.

5. Government Regulation

For the potential U.S. investor looking at agribusiness opportunities, it is encouraging to see the Dominican government

developing legislation which offers substantial incentive to foreign investment in export-oriented ventures.

In the past, government intervention in controlling prices, and its dictating counterproductive import-export policies has produced economic distortions and disincentives in the agricultural sector. However, recent government action that unified all currency exchange at a freely determined market rate has eliminated the major source of price distortions. Further reducing government control on prices and exports and increasing the access of private enterprise to government controlled arable land is needed to improve implementation of an export-led growth strategy.

C. Investment Issues and Guidelines

In evaluating different aspects of the investment climate, there are a number of constraints and difficulties that a potential investor should be aware of, as well as the measures to alleviate or avoid them.

1. Convertibility of Currency

Until recent years, the Dominican peso, pegged to the U.S. dollar at one to one by their constitution, had proved solid and stable. But since 1979, rising import costs of petroleum and falling export prices for sugar were prime factors that substantially weakened the peso which showed a disparity of up to 300% in its value on the official and floating exchange market. (See Appendix A, Table 8, for Comparative Values of Sugar Exports with Petroleum Imports.)

It is with respect to the Foreign Investment Law that theory and practice parted company. With a plumazo, a simple stroke of the pen, the Dominican Government, in May of 1984, under the pressure of its foreign exchange crisis, changed the rules of

the game, obliging a company with registered foreign investment to obtain its foreign exchange on the floating rather than the official exchange market. Pesos deposited in the Central Bank to pay dividends and letters of credit now had only one third of their former value when converted to dollars. This produced losses of many millions of dollars to foreign banks and corporations, with the U.S. Overseas Private Investment Corporation (OPIC) covering the losses of at least one U.S. company in the amount of several million dollars.

Respected Dominican businessmen, in responding to the unfairness of this unexpected change, point to the severity of the Dominican economic crisis and its monetary bind, as well as the tremendous fiction of the official exchange rate (one peso = one dollar) during the last few years, which the foreign business community was well aware of. According to them, no informed businessman should have been surprised or caught off guard by the now somewhat notorious amendment decreed by the Monetary Board.

Faced with the current situation, OPIC has temporarily suspended its program for currency convertibility until it can negotiate a satisfactory working agreement and settlement with the national government, which is expected to be completed soon. Since 1962, OPIC has provided an active insurance program covering the risks of war, expropriation and currency convertibility to enterprises in agro-industry and in non-traditional agricultural exports. OPIC's resources have also funded feasibility studies for American investors and supplied partial financing for qualified projects.

To obviate the problem of local currency convertibility to dollars, an investor looking to do business in the Dominican Republic would do well to structure and position his venture so as to qualify for the industrial incentive benefits under the export promotion laws which permit a corporation to retain its foreign exchange earnings.

2. Repatriation of Profits and Capital, Transfers, Remittances

Though Law 861 establishes maximum allowable profit remittances per year at 25% of registered capital, the legislation on Free Zones states that a firm registered under the Law does not face limitations on profit remittances and need not report profits to the Foreign Investment Directorate. Imaginative business practice and reinvestment of peso earnings can generate additional foreign exchange for those companies operating outside of the Free Zone.

3. Government Domestic Price Controls

These controls and the consequent unattractive environment in the internal market were described under numeral 5 of the Agricultural Sector Survey.

Since export-oriented production avoids the problems and uncertainties of the government intervening with commodity price controls in the local market, it would be advisable for a potential investor to consider with preference a venture that focuses on the export rather than the domestic market.

4. Lengthy Governmental Procedures and Approvals

An investor's application for government authorizations take time and often run through a gamut of overlapping requirements by state agencies. For an interested investor this is an irritating reality prevalent in nearly all developing countries and one which has no ready solution. Having a well placed Dominican partner on your side can speed approvals along considerably, as can the contracting of an experienced and influential law firm (preferably with U.S.-Dominican partners) to sort through regulations and confusing procedures so as to help structure your corporate endeavor to get maximum mileage out of incentive laws and to keep to a minimum ever present risks.

To its credit, the Dominican government continues to try to simplify procedures for foreign investors. A high level investment commission, formed by representatives of the private and public sector, works through the Foreign Investment Promotion Center, to assist potential investors, seemingly with some degree of success.

5. Verification of Needed Resources for Project Implementation

Once a potential investor judges that Dominican economic stability and fiscal incentives justify investigating the feasibility of a particular project, he must check out the adequacy of the natural and human resources and infrastructure specifically necessary for project implementation. As explained in the "Background" section of this report, basic infrastructure and resources would be generally adequate. But as often happens in developing countries, a new venture or the combined demands of new industries will catch a developing country still at the stage of putting in a needed road or rehabilitating irrigation canals, or finally giving long neglected generators the barest of maintenance - a few of the very real examples that make the Dominican Republic a country still on the road to development. This being the case, the U.S. entrepreneur needs to evaluate carefully the needed infrastructure and resources that his agribusiness would demand, and assure himself that all needed elements are in place, or take the immediate steps to see that they soon are.

6. Foreign Ownership of Land

Although Dominican legislation allows foreign ownership of land, a potential investor in agribusiness should investigate the advantages of a leasing arrangement with government or a joint venture with a private land holder. Reducing the risk of a large capital commitment is one such advantage. Being able to work within the legal restriction of agricultural exploitation to mixed companies would be another.

D. Business, Tax and Trade Issues

1. Forms and Formation of Business Enterprise

Business may be undertaken in the name of individuals or of legal entities. The stock company (compania por acciones = nominative shares or sociedad anonina = bearer shares) is the usual corporate form used by both Dominican and foreign businessmen. Some foreign interests employ the wholly-owned branch form. Although these limited liability stock companies may be publicly held, virtually all of them are closely held in practice.

The formation of a company under the Commercial Code is straight forward, beginning with an authorization to commence business activity from the Secretariat of State for Industry and Commerce. Formal steps of formation and registration usually take between four to six weeks. To establish a stock company, a minimum of seven shareholders is required, but six of the seven need have but one share each and all shareholders may be foreigners. Only 10% of the capital need be paid in before setting up the company. If a foreigner wishes to become a resident for business purposes, a qualified individual usually is able to obtain a temporary residence visa within six to eight weeks of application.

2. Labor Laws and Labor Costs

The 1951 Labor Code forms the core of extensive legislation regulating employer-employee relations. As for wages, a Price Waterhouse survey showed that average total annual compensation (salaries, commissions and bonuses) paid by surveyed companies during 1982 was approximately 30,000 pesos for supervising personnel and about 5,500 pesos for laborers. This includes social security and paid vacations, but not profit sharing which is a prorata share of 10% of annual pretax profits. The Labor

Code lists twenty-one reasons justifying termination of employment contracts without the employer incurring responsibility. Severance payment may not be required when operations are seasonal.

In project planning, it is important that a foreign investor keep in mind that the proportion of foreign citizens on the company payroll in the Dominican Republic and the total salaries paid them may not exceed 30 percent.

3. Taxes: Corporate, Export-Import and Personal

Corporate income tax is progressive and begins at 10 percent for earnings under 5,000 pesos, and tops off at 49.4 percent of earnings over 250,000 pesos. Dividends and interest payments remitted overseas are subject to a 20 percent withholding tax.

With the exports of Free Zone operations being excepted, there is a "temporary" surcharge of 36 percent on traditional exports and services (except tourism), and 5 percent on non-traditional exports. While this tax is in effect, traditional exporters will be required to exchange dollar earnings at 64 percent of the free market rate and non-traditional exporters will receive 95 percent.

Import duties include ad valorem taxes usually in the range of 5 to 30 percent of the FOB price and specific duties on most goods, ranging from .01 peso to 5 pesos per kilogram. Then, internal excise taxes of 20-100 percent of the FOB value plus a consumption tax of 20 percent of FOB value may be imposed. Finally, the sum of import duties and internal taxes is then subject to a 4 percent surcharge. In November of 1983, a value-added sales tax, assessed on the sale of specific imported and domestically manufactured goods, went into effect. Food, fuels, and fertilizers were among the exempted items.

Dominican personal income tax is the result of combining the products of flat category rates and progressive complementary rates applied to total income less personal and non-business deductions. Flat category rates rise from a low of 2 percent of income for salaries to a high of 12% for income from interest, leasing, etc. Complementary rates progress from 3 percent for the lowest bracket of less than 2,000 pesos to 70 percent for the highest of over 300,000 pesos.

4. Trade Legislation and Practice

a. The Caribbean Basin Initiative (CBI)

The CBI, effective January 1, 1984, favored the Dominican Republic, among other area countries, with duty free entry into the U.S. for all products imported from there, with a few exceptions such as textiles and tuna in cans. Specifically, the list of new items now duty free includes seasonal fruits and vegetables which had formerly paid an average duty of 10 percent or more. The CBI has already stimulated a significant increase in non-traditional exports to the United States, and serves as a real incentive to potential investors.

b. Trademarks and Technology

Contracts for the use of trademarks, for leasing machinery and equipment, and for the provision of specialized technical knowledge must be submitted to the Foreign Investment Directorate for approval and registration. The Foreign Investment Law prohibits crediting intangible technological inputs as a capital contribution. Trademarks may be registered for exclusive use, but registration is void if not exploited within one year. The Dominican Republic is a signatory to the Universal Copyright Convention, and provides protection for U.S. copyright holders.

c. Trade Barriers

Though there are no general discriminatory or preferential import policies to favor national firms over foreign ones, across-the-board bans on selected imports have been regularly used to ease the country's serious balance of payment problem.

What may in effect prove to be an economic barrier to an agricultural production venture is the abrupt tripling of the cost in pesos of inputs that must be imported. A careful study of increased input costs, arising from the de facto devaluation of the peso, is a must for a potential investor.

In summary, the Dominican Republic offers an adequately stable environment with attractive investment incentives for the U.S. agribusinessman who knows how to structure his enterprise to avoid the pitfalls described above and take full advantage of the local tax breaks and duty-free entry of export goods into the United States.

VI. POTENTIAL PROJECT OPPORTUNITIES

A. Country-Specific Criteria and Conclusions

After the reconnaissance team had gained meaningful information on the Dominican agricultural sector and the investment climate by conducting selected interviews and reviewing published data, it made an assessment of existing conditions from the potential investor's viewpoint and drew several country-specific conclusions.

It grouped these determinations around four fundamental requirements for a successful business enterprise, which can be characterized as

the "4-M's" of marketing, management, money, and material resources. Let's review these country-specific conclusions.

The first M is marketing. Dominicans since 1540 have concentrated on the export of sugar to the world market. Nowadays with sugar in excess and prices at an all time low, producers must search out new and profitable exports for the U.S. and other markets. This is a rather new exercise, neglected for years when sugar, coffee and cocoa were riding high. Aggressive marketing has now become necessary for non-traditional exports and the potential investor would do well to bring with him accurate market surveys for the crop anticipated, contracts for the purchase of products, or other assurances of profitable sales to come.

Producing for the local market is one type of venture that has little to recommend it. As mentioned previously, prices for domestic consumption are mandated by whatever party or group of politicians are in power. The pervasive bias toward centrally planned prices and wages had led to price distortions and inefficient land use. Potential investors would be well advised to aim production at the huge, adjacent U.S. market that offers CBI duty free import and not be tempted by the capricious local market.

The second M is management. While the Dominican Republic turns out skilled technicians, agronomists, soil scientists, computer experts and others, there is a shortage of experienced managers. Many successful operations are led by Americans, Canadians, Israelis or other Latins trained abroad. This shortage exists because until recently there were only two types of agricultural operations, the large sugar, cattle, cacao and rice farms and the small subsistence type enterprise. There were relatively few medium size commercial farms or businesses, making the demand for managers limited. Now this demand is growing faster than experienced decision makers can be found. In supplying this deficit, project planners need to be aware that no more than 30% of a company's payroll may be spent on foreign employees.

The third M is money, both for equity and operating capital. Available loans are in short supply in the Dominican Republic in spite of the efforts of USAID to see funds channeled to worthwhile new projects. Bank loans for domestic production and consumption, and for Dominicans who have an established track record, are available. For the new U.S. investor, however, funds must come from other sources: U.S. capital brought in, or joint ventures with Dominicans who provide land as part of their equity in the new venture. Joint venture arrangements with Dominican partners who supply land as their equity can also avoid the risks and the sometime sticky situation of foreign land ownership which has a way of arousing latent xenophobia in developing countries. Money is in short supply and difficult to borrow except at high interest rates and for relatively short terms. This problem continues to slow the development of new projects.

The last M is obviously the easiest to discover - material resources of land, water, climate, labor supply and transport. All of them abound in the Dominican Republic. Climate and micro-climates, land and water, provide great opportunity to produce many varieties of products in demand. The labor supply is ample, hard working, paid at a low minimum wage, and readily trainable. Transport is served by an adequate network of paved highways and penetration roads, while seaports on both north and south coasts are available for shipping. Airports at Santo Domingo and Puerto Plata provide air freight service for light weight perishable items such as cut flowers or shrimp. Historically, where transport has not existed for increasing quantities of produce, it has become available as needed.

B. Project Rating Code

With these country-specific conclusions in mind, the team investigated over 200 agribusiness opportunities in the Dominican Republic. This involved numerous activities, including reading feasibility studies and other project information, interviewing

principals, visiting certain of the projects on the ground, and talking to bankers. The team received valuable assistance from officials at USAID and the Latin American Agribusiness Development Corporation, who helped to identify many of the prospective projects. To evaluate the potential agribusiness opportunities, team members developed and applied a special rating code which graded each project under the following headings:

- U.S. Export Potential
- Historical Success of This Type of Venture
- Significant Limitations
- Management Requirements
- Market Potential
- Risks and Uncertainties

The complete rating code can be found in Appendix B.

C. List and Description of Potential Projects

The evaluative process, using the rating code, ranked twenty projects as having good potential, with the top five receiving an excellent rating. The rating code grid with individual project evaluation is included in Appendix B. These top five project opportunities are described below, and the good potential ventures listed thereafter.

1. Winter fruits and vegetables. This project has market potential, and ventures of this type are proving successful. Agronomic resources are adequate and available. Marketing, management, and technical expertise need to be provided by a U.S. investor until local personnel is adequately trained. The project has a low risk and limitations rating, and a very good projected return on investment.

2. Cut flowers. The U.S. market provides excellent incentive for high quality production. Climate and other growth conditions

are good. The historical success of this type of project is good. Caribbean Basin Initiative (CBI) provides commercial advantage with duty free entry. Original managerial and technical personnel from the U.S. are needed until local competency is attained. Marketing is to remain in the hands of U.S. entrepreneurs. There is low risk and a high rate of return on investment.

3. Fresh pineapples. U.S. offers good market potential, especially with a price advantage offered by CBI duty-free entry. Adequate land and other production resources are available, especially from sugar cane land holdings. One start-up venture of this type looks promising. The project has a good rate of return, low risk, moderate limitations. Start-up managerial and technical assistance by U.S. partner is needed, with marketing to be handled by an American entrepreneur.

4. Fresh water shrimp farming. U.S. and local tourism markets offer excellent potential for this venture. Climate, water, and other growth resources are good. Limitations are moderate to low, depending on production of larva. Two start-up ventures in country supply some of tourist hotels and show promise for expansion. U.S. marketing, technical, and managerial expertise is needed to establish commercial production. The project has a low risk rating, and a good return on investment.

5. Alternate sugar cane processing - ethanol and cogeneration of electricity. A potential export market exists for ethanol as an octane enhancer. There is a good domestic market for power generation, especially considering avoided costs from petroleum imports. Abundant sugar cane production is available for processing. Capital, state-of-the-art technology, and management needs to be provided by U.S. sources. Though ethanol production does not qualify for the special fiscal incentives given non-traditional products, the potential economic benefits of the project make it an excellent opportunity.

Those projects rated by the team as showing good potential are the following:

- the growth and processing of aseptic-pack tomatoes

- the production of ornamental plants

- the export production of cashew and macademia nuts

- the processing of frozen fruits and vegetables

- the production and export of molasses (This traditional product provides the basis for a project with good economic potential, though not qualifying for the special incentives of non-traditional products.)

- salt water shrimp farming

- growth and processing of spices and essences

- large-scale beef livestock production and meat processing for export

- growth of citrus fruit

- processing of fruit concentrates

- large-scale cotton production

- dessicated coconut processing

- export production of tropical and exotic fruits

- production of tree seedlings for domestic and export market

- tree production of fast growing varieties for local consumption as fuel (These last two projects involving start-up tree development operations are of the sort to require specific authorization from the Directorate of Foreign Investment.)

A project profile team of ASAC consultants will return to the Dominican Republic for three weeks in September, 1985, to review the twenty projects identified by the Reconnaissance Team and work up project investment profiles on five of those business opportunities that prove to be most promising as prefeasibility information is gathered on them. These project profiles will be added to the current findings to form an integral report "Agribusiness Investment Opportunities in the Dominican Republic," as established in the Grant between the U.S. Trade and Development Program (TDP) and the American Society of Agricultural Consultants International (ASACI).

If further information is desired, it may be obtained by contacting ASACI headquarters at the following address:

American Society of Agricultural Consultants International
8301 Greensboro Drive, Suite 470
McLean, Virginia 22102

Telephone: (703) 893-8303 (04)
Telex: 704419 ASACI MCLN UD

APPENDIX A

TABLES: ECONOMIC, AGRICULTURAL AND TRADE STATISTICS

Table 1. KEY ECONOMIC INDICATORS: DOMINICAN REPUBLIC
(Value in millions of RD$ and US$)

Population: 6.2 million (1984)

Income(RD$ millions)	1983	1984	83/84 % Change	Projected 1985
GDP (Current Prices)	8,772.6	11,018.4	25.6	14,985.6
GDP (Constant 1970 Prices)	3,192.5	3,211.5	0.6	3,272.8
Per Capita (Current Prices)	1,414.9	1,777.2	25.6	1,809.7
Per Capita GDP (Constant 1970 Prices)	532.0	518.0	0.6	511.4
Money and Prices (RD$ millions)				
Money (Currency and deposit demand)	938.5	1,333.0	42.0	1,650.0
Time and savings deposits	895.1	1,010.3	12.9	1,410.0
Consumer price index	169.0	210.3	24.4	284.3 (35.0)
Parallel market exchange rate (average)	1.6	2.8	75.0	3.3
Balance of Payments and Trade (US$ millions)				
Gross international assets	271.8	356.2	31.1	392.0
Net international assets	-1,088.2	-1,142.5	5.0	-1,349.0
Balance of payments	-143.6	-754.7	-	206.4
Balance of trade	-493.8	-380.5	-	-343.8
Current account balance	-421.1	-178.9	-	- 86.0
Exports (FOB)	785.2	871.0	10.9	806.2
United States share	503.6	668.3	32.7	600.0
Imports (FOB)	1,279.0	1,251.5	2.2	1,150.0
United States share	441.5	630.6	42.8	578.0
External public debt	2,239.8	2,479.2	10.7	(f)
External private debt	310.3	302.3	-2.6	(f)
Debt service ratio (percentage)	46.3	39.8		63.6
Other Indicators				
1.Central government deficit	-293.1	129.7	-55.7	-179.6
2.Registered foreign investment	252.4	257.5	2.0	-
Passenger arrivals(000)	597.6	680.8	10.6	791.8

1. RD$ millions
2. US$ millions
(f) Pending Paris Club and commercial bank rescheduling

Sources: Central Bank of the Dominican Republic
U.S. Department of Commerce
* (RD $3.00 = US $1.00)

May 1985

Table 2. GROSS DOMESTIC PRODUCT
(RD$ Million at Current Prices)

Sector	1983	Percent
Agricultural (traditional agriculture, livestock poultry and fishing)	1,696.5	19.3
Mining	386.8	4.4
Manufacturing (sugar production and other manufacturing	1,353.7	15.4
Construction	676.8	7.7
Commerce	1,406.4	16.0
Transport and Communications	483.5	5.5
Electrical Power	61.5	0.7
Finance	334.0	3.8
Real Estate	773.5	8.8
Government	738.4	8.4
Other	879.0	10.0
TOTAL	8,790.0	(100)

Source: Central Bank of the Dominican Republic
December, 1983

Table 3. DOMINICAN REPUBLIC EXPORTS (US$ millions)

	1983	1984	1985*
Sugar and derivatives	298.9	323.5	258.7
Coffee	76.4	95.1	86.5
Cocoa and derivatives	60.9	76.7	78.0
Tobacco and by-products	24.0	30.4	38.3
Gold and silver	164.5	131.8	105.4
Ferronickel	83.5	108.5	109.3
Other	77.0	105.0	130.0
TOTAL	785.2	871.0	806.2

DOMINICAN REPUBLIC IMPORTS (US$ millions)

Petroleum	461.3	506.9	446.2
Basic Food	63.8	78.3	90.3
Other	753.9	666.3	613.5
TOTAL	1,279.0	1,251.5	1,150.0
Trade Balance	(493.8)	(380.5)	(343.8)

Source: Central Bank of the Dominican Republic

*Projection

May 1985

Table 4. LAND CAPABILITY CLASSIFICATION

Production Capacity Area	Land Area	Percentage of Total Land
	Acres	Percent
Good for Farming:		
Excellent for cultivation	134,250	1.1
Very Good for cultivation	587,500	4.9
Good for cultivation	780,500	6.6
Limited or marginal for cultivation	909,750	7.7
Not Good for Farming:		
Pasture--no erosion hazard	1,517,750	12.7
Pasture--erosion hazard	1,402,750	11.8
Forest	6,290,250	52.7
Wildlife	300,500	2.5
Total	11,923,250	100.0

SOURCE: OAS Survey of Natural Resources of the Dominican Republic

Table 5. DOMINICAN REPUBLIC - ACTUAL AND POTENTIAL LAND FOR IRRIGATION

Hydrogeologic Zone	Area (Acres) Actual	Potential
Oriental Coastal Plains	32,000	232,000
Oriental Mountain Range	--	42,500
Samana Peninsula	1,000	--
Northern and Atlantic Coast	7,500	62,500
Cibao Valley	200,000	500,000
Central Mountain Range	22,500	129,500
San Juan Valley	80,000	112,500
Neyba Mountain Range	9,750	30,000
Neyba Valley	38,500	116,000
Bahoruco Mountain Range	600	--
Barahona	47,250	53,750
Azua Valley	37,500*	38,750
Bani Valley	20,000	45,000
TOTALS	495,000	1,362,500

*Includes water from wells.

SOURCE: National Hydrology Resources Institute

Table 6. HARVESTED AREA

Commodity	1969-71 average	1979-81 average	1982 average	Projected 1985 average	Projected 1990 average
		1,000 Acres			
Paddy Rice	200.0	310.0	272.5	325.0	362.5
Corn	67.5	55.0	62.5	50.0	50.0
Sorghum	10.0	20.0	35.0	40.0	40.0
Dried Beans	77.5	142.50	137.5	137.5	137.5
Pigeon Peas	62.5	37.5	42.5	45.0	45.0
Potatoes	5.0	5.0	5.0	5.0	5.0
Cassava	37.5	35.0	47.5	47.5	50.0
Sweet Potatoes	22.5	25.0	22.5	25.0	25.0
Yams	NA	25.0	25.0	25.0	25.0
Onions	5.0	5.0	5.0	5.0	5.0
Sugarcane	372.5	455.0	462.5	475.0	475.0
Tobacco	50.0	82.5	65.0	62.5	50.0
Peanuts, shelled	200.0	87.5	87.5	62.5	62.5
Bananas	65.0	NA	NA	NA	NA
Plantains	75.0	87.5	87.5	90.0	87.5
Coffee, green	237.5	275.0	275.0	275.0	275.0
Cocoa Beans	222.5	237.5	240.0	237.5	237.5
TOTAL	1,710.0	1,885.0	1,870.0	1,907.5	1,932.5

NA = Not available. Harvested area of mangoes, avocados, and pineapples is not available.

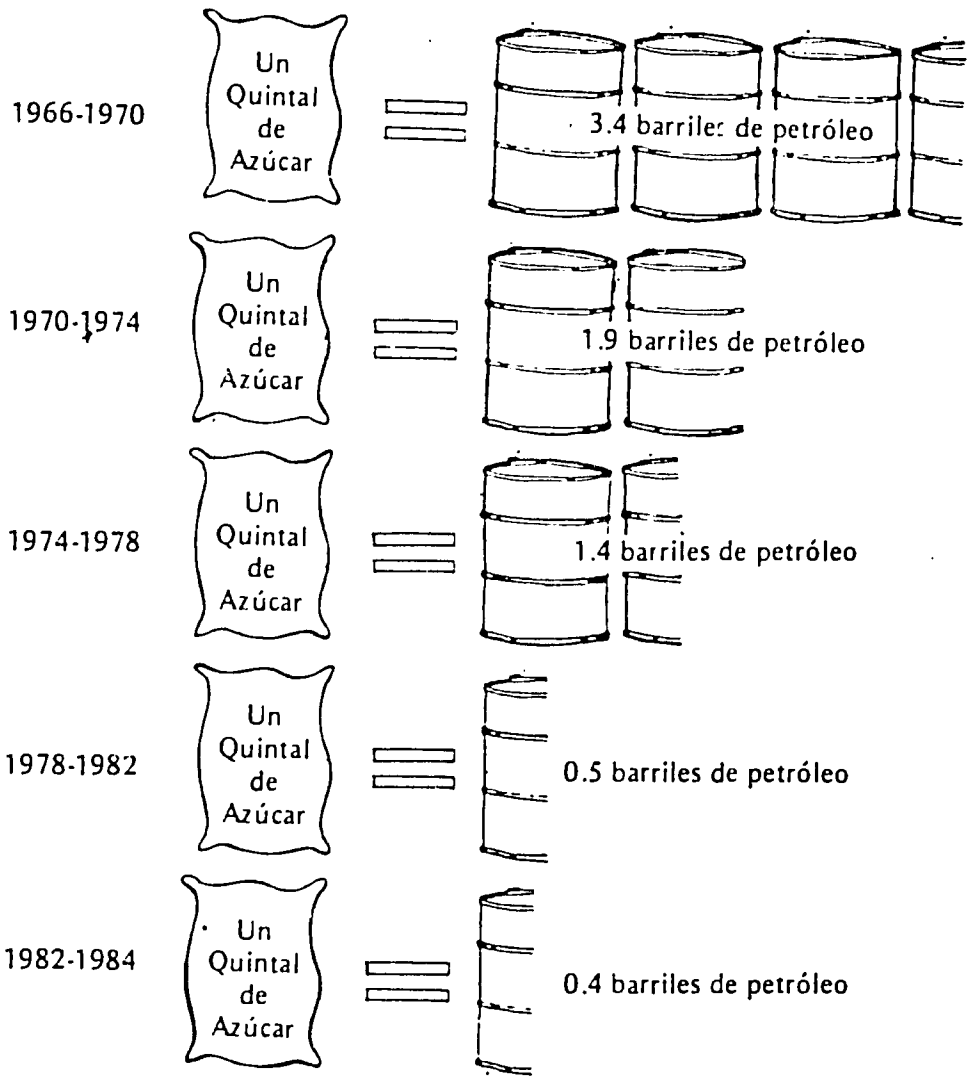
Table 7. FOREIGN INVESTMENT STATISTICS
Registered Foreign Investment by Sector (RD$s)
February 1984 (US$1.00=RD$1.00)

Agriculture	257,000
Mining	19,849,700
Food Products	64,873,100
Beverages and Tobacco	18,110,400
Textiles and Clothing	3,974,500
Wood and Wood Products	560,100
Chemicals	22,200,400
Metalworking, Machinery and Equipment	5,987,900
Transport, Storage and Communications	16,535,200
Finance, Insurance, Real Estate and Tourism	59,753,200
Commerce	40,245,600
TOTAL	252,347,100

Source: Monthly Statistical Bulletin of the Central Bank of the Dominican Republic - February 1984.

Table 8. COMPARATIVE VALUES OF SUGAR EXPORTS WITH PETROLEUM IMPORTS
(A hundred weight bag of sugar vs. a 55 gallon barrel of oil)

PROMEDIO POR PEDIDO DE BARRILES DE PETROLEO QUE SE COMPRABAN CON UN QUINTAL DE AZUCAR QUE EXPORTABAMOS:



Source: The Dominican newspaper Hoy, June 18, 1985

APPENDIX B

RATING CODE FOR POTENTIAL PROJECTS
PROJECT RATING GRID

RATING CODE FOR POTENTIAL PROJECTS

The follcwing rating code was used for evaluation of agribusiness projects in the Dominican Republic.

I. U.S. Export Potential

C.G. - Capital Goods (one shot)
R.M. - Raw Materials Production Inputs (annual)
S - Services (Consultants, managements, labor)

II. Historical Success of this Type Venture

1. Has not been done - uncertain future
2. Has not been done - but shows good promise
3. Has been done - poor results
4. Has been done profitably - uncertain growth potential
5. Has been done profitably - good growth potential

III. Significant Limitations

1. Climate, water, soil uncertainties
2. Transport limitations
   a. Internal transport
   b. Export transport
3. Labor

IV. Management Requirements

1. Entrepreneurial oversight
   a. Can be done by Dominican - not identified
   b. Can be done by Dominican - already identified
   c. Requires expatriot - not identified
   d. Requires expatriot - already identified

2. Production manager
   a. Can be done by Dominican - not identified
   b. Can be done by Dominican - already identified
   c. Requires expatriot - not identified
   d. Requires expatriot - already identified

V. Market Potential

1. Growth
   a. No potential market established
   b. Market uncertain
   c. Market guaranteed

2. Nature of Market
   a. Local
   b. Export

VI. Risks and Uncertainties

1. Markets
   a. Low risk (high growth - comparative production cost advantage over competition)
   b. Moderate risk (low growth or no comparative advantage)
   c. High risk (low growth - no unknown comparative advantage)

2. Business Environment Risks/Changes (Exchange Risks, Profit Repatriation, Export Bans, Export Taxes, Raw Material and Input Import Restrictions, High Customs Duties, Risk of Expropriation, Social/Political Upheaval)
   a. High
   b. Medium
   c. Low

PROJECT RATING GRID

	U.S. Export Potential	Historical Success	Significant Limitations	Management Requirements	Market Potential	Risks & Uncertainties
Winter Fruit & Vegetables	CG/S/RM	5	1	A/C A/C	C/B	B/C
Cut Flowers	CG/RM/S	5	1	B/C	C/A	A/C
Fresh Pineapples	CG/RM/S	5	1	B/B	C A/B	A/C
Fresh-Water Shrimp Farming	CG/S/RM	5	1/3	D/D	C A/B	A/C
Alternate Sugar Cane Processing	CG/S	2	NONE	C/C	B/C A/B	A/B B
Aseptic Pack Tomatoes	CG/RM/S	2	1	B/C	C/B	B/C
Ornamental Plants	CG/RM/S	1	1	B/C	C/A	A/C
Cashews & Macademia	CG/RM/S	5	1	C/A	C/B	B/B
Frozen Fruits & Vegetables	CG/RM/S	5	1	D/D	C/B	A/C
Molasses	S	5	NONE	A/A	C A/B	A/B
Salt Water Shrimp	CG/RM/S	1	1/3	C/D	C/B	A/C
Spices & Essences	CG/RM/S	5	NONE	B/B	C/A	B/B
Meat Processing	CG/RM/S	5	NONE	B/B	C/A	B/C
Citrus Fruit Growing & Processing	CG/RM/S	2	1	B/C	C/B	A/C
Fruit Pulper	CG	5	NONE	B/A	C/B	B/C
Cotton Production	CG/RM/S	5	1/3	C/B	C A/B	A/C
Tree Seedlings	RM/S	2	NONE	D/B	C/A	A/C
Dessicated Coconut	CG	5	3	B/D	C/B	B/C
Tropical & Exotic Fruits	CG/RM	5	1	B/B	C/B	A/C
Local Tree Production	RM/S	2	NONE	D/B	C/A	A/C

APPENDIX C

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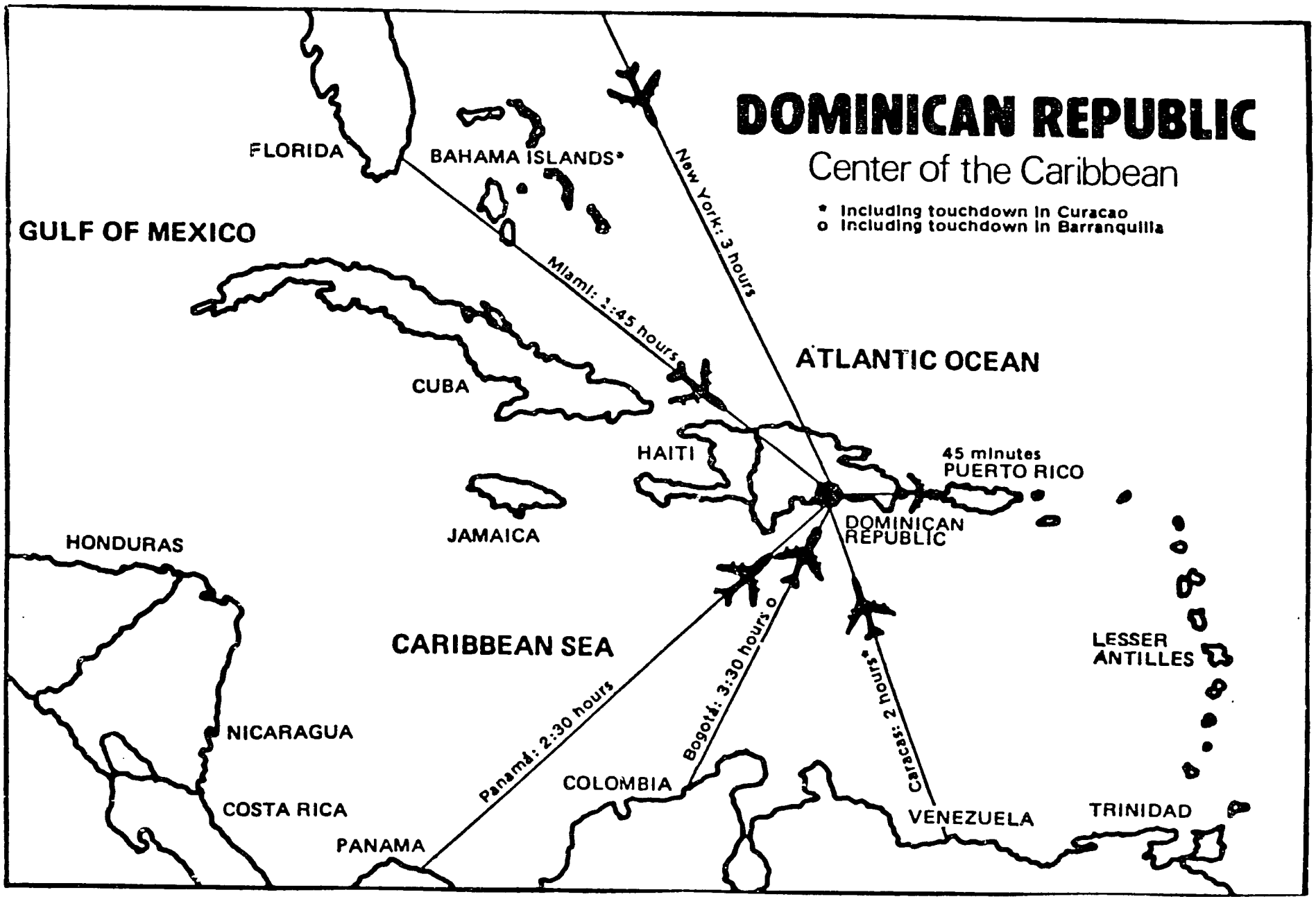
APPENDIX D

MAPS OF THE DOMINICAN REPUBLIC


DOMINICAN REPUBLIC
Center of the Caribbean
* Including touchdown in Curacao
o Including touchdown in Barranquilla
FLORIDA
BAHAMA ISLANDS*
GULF OF MEXICO
New York: 3 hours
Miami: 1:45 hours
ATLANTIC OCEAN
CUBA
HAITI
45 minutes
PUERTO RICO
JAMAICA
DOMINICAN REPUBLIC
HONDURAS
CARIBBEAN SEA
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Bogotá: 3:30 hours o
Caracas: 2 hours*
Panamá: 2:30 hours
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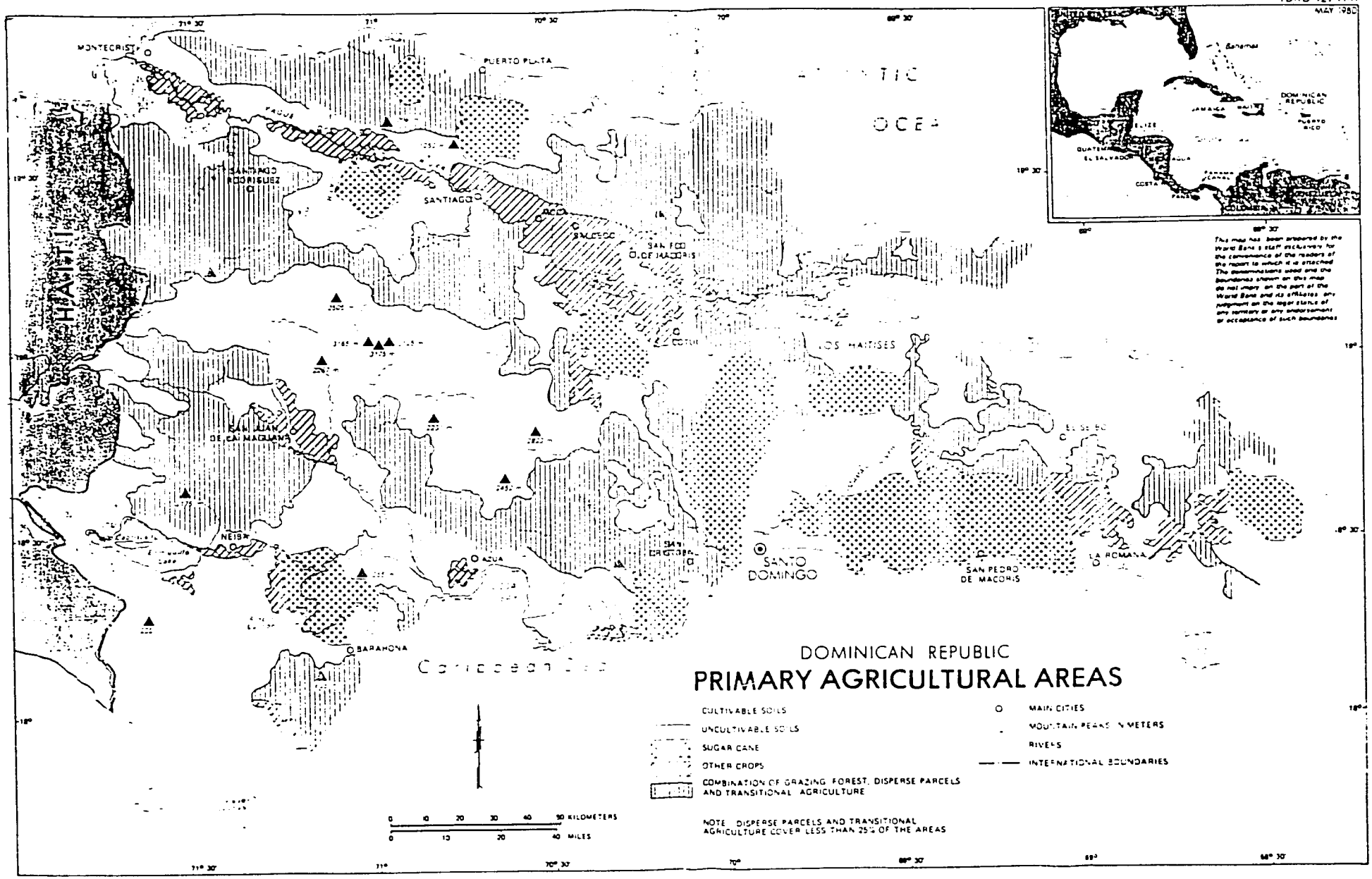
COSTA RICA
VENEZUELA
TRINIDAD
PANAMA

IBRD 12711R1

MAY 1980



PROJECT PROFILE REPORT
AGRIBUSINESS INVESTMENT OPPORTUNITIES
IN THE DOMINICAN REPUBLIC

PREPARED BY

THE

AMERICAN SOCIETY OF AGRICULTURAL CONSULTANTS INTERNATIONAL

UNDER A GRANT FROM

THE

U.S. TRADE AND DEVELOPMENT PROGRAM

OCTOBER 30, 1985

TABLE OF CONTENTS

I. INTRODUCTION

Working under a Grant Agreement with the United State Trade and Development Program (TDP), the American Society of Agricultural Consultants International (ASACI) sent a project investment profile team to identify and develop prospective agribusiness projects in the Dominican Republic.

In September, 1985, the five-man team of consultants worked for three weeks in the Dominican Republic in the preparation of the present report, Agribusiness Investment Opportunities in the Dominican Republic. The team was composed of the following members: Kelly Harrison, agricultural economist and Team Chairman, President of Kelly Harrison Associates, Inc., Annandale, Virginia; Hugh Poole, horticulturalist, Cohort Associates, Trenton, Florida; Francis C. Schaffer, industrial engineer, F.C. Schaffer Associates, Inc., Baton Rouge, Louisiana; Esper K. Chandler, agronomist, Land Resources Consultants, Texas Plant and Soil Lab, Edinburg, Texas; and Michael W. Hurley, Director of International Agribusiness Teams, ASACI, McLean, Virginia.

The project profile team began its efforts by studying the Reconnaissance Survey Report prepared by the lead team of ASACI consultants in June of 1985. The first report analyzed the Dominican agricultural sector, assessed the investment climate, and recommended the further investigation of five excellent and fifteen good agribusiness project opportunities.

Once in the Dominican Republic, the second team gathered project data on the twenty ventures, confirmed the findings of the first team as to the best prospective projects, and then proceeded to develop the needed technical, marketing, and financial information to profile five agribusiness ventures.

The project profiles contained in this report are the following:

1. Alternate Sugar Cane Processing
   1.1 Production of Ethanol from Sugar Cane Products

1.2 Cogeneration of Electricity and Steam from Bagasse

1.3 Products and By-Products of the Cane Sugar Industry

2. Cut Flower Production for Export
3. Pineapple for Fresh Fruit and Processing
4. Cantaloupe Production with Sorghum Rotation
5. Fresh Water Shrimp Project

Because the report is only a preliminary analysis of the different project opportunities, each potential investor must make his own independent investigation and assesment of a prospective venture before making any investment decision. To facilitate follow-up on individual project opportunities, the report lists after each profile potential Dominican partners interviewed by team members. For the potential investor, who would want to pursue the prospective ventures, the U.S. Trade and Development Program (TDP) currently has available five hundred thousand dollars in funds earmarked for financing feasibility studies for Dominican agribusiness projects. For further information, a potential investor should contact TDP, Suite 300, SA-16, IDCA, Washington, D.C. 20523, telephone: (703) 235-3657.

The ASACI consultants who prepared this report are also available to the potential investor interested in following up on Dominican project opportunities, as is the agricultural expertise of the certified consultants that form the American Society of Agricultural Consultants International. The prospective investor may obtain the current report and/or the individual project investment profiles at cost as well as information on certified ASACI consultants by contacting The Society's headquarters at the following address.

American Society of Agricultural Consultants International
8301 Greensboro Drive
Suite 470
McLean, Virginia 22102
telephone: (703) 893-8303/04
telex: 704419 ASACI MCLN UD

II. ONE PAGE SUMMARIES

Project Name: COGENERATION OF ELECTRICITY AND STEAM FROM BAGASSE

Location: Dominican Republic, near 5 largest sugar cane mills

Project Proposal:

The possible project or projects involve the co-generation of electricity and steam at a sugar factory using bagasse as a fuel, replacing old low pressure boilers with modern high pressure boilers, changes in the use of process steam, and installation of additional steam driven generator capacity.

Potential Profitability:

Assuming the processing of 10,000 short tons of cane per day and a selling electricity price of $.05 per kwh, a capital investment of $17 million would return $2.5 million in yearly profits after taxes.

Project Viability:

Production: There are at least 5 sugar factories of sufficient size to justify co-generation, with all required infrastructure and availability of bagasse fuel directly from the milling process. U.S. technology exists to implement project.

Market: The government electrical power company.

Personnel: Specialized design assistance is available from one of the several U.S. consulting engineering companies specializing in the production of sugar, sugar cane and sugar by-products.

Credibility of Local Partner:

The three companies owning large sugar facilities are the State Sugar Council, Consejo Estatal del Azucar CEA; Central Romana Corporation; three mill companies owned by the Vicini family.

Project Name: CUT FLOWER PRODUCTION FOR EXPORT

Location: Dominican Republic, especially higher central elevations near Jarabacoa, Constanza, Valle Nuevo

Project Proposal:

To establish a commercial operation to produce popular varieties of cut flowers for export

Production and Potential Profitability of Five Varieties:

flower	acres	capital investment	return on equity
orchids	10	$1,222,000	58%
chrysanthemum	25	$1,030,500	23%
roses	10	$1,817,000	61%
anthurium	10	$952,000	113%
carnations	30	$940,500	71%

Project Viability:

Production: There exists a wide range of micro-climates which make the production of many floral varieties possible. Soils on higher elevations are relatively good and well drained. Water supplies are deemed adequate. Some shading will be required. Technical equipment, supplies, and expertise would need to be imported from the U.S.

Market: The nearby eastern seaboard of the United States, especially market access through Miami and New York.

Personnel: At the present time, there is no core of good Dominican flower growers with the experience necessary to manage a large export-oriented operation.

Credibility of Local Partner:

Several producers and landowners with suitable sites were visited by the team and prequalified as potential partners interested in joint ventures with prospective U.S. investors. They are listed in the full project investment profile.

Project Name: CANTALOUPE PRODUCTION WITH SORGHUM ROTATION

Location: Dominican Republic, especially in northwestern and southwestern areas

Project Proposal:

To set up a commercial operation to produce high quality cantaloupe on 1,000 acres for the U.S. winter market with a rotation of sorghum for domestic consumption.

Potential Profitability:

The internal rate of return on equity would be 65%.

Capital Requirements:

Fixed investment requirements total $1,650,000, including $800 per acres for uncleared land at current market price.

Project Viability:

Production: Soils in the north and south west are suitable for melons and other produce. Flood irrigation would be required. Fertilizers and pesticides are in good supply. Careful professional attention must be given to soil and water analysis and management, as well as to the programming, execution, and monitoring of efficient production practices.

Market: The U.S. eastern seaboard represent a good seasonal (November-March) market for Dominican winter fruit and vegetable production, with cantaloupe receiving a 37% premium price increase during the winter months.

Personnel: Manpower is abundant and low-cost in the areas under consideration. Some managerial and technical expertise is available locally.

Credibility of Local Partner:

Three local groups with good business and agricultural talent were prequalified by the team and are listed in the profile. Government agencies owning land negotiable for joint venture arrangements are CEA and IAD.

Project Name: PINEAPPLE FOR FRESH FRUIT AND PROCESSING

Location: Dominican Republic, esp. lands from Villa Altagracia to Monte Plata

Project Proposal:

To produce pineapple for fresh fruit and processing for concentrated juice on 1,950 acres. Contract grower arrangements and a processing plant are integral parts of the project.

Potential Profitability:

The internal rate of return would be 48%.

Capital Investment:

Fixed investment requirements total $3,100,000. Project operations reach a steady state in year four with gross profits of $4.5 million.

Project Viability:

Production: Dominican producers have clearly proven their ability to produce a quality fresh pineapple for the U.S. market. Well drained soils, relatively flat in a dry climate with water steadily available--are available.

Market: The U.S. for both fresh and juice concentrate.

Personnel: Although there are Dominican agronomists with good knowledge of pineapple, it does not appear that thee are many who can properly manage a large commercial operation for the export market. An experienced agronomist would be needed to insure good production practices. It is practical to also contract with small landowners to grow to specifications.

Credibility of Local Partners:

Exproco--has experience in marketing fresh pineapple to EC and US, desires technical experts in production and additional marketing assistance.

Frutas Dominicanas--has worked with United Brands and may desire additional financing.

FEDOCA (cane growers assn.)--has land presently in sugar cane, desires technical assistance and marketing expertise.

CEA and IAD--government organizations that have land, especially in can, desire technical assistance and marketing expertise. Lease of land arrangements negotiable.

Project Name: INTEGRATED FRESH WATER SHRIMP PROJECT

Location: Dominican Republic, esp. near urban and tourist centers of Santo Domingo, Santiago, Puerto Plata

Project Proposal:

To establish a commercial venture integrating operations of a hatchery, 75 hectares of grow-out ponds, and a packing house. The cultured species is macrobrachium rosenbergii.

Potential Profitability:

The projected return on equity is 28%.

Capital Investment:

The total equity requirement for the venture is $1,375,000. Profits in the second year reach a level of $900,000 and increase slightly through year five.

Project Viability:

Production: The technology for a commercial operation is available from experienced U.S. companies. Brood stock can be selected from available local sources. There are sites with suitable soils and water supply. At least three small commercial operations exist now.

Market: The Dominican Republic--the urban restaurant and tourist hotel trade. And the U.S. with product sold as fresh iced whole, large prawn.

Personnel: The special know-how of an experienced marine biologist acquainted with commercial operations culturing the fresh water species would be needed.

Credibility of Local Partners:

The team recommends contact with three parties who have small start-up operations, basic managerial competence, and the desire to work with U.S. technical and marketing expertise, and capital to improve and expand their existing operations: CARIMPEX, QUINIGUA, and Mr. Luis Ma. Guerrero Weber/ Mr. Claudio Pimentel.

III. PROJECT INVESTMENT PROFILES

ALTERNATE SUGAR CANE PROCESSING

PRODUCTION OF ETHANOL FROM SUGAR CANE PRODUCTS

1. Description of Project and its Rationale

Proposed Project

Production of ethanol from sugar cane, sugar cane molasses, sugar, or other sugar cane products or by-products.

Historical

Ethanol or Ethyl Alcohol (C_2H_5OH) has been used by man since the dawn of history. The first intoxicating alcohol beverages were probably produced by the spontaneous fermentation of dilute natural sugar solutions, probably from juices of melons or sugar cane and from diluted honey. Later, man learned to control the fermentation as well as to convert the starches from grain, yams, potatoes, etc. to sugar and then ferment into an intoxicating beverage. The direct result of these fermentations are called beer (wine, if from grapes or fruit, mead if from honey) and usually contains 4% to 9% alcohol. The distillation of beer in order to obtain higher concentrations of alcohol was developed in the Middle East in the early part of the Christian Era and spread to Europe during the middle ages. The distillation process used until fairly recently limited the concentration of alcohol to approximately 50% which was called 100 "proof". Thus, alcohol content is half of the "proof". From about 1600 until recently, the production of beverage alcohol from molasses or cane juice (called rum or rhum) was concentrated in the islands of the Caribbean where rum is still produced. Improvements in the distillation process to include rectification have allowed closer approaches to the azeotropic mixture of alcohol and water (95.5% alcohol). Absolute or anhydrous alcohol (99.3 - 99.9% alcohol) requires re-distillation of the azeotropic mixture with a third component such as benzene or dehydration by chemical reaction or

molecular sieves. Alcohol for use as a fuel in internal combustion engines must be anhydrous. For many years prior to WWII, 88 - 90% of all industrial (non-beverage) alcohol was produced from molasses, about 5% from grains or potatoes and about 5-7% from other sources including synthetic petro-chemical production. By 1965 synthetic petro-chemical production accounted for over 95% of all industrial alcohol production, peaking at 98% in the early 1970's. With the OPEC oil embargo and the ensuing energy crisis, there was a wave of interest in anhydrous alcohol production from renewable natural sources as a subsitute for gasoline (petrol) during 1975-79. With the ending of the petroleum shortage and weaking of petroleum prices, interest in anhydrous alcohol production declined during 1980-84. Currently, there is renewed interest in producing anhydrous ethanol for mixing with gasoline where ethanol serves as an extender and octane enhancer. This interest in the Caribbean area is based on the following:

1. A temporary shortage of anhydrous alcohol for mixing with gasoline in the U.S. due to increased demand following a sharp reduction in the amount of lead allowed in gasoline under EPA regulations in the U.S. after 1 July, 1985.

2. Eligibility of Caribbean countries qualifying under the CBI to export alcohol to the U.S. to qualify for the exemption of 6 cents of the U.S. federal excise tax on gasoline provided the gasoline contains 10% ethanol. This corresponds to $0.60 per gallon of anhydrous ethanol. Additionally, CBI qualified countries are exempt from the 3¢ per gallon of alcohol import duty. Thus, the total price advantage over non-CBI countries is $0.63 per gallon of anhydrous alcohol.

3. The pressure to find ways to replace sugar production for an industry which is suffering due to the reduction in the size of preferential markets for sugar due to inroads from corn sweeteners and aspartame (Nutra-Sweet) and other non-calorific sweeteners, combined with the subsidized over-production of sugar by France and other EEC countries which are "dumping" over 3

million tons of sugar per year on the world market. At present, the world price for sugar is U.S. 5.5 cents per pound compared to the 17.0-18.0 cents per pound average price of producing sugar in the world.

Ethanol Potential in the Dominican Republic

The Dominican Republic is one of only several countries that produce sugar at substantially less cost than the world's average cost of producing sugar. At the present time the Dominican Republic produces about 1,100,000 metric tons of sugar per year (down from 1,250,000 per year in 1981-1984). About 450,000 metric tons of this year's production must be sold on the world market at world prices which are currently distressed. It is likely that the U.S. quota available to the Dominican Republic, already reduced from 486,000 metric tons in fiscal year 1984 to 406,000 metric tons in 1985 will probably be further reduced to slightly over 300,000 metric tons in 1986 and, perhaps, further reduced in subsequent years. Thus, unless world sugar prices increase very substantially, there will be excess cane and/or sugar production available for possible conversion to alcohol. Dominican Republic also produces about 55,000,000 million gallons of molasses as a by-product of its sugar production. Molasses is an excellent feedstock for producing ethanol and molasses prices, like sugar prices, are currently depressed. Further, ethanol produced in the Dominican Republic and blended 10% with gasoline makes that gasoline exempt from U.S. 6 cents of the U.S. Federal Excise Tax which results in the value of ethanol produced in the Dominican Republic being worth U.S. $0.60 more per gallon in the U.S. market as compared to ethanol produced in a non-CBI country. Labor costs in the Dominican Republic are low and the cost of shipping to the U.S. is less than in most CBI eligible countries. It would seem that, if it is feasible to produce ethanol from sugar cane products anywhere, it should be feasible in the Dominican Republic.

2. Sponsorship, Management and Technical Assistance

The potential projects discussed herein would require the cooperation of a sugar company and would best be built adjacent to an existing sugar factory. Thus, the potential projects would involve one of the 13 operating factories and one of the three sugar companies in the Dominican Republic. In many cases, a joint venture with one of the sugar companies is indicated as the sugar factory could supply the raw materials and also repair facilities, logistical support, management and technical assistance, laboratory facilities, and various other support services. Specialized design, technical and management assistance is available from any of the several U.S. Consulting Engineering Companies specializing in the production of sugar cane and cane sugar by-products. The three companies owning sugar facilities in the Dominican Republic are:

Consejo Estatal del Azucar (CEA), an agency of the Government of Dominican Republic, operator of the Government owned sugar factories.

Central Romana Corporation, owner and operator of Central La Romana Sugar Factory, the largest raw sugar factory in the world in terms of annual sugar production.

Various companies owned or controlled by the Vicini family, owners and operators of Central Caei, Central Cristobal Colon and Central Angelina.

3. Market and Sales

The market for the ethanol would be either the United States or for local consumption in the Dominican Republic. Sale in the Dominican Republic would require negotiation of a subsidized selling price. In any event, there are risks that should be considered. Some of these are summarized in Section 5.

Anhydrous ethanol prices that would currently apply to ethanol produced in the Dominican Republic can be estimated as follows, per U.S. gallon of ethanol.

Wholesale rack price of gasoline, Miami	$ 0.75
Octane enhancement value, 4 cents to 9 cents, say	0.06
Federal Excise Tax Exemption	0.60
Total	$ 1.41
Less:	
Freight and insurance from FOB Dominican Republic (DR) to CIF Miami plus unloading and delivery to blender	.07
Blenders Margin @ 10%	.14
Probable Price, FOB Dominican Republic port	$ 1.20

4. Technical, Financial and Investments Required

Ethanol Production Costs

Ethanol production costs depend upon many factors, so an accurate cost estimate would depend upon knowing location of project, process used, cost of plant, and, (especially), cost of the raw materials. For the purpose of evaluating the general feasibility of several approaches to alcohol production from sugar cane being discussed in CBI eligible countries, we will make some very rough assumptions for a number of feedstocks in producing ethanol. In all cases where the ethanol plant is operated for 180 days in conjunction with an existing sugar factory, we have assumed that the fiber content of the cane is sufficient to provide the steam and electricity from bagasse and that there is sufficient boiler and generating capacity at the sugar factory to provide this steam and electricity.

Case I - From raw sugar or syrup or juice. Facility in conjunction with existing sugar factory.

Case II - From molasses. Facility in conjunction with existing sugar factory.

Case III - From molasses. Facility separate from sugar factory.

Case IV - From sugar cane utilizing own milling plant, boiler, etc. Use molasses out-of-crop.

Subcase "A" - Operation during 180 day sugar crop.

Subcase "B" - Operation 360 days year.

YIELD AND COST ASSUMPTIONS

Yields	Theoretical	At 90% eff.
Pounds Alcohol/Pound Sucrose	0.528	
Pounds Alcohol/Pound Invert Sugars	0.511	
Pounds Alcohol/Pound Starch	0.568	
Pounds Sucrose/Gallon Ethanol	12.170	13.52
Pounds Invert Sugars/Gallon Ethanol	12.810	14.23
Pounds Starch/Gallon Ethanol	11.530	12.81

	Practical
Gallons Molasses/Gallon Ethanol	2.7500
Bushels Corn/Gallon Ethanol	0.4000
M Tons Cane/Gallon Ethanol via cane juice	0.0555
Gallons Ethanol/M. Ton Cane via cane juice	18.0000
Pounds 96° raw sugar/Gallon Ethanol	14.1000
Pounds steam for Distillery/Gallon Ethanol	18-45, say 25
Pounds steam for concentrating stillage	20-30, say 25

Cost of Molasses - $0.20/gallon ($35.00/metric ton)

Cost steam from bagasse - $1.50/1000 pounds

Cost steam from fuel oil - $6.00/1000 pounds

Cost electricity from bagasse - $0.02/kwh

Cost electricity purchased - $0.08/kwh

Cost of raw sugar - $0.055/pound

Cost of sugar cane including harvesting and hauling to plant - $13.00 per metric ton

Amortization and debt service - 12% of capital cost per annum

Cost of 3200 tons of cane/day (TCD) milling plant, bagasse burning boiler and distillery to produce 10.0 million gallons alcohol in 180 days or 20.0 million gallons in 360 days	$30,000,000.00
Cost of distillery to produce 10.0 million gallons alcohol in 180 days utilizing existing sugar factory facilities	9,000,000.00
Cost of self sufficient distillery complete with its own oil fired boiler, storage facilities, etc., 10.0 million gallons in 180 days, 20.0 million gallons in 360 days	15,000,000.00

	CASE I		CASE II		CASE III	CASE IV	
ANNUAL PRODUCTION	A 10.000	B 20.000	A 10.000	B 20.000	B 20.000	A 10.00	B 20.000
Raw sugar, syrup or juice @ 5.5¢/lb.	0.780	0.780					
Molasses @ 20¢/gallon			0.550	0.550	0.550		
Cane @ $13.00/M.T.						>0.72	0.064
Distillery fuel cost, 25 lb.							
steam, from bagasse	0.040	>0.090	0.040	>0.090	0.150	-	
steam, from oil						-	0.075
Yeast & Enzymes	0.030	0.030	0.030	0.030	0.030	0.03	0.030
Chemicals	0.010	0.010	0.020	0.020	0.020	0.05	0.050
Repairs, maintenance, lubricants, etc.	0.020	0.020	0.020	0.020	0.020	0.14	0.080
Electricity 2 kw, from factory	0.040	>0.100	0.040	>0.100		-	>0.080
, from outside					0.160		
Steam to concentrate stillage	0.040	0.090	0.040	0.090	0.150	-	0.075
Labor	0.010	0.010	0.010	0.010	0.020	0.06	0.050
Management and G & A	0.015	0.010	0.015	0.010	0.015	0.03	0.020
Professional Services, legal, auditing, and consulting	0.005	0.004	0.005	0.004	0.004	0.01	0.007
Miscellaneous	0.010	0.010	0.010	0.010	0.010	0.01	0.010
Production Cost, US$/Gallon	1.000	1.154	0.780	0.934	1.129	1.05	1.117
Capital Requirements, Millons of US$	9.000	9.500	9.000	9.500	15.000	30.00	31.000
Amorization of investment including insurance, etc. @ 12% of capital, per gallon of ethanol	0.018	0.057	0.108	0.057	0.180	0.36	0.186
TOTAL COST in US$/gallon	1.110	1.210	0.890	0.990	1.310	1.41	1.300
MARGINS & PROFITS:							
Selling price, FOB	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20
Production Costs	1.00	1.15	0.78	0.93	1.13	1.05	1.12
Gross Margins	0.20	0.05	0.42	0.27	0.07	0.15	0.08
Capital Costs	0.11	0.06	0.11	0.06	0.18	0.36	0.19
Profit [Loss]	0.09	[0.01]	0.31	0.21	[0.11]	[0.21]	[0.11]

It would appear that the only project feasible under present conditions of raw material and product prices would be Cases 1IA and IIB, ethanol projects in conjunction with an existing sugar factor, utilizing molasses as a feedstock. Under Case IIA, a profit of $0.31 per gallon on 10,000,000 gallons or $3,100,000 per 180 operating day year is projected. The minimum investment is estimated at $9,000,000. Case IIB projects profits of $0.21 per gallon x 20,000,000 or $4,200,000 per 360 operating day year on $9,500,000 investment. Case IA is marginally profitable with raw sugar or the sucrose content of syrup at 5.5 cents per pound of sucrose. If world prices were 2.75 cents per pound as they were last year, Case IA could be quite profitable ($0.48 per gallon) in association with sugar production for U.S. quota and local consumption sugar. At low sugar prices, a distillery installed to convert molasses to alcohol could be used to produce ethanol from a mixture of "A" molasses and clarified juice, reducing sugar production by 40-50% to "A" strikes of sugar, and exporting the molasses.

5. Risk Factors

Any ethanol production is quite risky. Some of the risk factors are:

1. Dependence upon the U.S. Federal Excise Tax exemption for a substantial portion of the product price if the product is marketed in the U.S.. This tax U.S. tax exemption is scheduled to expire at the end of 1991. President Reagan has recommended to the U.S. Congress, as part of his tax reform plan, that this exemption only apply to U.S. plants in production as of 1 January 1986. Although plants in the CBI eligible countries could perhaps be treated the same as U.S. plants, there is no chance that a new plant could be in operation by 1 January 1986. Of course, there is a good possibility that tax reform may not be considered this year. However, even if the tax exemption is not touched this year, it could be a target for reduction or elimination in the future.

2. Volatility of raw material costs. Molasses prices have varied from 10 cents to 46 cents per gallon over the past 5 years. An increase in price from the present 20 cents per gallon to 30 cents per gallon would eliminate the entire profit margin for molasses based alcohol. Sugar prices are even more volatile, having varied from 2.2 cents to 36 cents per pound over the past 5 years and hit a high of 66 cents per pound a little over 10 years ago. Over the past 6 months, world sugar prices have increased from 2.3 cents to 5.5 cents.

3. Increased ethanol production capacity could well saturate the premium U.S. market for ethanol in the near future and depress ethanol prices.

4. A further substantial reduction of crude oil prices would reduce gasoline prices and, to a lesser extent, ethanol prices.

5. A change of energy policy and alcohol prices by the GODR if a contract were negotiated to sell the production in the Dominican Republic.

6. Conclusions

As a bio-renewable non-polluting fuel and octane enhancer, the production of ethanol from sugar cane, grain, and starch-containing plants should have a good future, long term. However, near-term risks would seem to limit consideration of a sugar-based ethanol project to projects in association with existing sugar producing facilities with efficient steam utilization and with steam and electrical generation stations of sufficient size to supply low-cost, bagasse-produced steam and electrical power to the ethanol plant.

As the Dominican Republic does not produce oil, and as gasoline prices in the Dominican Republic are relatively expensive and require foreign exchange, it would seem logical that the Government of the Dominican Republic would consider policies to encourage ethanol production as an

import substitution. Such encouragement might be by way of guaranteeing prices at a profitable level or providing tax exemption for gasoline mixed with ethanol produced in the Dominican Republic. Without some sort of encouragement from the government of the Dominican Republic, any ethanol project is quite risky.

Longer term, any substantial and substained increase in crude oil prices would make ethanol quite profitable so that projects that can be justified at this time could, perhaps, be on the ground floor of a new and exciting industry of producing fuels and energy from sugar cane, sweet sorghum and starch crops (corn, cassava, etc.). A well managed sugar cane plantation can produce more BTU's of energy than any other crop -- and in a form that can be converted to useable forms of energy by proven methods. These usable forms include carbohydrates (sugar), ethanol, steam and electrical power, and charcoal. Sugar cane production could be the true energy farm of the future -- as soon as economics are right. However, at today's prices, the production of most of these energy products is marginal and their profitability dependent upon the specifics of the individual situation.

COGENERATION OF ELECTRICITY AND STEAM FROM BAGASSE

1. Brief Description of Project and its Rationale

The possible project or projects involve the co-generation of electricity and steam at a sugar factory using bagasse as a fuel. Such co-generation has long been practiced by sugar factories but, except for Hawaii, has largely been confined to the generation of the sugar factory's own electric requirements, generally 0.4 to 0.5 MW per 1000 tons of cane daily processing capacity. Co-generation of electricity for sale was not generally considered economic prior to the O.P.E.C. oil embargo, since energy in the form of natural gas, coal or residual fuel oil costing US $0.10 to US $0.15 per 1,000,000 BTU in already fully depreciated power houses allowed the production of electricity at about $0.01 per kwh. However, with the OPEC oil embargo, power prices have escalated. The cost of nuclear power is estimated to be $0.15 to $0.25 per KWH. With the increase in cost of petroleum products, there are few areas that can produce additional power from new plants at less than $0.05 per KWH. Thus, the availability of bagasse that must be burned anyway to produce steam is of interest, and many governments (including the U.S.) are requiring power companies to pay the "Avoided Cost" of new electric capacity to encourage production from renewable waste fuels such as bagasse and city garbage. Although the present installed generating capacity in the Dominican Republic exceeds present demand, there is actually a near balance and sometimes a shortage of electricity in the Dominican Republic due to poor condition of some of the electrical equipment and low water levels and "silting" in reservoirs supplying hydro-electric power. Further, with increased population and per-capital buying power as well as an expanding tourist industry that requires air conditioning, electric demand should increase.

Installation of co-generation at existing sugar factories is often particularly attractive due to the presence of all required infrastructure and the availability of bagasse fuel directly from the milling process. Such production usually requires the replacement of old low pressure

boilers with modern high pressure boilers, changes in the use of process steam, and installation of additional steam driven generator capacity. Many existing sugar factories are facing the necessity of replacing old boilers built 25 to 50 years ago and it costs very little more to replace them with high pressure boilers rather than with low pressure boilers.

Recent sugar factory boiler installations have usually been made with co-generation. For example, in Hawaii the Pepeekeo factory, the Lihue factory and the Puna factory and several others generate 10 to 15 MW of power in excess of their requirements for sale to the electric power companies. The new (1980) Kenana Sugar Factory in Sudan was designed for and is now producing 40.0 MW, of which 30.0 MW is in excess of factory requirements. Kenana has provisions to produce up to 90.0 MW, of which 80.0 MW would be in excess of factory requirements. Thus, it can be seen that co-generation is a proven concept in the sugar industry.

At the present time there are at least 5 sugar factories in the Dominican Republic of sufficient size to justify co-generation. The largest of these, Central Romana, over 20,000 Tons Cane per Day (TCD), has for many years converted its excess bagasse to furfural and is not a likely candidate for co-generation in excess of the limited amount presently practiced. The private company owning the other factory of sufficient size for co-generation is already making arrangements for co-generation ir a recently commissioned study confirms its feasibility. The three factories owned by CEA of sufficient size to be possibly attractive at present for co-generation are the 13,000 TCD Rio Haina, the 5500 TCD Barahona and the 4500 TCD Boca Chica factories. In this brief profile, we have used a 10,000 TCD factory as a basis. As the co-generation of electricity is not labor intensive, as the generators are multiple units, and as boiler capacity unit cost does not vary greatly, it is believed that a general approximation of results projected can be obtained by using multiples -- 1.3 for the 13,000 TCD operation and 0.55 and 0.45 for the 5500 TCD and 4500 TCD operations respectively. Obviously, a complete detailed analysis of the specific project would be required, the results of which could vary considerably from the projections. The purpose of this profile is to determine the possible general feasibility of co-generation in the Dominican Republic sugar industry.

Based on the assumptions used, if a US $0.05 per KWH price could be negotiated with the Government of The Dominican Republic (GODR) power company, a payback of about 5.2 to 5.4 years is indicated with annual returns to equity being over 150% (with equity being 10% of project cost) and over 75% (with equity being 20% of project cost). If a price of US $0.06 per KWH can be negotiated, the payout would be reduced to about 4.2 years and annual returns increased to over 200% (10% equity) and over 100% (20% equity).

The concept appears possibly feasible and attractive but there are many risk factors including the necessity of dealing and negotiating almost exclusively with various agencies of the Government of The Dominican Republic. A further risk factor is the long time viability of the sugar industry in the Dominican Republic. However, as the project would be installed in one of the larger and more efficient of the factories, they would probably be among those last to be closed in any contraction of the sugar industry. These factories are likely to be in operation for many years unless the sugar industry is abandoned completely or reduced to the two private sector companies, which seems highly unlikely.

2. Sponsorship, Management and Technical Assistance

The potential project would involve one of the 5 larger operating sugar factories and one of the three sugar companies in the Dominican Republic, most probably a State Sugar Council factory. A joint venture with the sugar factory is indicated as they could supply not only the bagasse but also repair and maintenance facilities, logistical support, management and technical assistance and various other support services. Specialized design assistance is available from one of the several U.S. Consulting Engineering Companies specializing in the production of sugar, sugar cane and sugar by-products. The three companies owning sugar facilities in the Dominican Republic are:

Consejo Estatal del Azucar (CEA), an agency for the Government of Dominican Republic, operator of the Government owned sugar factories.

Central Romana Corporation, owner and operator of Central La Romana Sugar Factory, the largest raw sugar factory in the world in terms of annual sugar production.

Various companies owned or controlled by the Vicini family, owners and operators of Central Caei, Central Cristobal Colon and Central Angelina.

3. Market and Sales

The only market for the electric power is the Government owned power company. A long term contract for the sale of electricity containing suitable escalation provisions would have to be negotiated.

4. Technical Feasibility, Manpower & Resources

In order to determine the technical feasibility of the cogeneration of electricity at a sugar factory in the Dominican Republic, we have made the following assumptions as a basis for preparing a complete material and energy balance.

Technical Assumptions

10,000 short tons cane (STC)/day (11,000 STCD design, 21.8 hours per day operation)

Grinding rate - 458.88 STC/hour

Cane:	% Pol	12.50
	% Brix	15.39
	% Fiber	16.00
	% Imbibition	32.00
Bagasse:	% Cane	34.43
	% Pol	2.54
	% Moisture	50.00
	% Fiber	46.47
Pol Extraction		93.00
Final Molasses		6.69 gallons per ton cane @ 80 Brix

Bagasse Fiber Gross H.V.	8,350 BTU/pound
Bagasse as burned, Gross H.V.	3,925 BTU/pound
Average Boiler Efficiency	58.00% (Based on gross H.V.)
Boiler steam	450 PSIG, 680° FTT
Boiler Feed Water Temperature	259° F
Turbine Back Pressures	22 PSIG at turbines
Exhaust Pressures	20 PSIG in lines

Knives - 2 sets, steam turbine driven, 21.27 pounds steam/HP-Hr.

Mills - 6 sets 3 roller mills, steam turbine driven, 21.27 pounds steam/HP-Hr.

BFW Pumps - steam turbine driven, 24.57 pounds steam/HP-Hr.

Limed and clarified juice pumps, 24.57 pounds steam/HP-Hr.

ID Fans - steam turbine driven, 24.57 pounds steam/HP-Hr.

FD fans - electric

Back pressure turbo - generators, 20.58 pounds steam/KWH

Condensing Turbo - generator, 10.00 steam/KWH

Amount steam to back pressure TG -- sufficient, when combined with exhaust from drive turbines to supply factory exhaust steam requirements

Amount steam to condensing TG -- all steam produced by bagasse in excess of that required to pass through back pressure turbines to supply factory exhaust steam requirements.

Pan system -- 3 boiling system

Pans -- On first vapors at 10.4 PSIG

Evaporator - Quadruple effect

Vapors from first body to all vacuum pans, clarified juice heater and second stage lined juice heater and remaining bodies of evaporator.

Vapors from second body to first stage limed juice heater and remaining bodies of evaporator.

To Be Determined

1. Total steam available from bagasse
2. Total exhaust (low pressure) steam requirements that must come from factory drive turbines and back pressure turbo-generators

3. Steam available to condensing turbo-generators
4. Total electric production
5. Factory electric requirement
6. Electric Power available for export
7. Alternate arrangements to maximize electric production

Calculations

Several complete materials and energy balances were calculated based on the above assumptions plus other assumptions that either derive from the basic assumptions or are typical sugar factory practices. The calculations are not included for reasons of bulk as each set of calculation summary printouts required 59 pages. The results of the calculations provide the following answers for the seven questions set forth above. The calculations are available upon request.

1. The total steam available from the bagasse is 640,700 pounds per hour (PPH)
2. The total live steam required to pass through the plants prime movers and 10.0 MW of back pressure turbines is 394,600 PPH. The exhaust from this steam will provide the 408,000 pounds of low pressure saturated exhaust steam required by the processing of raw cane juice into sugar.
3. The amount of steam available for the condensing turbines is 640,700 PPH - 394,700 PPH = 246,000 PPH. We have assumed that 5% of the bagasse, corresponding to 32,000 PPH of steam is set aside for start-ups and inefficient firing after factory interruptions. Thus the actual steam available for the condensing turbines is 214,000 PPH.
4. Total electric production from the condensing generator(s) is 214,000 divided by 10.2, a typical water rate for a 10 to 20 MW condensing turbo-generator with the steam conditions assumed. Thus, the electric power from the condensing generators = 20.980 MW, say 20.0 to provide a safety factor. Total electric production from the factory will be 20.0 from condensing units and 10.0 from non-condensing units, a total of 30.0 MW.

5. The factory electric requirements are calculated to be approximately 4.5 MW.
6. The amount of electric power available for export is 30.0 - 4.5 = 25.5 MW (Case A).

7-b. With the same boiler efficiency, the conversion of quadruple effect evaporators into quintuple effects would allow generation of 3.9 additional MW, or a total of 33.9 MW. Electric power available for export = 29.4 MW (Case B).

7-c. With 65% boiler efficiency, 718,000 pounds of steam can be generated, or 77,300 additional pounds of steam. This will allow generation of 7.6 additional MW of electricity or 37.3 MW with quadruple effect (Case C) evaporation. Electric power available for export = 32.8 MW.

7-d. With 65% boiler efficiency and quintuple effect evaporation, total electrical power generation can be increased to 41.2 MW. Electric power available for export = 36.7 MW (Case D).

Manpower

The cogeneration of electricity at an existing sugar cane factory requires few if any additional personnel other than the necessary accounting and office personnel to handle the separate financial records if the enterprise is set up as a separate company. In cases where a number of small, old, manually cleaned boilers are replaced by a large efficient water wall, stoker fired boiler with traveling grates and mechanical ash disposal, the total number of personnel will be substantially reduced. The manpower assumptions used in the financial projections appear in Section 5.

Resources

We have assumed that there will be a suitable area at the sugar factory to locate the new boiler and turbo-generators and a small office. All other resources are normally available at any sugar factory--utilities, maintenance services, transportation and other infrastructure.

5. Investment Requirements, Project Financing and Returns

Capital Improvements Required

For the purpose of this projection, we have assumed that the existing sugar factory has quadruple effect evaporators but that about 30,000 sq. ft. HS of evaporators and one pan must be added. We have assumed that piping changes must be made to put all pans and heaters on vapors. We have assumed that the factory already has 5.0 MW of generating capacity to supply its own electric needs and that the additional generating capacity and switchgear must be added. We have assumed that the factory already has sufficient boiler capacity to burn all its bagasse but that the existing boilers are of 250 PSIG or less so that, for Case A and Case B, 250,000 PPH of new high pressure, high efficiency boiler capacity must be added to bring the overall boiler efficiency to 58% and to supply high pressure (450 PSIG or more) steam to the additional turbo-generators; for cases C and D we have assumed that all boiler capacity will be supplied by new high pressure, high efficiency boilers. In the case of quintuple effect evaporation schemes (Case B and Case D) we assume that, in addition to the 30,000 sq. ft. H.S. for the quadruple mentioned, an additional 40,000 sq. ft. H.S. of evaporation capacity will be required. The costs are summarized below. All costs are CIF equipment costs plus 50% added for foundations and other local materials, engineering, erection costs and insurance during construction. All costs are in US$ and assume that the project materials will be exempted from all import taxes and duties.

	CASE A	CASE B	CASE C	CASE D
Evaporator bodies, Vacuum Pan & Piping Additions & Modifications	1,200,000	2,500,000	1,200,000	2,500,000
High Pressure Boiler Capacity	7,600,000	7,600,000	18,000,000	18,500,000

Back Pressure Turbo - Generator	700,000	700,000	700,000	700,000
Condensing Turbo - Generator(s)	3,000,000	3,600,000	4,100,000	4,800,000
Switchgear, electric modifications, etc.	600,000	700,000	800,000	900,000
Totals	13,100,000	15,100,000	24,800,000	27,400,000
Round To	13,500,000	15,500,000	25,000,000	28,000,000

Financial Structure

Because of the large amounts of capital required and the dependence upon governmental policies as regards the sugar industry, as regards the relationship with the State Sugar Council (CEA) and as regards the price to be received by the project from the National Electric Grid, it is envisioned that the project will have to be financed largely by suppliers credits, Aid Programs, and government and international organizations. Equity, if any, will be small (10-20%) in relation to debt in order to provide an adequate return on equity investment. Logical equity holders would be CEA, GODR, IFC, the equipment suppliers and, perhaps, private investors. Operating capital requirements are relatively small since the raw material (bagasse) is obtained from the mill as produced and the product is delivered immediately to the electric grid. Further, during the assumed 6 months of the sugar grinding season, practically no additional employees are required (fewer could be required as a modern large stoker fired water wall boiler with traveling grates require less labor than the several small manually cleaned boilers it or they will probably replace). During the six months the project could be operated on auxiliary fuel, 20 to 30 employees will be required - still a relatively small number.

Financial Assumptions

For the purpose of these projections, we have assumed that the sugar factory at which the project is installed is either a substantial equity holder in the project and/or has a vested interest in the project so that the project is furnished the necessary bagasse at no cost and, in return, receives back the projects exhaust steam. It is assumed that the project will bear all costs of the project itself and costs within the sugar factory necessary to achieve the required steam economy. It is assumed that the factory will pay nothing for the benefits it derives from the project (dependable boiler capacity and steam supply, more dependable electric supply, new pan and evaporator capacity, etc.). It is assumed that the project will pay only for additional personnel required beyond those the sugar factory would ordinarily employ in their boiler station but that the project will employ and pay for all personnel in the power generation station. It is assumed that residual fuel oil is the out-of-crop fuel although coal should be considered. It is assumed that all payouts and profits shall be derived during 180 days of in-crop operation on bagasse. It is assumed that operation, if any, during the out-of-crop season is on a break-even basis. (actually, the power plant should have some value and earn some profit during the out-of-crop season). We have assumed that equity equal to 10% of the project cost will be for operating capital and interest during the first 6 months of the 18 month construction period so that the loan repayments will start 6 months after completion of the project which should be timed to coincide with the start of the grinding season. Further, we have assumed that electric power will sell for between 5 and 7 US cents per KWH during the payout period -- projections are made for both 5 cents/KWH and 6 cents/KWH.

Negotiations

Obviously, the scenario presented would require extensive negotiations with CEA, the individual sugar factory, the Government of the Dominican Republic, the government owned power company and others. The final scheme worked out could vary greatly from that assumed. Nevertheless, we believe the assumptions used will allow us to test the general feasibility of the project.

PROJECTIONS AT $0.05 PER KWH (for 10,000 TCD Factory In US $)

	CASE A	CASE B	CASE C	CASE D
Capital Investment	14,850,000	17,000,000	27,500,000	30,800,000
Plant Cost & Debt Financed	13,500,000	15,500,000	25,000,000	28,000,000
Equity (Equiv to Operating Capital)	1,350,000	1,500,000	2,500,000	2,800,000
Power for Export	25.5 MW	29.4 MW	32.8 MW	36.7 MW
Income for 180 Days	5,508,000	6,350,000	7,085,000	7,927,000
COSTS:				
Average Annual Interest	1,039,000	1,193,000	1,925,000	2,156,000
Depreciation @ 5%	675,000	775,000	1,250,000	1,400,000
Operating Personnel	175,000	175,000	200,000	200,000
General & Administrative	300,000	300,000	400,000	400,000
Repair & Maintenance @ 4%	540,000	620,000	1,000,000	1,120,000
TOTAL COSTS	2,729,000	3,063,000	4,775,000	5,276,000
Gross Profits	2,779,000	3,287,000	2,310,000	2,651,000
Taxes @ 25%	695,000	822,000	578,000	663,000
Profit after Taxes	2,084,000	2,465,000	1,732,000	1,988,000
Add Back Depreciation	675,000	775,000	1,250,000	1,400,000
Avg. Annual Cash Flow	2,759,000	3,240,000	2,982,000	3,388,000
PAYBACK YEARS (based on Avg Ann. Cash Flow)	5.4	5.2	9.2	9.1
Avg Annual Profit % Equity	154%	164%	69%	71%
Avg Annual Profit % (Equity of 20% Capital Cost)	77%	82%	35%	36%

Projections at $0.06 per KWH (For 10,000 TCD factory in US$)

Capital Investment	14,850,000	17,000,000	27,500,000	30,800,000
Project Cost & Debt Financed	13,500,000	15,500,000	25,000,000	28,000,000
Equity (Equiv to Operating Capital)	1,350,000	1,500,000	2,500,000	2,800,000
Income for 180 Days	6,610,000	7,620,000	8,502,000	9,513,000
COSTS:				
Average Annual Interest	1,039,000	1,193,000	1,925,000	2,156,000
Depreciation at 5%	675,000	735,000	1,250,000	1,400,000
Operating Personnel	175,000	175,000	200,000	200,000
General & Administrative	300,000	300,000	400,000	400,000
Repairs & Maintenance @ 4%	540,000	620,000	1,000,000	1,120,000
TOTAL COSTS	2,729,000	3,023,000	4,775,000	5,276,000
Gross Profits	3,883,000	4,557,000	3,727,000	4,237,000
Taxes @ 25%	970,000	1,139,000	932,000	1,059,000
Profit after Taxes	2,912,000	3,418,000	2,795,000	3,178,000
Add Back Depreciation	675,000	775,000	1,250,000	1,400,000
Avg. Annual Cash Flow	3,587,000	4,193,000	4,045,000	4,578,000
PAYBACK YEARS (based on avg annual cash flow)	4.2	4.1	6.8	6.7
Avg Annual Profit % Equity if equity is 10% of capital costs	216%	228%	112%	114%
Avg Annual Profit % Equity if equity is 20% of capital costs	108%	113%	56%	57%

6. Government Support and Regulations

The Dominican government in its policy making in recent years has been providing incentives for foreign investment to support the build-up of integrated agribuinesses, especially those producing and exporting non-traditional products. Law No. 409, the Agro-industrial Promotion Law would offer considerable incentives including tax exemptions to this type

of project. Further discussion of investment regulations is taken up in the Reconnaissance Survey Report which is available from ASAC International or the Trade and Development Program.

7. Time Scale Envisioned for Project

The project will require about 18 months from placing of orders to initial operation, assuming a 6 month head-start for pre-breaking ground engineering and procurement. Thus, the total time frame is 24 months from project authorization. It should be scheduled to be "on-stream" at the beginning of a grinding season to minimize interest payments on idle capacity as the factories operate only 180 - 200 days per year.

8. Appendix

Amortization of Investment of $13,500,000

YEAR	PRINCIPAL	INTEREST	TOTAL PAYMENT
1	$ 769,284	$ 1,620,000	$ 2,385,285
2	861,602	1,527,687	2,385,285
3	964,994	1,424,295	2,385,285
4	1,080,792	1,308,495	2,385,285
5	1,210,486	1,178,798	2,385,285
6	1,355,747	1,033,542	2,385,285
7	1,518,435	870,854	2,385,285
8	1,700,644	688,639	2,385,285
9	1,904,723	484,560	2,385,285
10	2,133,292	255,996	2,385,285
TOTAL	$ 13,500,000	$ 10,392,866	$ 23,852,850

Total Loan	$ 13,500,000	$ 15,500,000	$ 25,000,000	$ 28,000,000
Avg Annual Principal	1,350,000	1,550,000	2,500,000	2,800,000
Avg Annual Interest	1,039,000	1,193,000	1,925,000	2,156,000
Annual Payments	2,385,000	2,433,000	4,425,000	4,956,000
Total Payments	23,893,000	27,433,000	44,246,000	49,556,000

PRODUCTS AND BY-PRODUCTS OF THE CANE SUGAR INDUSTRY

1. Brief Description of Projects and Their Rationale

This profile contains a general discussion of various products and by-products of the cane sugar industry other than its two main products, sugar and molasses and other than the production of industrial/fuel grade ethanol (ethyl alcohol) and the co-generation of steam and electricity for bagasse, both of which are profiled separately in some detail.

The cane sugar industry has many by-products. Sugar cane can produce more food and more potential energy and fiber per hectare than any other crop -- 3 to 6 times as much as most other crops. For example, a hectare of good sugar cane on good soils can produce 100 tons of sugar cane from which typically is produced 10 tons of sugar, 3 tons of molasses, 3 tons of filter mud, 0.5 ton ash, and 15 tons of bone-dry fiber (in 33 tons of 50% moisture bagasse). In addition, 30 to 50 tons of green cane leaves and tops are first burned away and the balance often discarded. These tops and leaves could be valuable as fodder, ensilage, commercial animal feed, or for their fiber and/or fuel value. Total production of food and fiber per hectare is about 45 tons on a bone-dry basis.

Many potential products have been ignored when sugar prices were good and the most important problem to sugar companies seemed to be the expansion of their production of profitable sugar. However, in the past few years, the price of that portion of sugar (about 15%) traded on world markets has declined and is now at about 5.5 U.S. cents per pound, one-third of the average cost of producing sugar in the world. The Dominican Republic has been particularly hard hit as it must export over 50% of its production at world market prices. As one of the lowest cost producers of sugar (about 13.5 U.S. cents per pound), and in an area of low labor costs, increased attention is being given to three matters -- (1) diversion of some of the extensive cane lands in the Dominican Republic to other agricultural uses to reduce the amount of sugar that must be sold on the world market at a loss, (2) increasing the cost efficiency of sugar production and, (3) development of industries utilizing sugar or sugar industry by-products.

At the same time that much of the sugar industry is discarding or underutilizing its sugar cane tops, leaves and fiber, the Dominican Republic is importing animal feeds, timber products and is denuding its forests to produce firewood and charcoal for household fuel use. It has been estimated that the country has lost about 75% of its forests in the past 25 years. The loss of forests will result in making both droughts and floods more severe and constitute a danger to human life not only from floods, but also from mud-slides similar to the one that took over a thousand lives in San Pedro Sula, Honduras about 12 years ago. On a global basis, no one can predict the danger to the ecology of the world that the destruction of the world's forests will cause. Thus, we feel that the production of charcoal and firewood from bagasse and the substitution of sugar cane based animal feeds would not only be profitable but achieve desirable social and environmental results. Thus, after reviewing some of the many by-products of the sugar cane industry, we feel that an animal feed/litter plant, synthetic lumber/board plant, and a plant to produce charcoal and/or fuel briquettes from bagasse merit attention as well as the separately profiled potential cogeneration and ethanol projects. Some of the other by-products briefly mentioned also have potential in the Dominican Republic.

2. Sponsorship, Management and Technical Assistance

Almost all of the potential projects discussed herein would require the cooperation of a sugar company and many would best be built adjacent to an existing sugar factory. Thus, in most cases, the potential projects would involve one of the 13 operating sugar factories and one of the three sugar companies in the Dominican Republic. In many cases a joint venture with one of the sugar companies is indicated as they could supply not only the raw materials but also repair and maintenance facilities, logistical support, management and technical assistance and various other support services. Specialized technical and management assistance is available from one of the several U.S. Consulting Engineering Companies specializing in the production of sugar, sugar cane and cane sugar by-products. The three companies owning sugar facilities in the Dominican Republic are:

Consejo Estatal del Azucar (CEA), an agency of the Government of Dominican Republic, operator of the Government owned sugar factories.

Central Romana Corporation, owner and operator of Central La Romana Sugar Factory, the largest raw sugar factory in the world in terms of annual sugar production.

Various companies owned or controlled by the Vicini family, owners and operators of Central Caei, Central Cristobal Colon and Central Angelina.

3. Market and Sales

As a number of potential projects are discussed, we cannot summarize the market and sales in one section. Many of the products discussed would depend upon local markets, some of which would require Governmental decisions or negotiations.

4. Discussion, Technical, Raw Materials and Investments

Some of the more important products and by-products of the sugar industry are as follows:

A. Sugar

Almost any of the products or by-products that can be made from molasses can be made from cane juice or sugar. There are several hundred derivatives of sucrose, some of which are or could become industrially important. These many derivatives of the chemical modification of the sucrose molecule will not be considered here as their inclusion would require hundreds of pages. Molasses contains about 50% total sugars and the sugars therein are usually less expensive that the use of sugar or cane juice. Therefore, products that can be made from sugar or molasses will not be discussed separately from the products made from molasses.

We should point out that bio-degradable detergents and soaps can be made from sugar and that such detergents could have a substantial future potential. Such detergents are probably economic at present with the

current low price of world sugar. However, world sugar prices are subject to rapid fluctuation and it would not be prudent to consider a detergent project that depends on the present 5.5 cents per pound world price of sugar which is far below the cost of production. If the full cost of the disposal of ordinary detergents, especially those containing phosphates, were built into the price of the detergents, their price would be substantially increased and sugar based bio-degradable detergents could be priced so as to allow it to pay 18-20 cents per pound for sugar. However, at present, the cost of disposal is passed on to municipal waste disposal systems and is not built into the price of detergents. Thus, the manufacturing of detergents from sugar must await pressures from environmental groups or changes in governmental policies. If sugar-based detergents become economic, the Dominican Republic, one of the lower cost major sugar producers in the world and close to large North American markets, could be a logical location.

B. Products from Bagasse

Bagasse is the residue of sugar cane after it has passed through the milling and juice extraction station. A typical bagasse as it comes from the sugar factory contains about 50% water, 45% celluloses, hemicelluloses, and lignins, 2% sugars and 3% ash. In the sugar industry, all of the non-soluble materials are called fiber although ash certainly is not fiber. Some of the products that can be produced from bagasse include the following:

- cogeneration of steam and electricity
- pulp and paper
- synthetic lumber
- corrugated board
- fiber board and particle board
- plastics and resins (from lignin)
- door cores
- acoustical wall and ceiling tiles
- fuel briquettes
- methane and producer gas

- furfural
- xylitol
- alpha cellulose
- absorbant for explosives (pith or light fraction)
- cattle feed (with or without addition of molasses)
- poultry litter and cattle bedding
- mulch and soil conditioners
- single cell protein for animal consumption
- carbon from fly ash
- CO_2 from stack gasses
- heat and/or steam from stack gasses

C. Molasses, Final or Blackstrap

Final or blackstrap molasses is the liquid residue from which no more sugar can be economically removed by crystallization and centrifuging. A typical final molasses weighs about 12.3 pounds per gallon and contains 50% total sugars. A typical analysis might be: 40% sucrose, 10% invert sugars, 12% protein and other nitrogenous compounds, 8% ash, 8% starches and non-sugar carbohydrates, 7% various including vitamins, minerals and waxes, and 15% water. Some of the products that can be produced from molasses include the following:

- animal feed
- industrial and anhydrous ethyl alcohol
- carbon dioxide (CO_2) and dry ice
- rum and other potable alcohols
- acetic acid and vinegar
- citric acid
- yeast
- butanol
- glycerol and other chemicals
- dextran
- other organic chemicals
- aconitic acid, other acids, and salts of these acids
- monosodium glutamate
- fertilizer

D. Filter Mud and Miscellaneous

Filter mud or filter cake is the material retained on the screens of the filters after the wet material that settles to the bottom of the clarifiers have been filtered to remove sucrose containing water. It contains soil particles, fiber, proteins, ash, waxes, sugars, etc. and is usually rich in calcium and phosphates. Some of the uses of filter mud include the following:

- cane wax
- animal feed
- a mulch, soil conditioner and fertilizer

E. Discussion

The cogeneration of electricity and the production of ethanol for industrial and fuel uses have been profiled separately. The production of rum and potable liquors is already being carried out in the Dominican Republic; an increase in the production of these products is mainly a marketing problem and is not considered herein.

Furfural (furfuraldehyde) is a major by-product produced from bagasse and used as a selective solvent and as a chemical intermediate from which Nylon and molding resins are produced. Its production requires a large capital investment and the right marketing connections. At the present time, Central La Romana in Dominican Republic and the Sugar Cane Growers Cooperative in Belle Glade, Florida are major producers of furfural and their plants are running at less than capacity due to depressed prices. We do not see any further opportunities in furfural in Dominican Republic at this time.

The production of acetic acid, citric acid, yeast, carbon dioxide, and similar products produced by the fermentation of molasses was not evaluated specifically. Yeast, CO_2 and dry ice are valuable by-products from the production of ethyl alcohol, the other fermentation products are either quite small industries or not particularly economic under present

conditions. The production of citric acid, acetic acid and vinegar could perhaps be justified if there is sufficient demand for these products on the island or nearby areas.

The economics of producing by-products from filter mud are generally not economic although the value of the mud as animal feed, fertilizer or soil conditioner is considerable under some conditions and can be justified if it can be hauled directly to fields or feed lots that can utilize it in close proximity to the factory. It can also be used in mixing potting soils. Two of the three cane wax from filter mud has not proved economic with the two of the three wax plants in the world (in Louisiana and Cuba) utilizing filter muds were closed several years ago and it appears that the production of wax from filter mud is not economic at this time.

The production of pulp and paper from bagasse requires a large capital investment and must be on a scale of, probably, 100 tons of pulp or paper per day or more to be economic under present conditions. Such large scale production would require a La Romana size plant to supply sufficient surplus bagasse. As La Romana presently uses its surplus bagasse to produce furfural, it is doubtful that a pulp or paper plant could be justified in the Dominican Republic under present conditions as it would require substitution of other fuels for bagasse in order for any of the other sugar factories to supply sufficient bagasse.

5. Three Projects of Possible Special Interest

Three products that could possibly be economic in the Dominican Republic under present conditions -- (1) animal feed/litter plant, (2) synthetic lumber/lumber/board, and (3) bagasse charcoal and fuel briquettes -- are summarized as follows.

Animal Feed/Litter

At the present time, some molasses is presently being utilized in Dominican Republic to feed cattle and swine. Most of it is fed direct, often enriched with urea. We do feel there is some potential in an animal

feed plant in Dominican Republic operating at one of the sugar factories that has a surplus of bagasse so that both bagasse and molasses can be utilized in making a pelletized feed. Sugar cane tops and/or whole cane can also be utilized. Such a plant could also produce poultry litter, mulch and similar products. As there are so many variations of animal feed/animal litter plants, no specific description or projections can be made in this brief summary.

Lumber and Timber Substitutions

Lumber and other timber products are in generally short supply and costly in Dominican Republic. Various synthetic lumbers, fiber boards, particle boards, acoustical tiles and door cores can be produced from bagasse. Most of these products require resins (perhaps from La Romana furfural?) to enhance their strength. In fact, if the fiber is separated from the pith, aligned bagasse fiber can be made into a board that is stronger and more wear resistant that high quality oak. We have not examined the economics of these products in Dominican Republic but point out that they could be economic in Dominican Republic.

Charcoal and Fuel Briquettes

Bagasse has a reasonably high heating value, about 8350 BTU per pound of bone-dry bagasse. This compares with a heating value of 11,000 to 14,000 BTU per pound for bituminous and anthracite coal, about 6,500 for lignite, 500-3500 for peat and about 3900-4500 for air dried wood and 11,000-13,000 for charcoal. Bagasse as produced contains about 50% moisture and about 3900 BTU per pound. It is obvious that, with a reduction in moisture content, partially dried bagasse could be used as a fuel with heating values equivalent or better than most "firewood" and, with further drying, comparable to lignite coal. The heating value and carbon content of the bone-dry material in wood and bagasse is very similar. Thus, bagasse can also be converted to charcoal.

Bagasse can be dried and compressed for use as a fuel for use in home cooking/heating. The process would consist of drying of the bagasse

(either whole bagasse or partly depithed) and then forming into briquettes. The depithed bagasse tends to burn with less smoke and form better briquettes than does whole bagasse and the pith (sometimes can be sold as an industrial absorbent) returned to the factory for "filter aid" and/or burning. A very rough cost estimate for a plant to make about 10,000 tons of product (from 20,000 tons bagasse) per 180 day sugar factory grinding season is about $800,000. Based on this, the economics would be about as follows, per ton of product briquettes.

Capital Costs	$ 12.00
Labor, 5 man-hours	3.00
Power, 100 KWH	- (to be negotiated with factory)
Flue gasses for drying	- (to be negotiated with factory)
Bagasse	- (to be negotiated with factory)
Repairs and Maintenance	1.00
Bags, second hand @ 20 cents	4.40
Supplies and lubricants	.20
General & Administrative	5.00
Total	$ 25.60

As good quality firewood has a usual value of $35 to $55 per ton, there could be a potential if Governmental policies are set up to discourage "poaching" firewood from national forests, and if a favorable joint venture can be negotiated with a sugar factory which would provide the electric power, flue gasses or bagasse at nil or low cost in return for participation in the profits.

Charcoal can be produced from any woody material including bagasse. It is obtained by the imperfect burning of wood in an oxygen-deficient atmosphere so as to leave a propondence of carbon that can be used as a fuel similar to coal. Although there are several approaches to making charcoal from bagasse, most involve carbonization of bulk or baled bagasse, the mixing of the resulting charcoal with molasses, the extrusion, pelletizing or pressing of the mixture into briquettes and the

recarborization of the briquettes in order to vaporize the water from the molasses and carbonize the molasses. The equipment consists largely of the same equipment as required for the drying and briquetting of bagasse to form fuel briquettes plus air-proof ovens in which to carry out the carbonization processes. A plant to produce 20,000 tons of charcoal per 180 day sugar factory grinding season would cost about 1.5 to 2.5 million dollars. Assuming a 2.0 million cost, a very rough estimate of the cost of producing charcoal follows.

Capital costs	$ 15.00
Labor, 7 man-hours	4.20
Power, 100 KWH	- (to be negotiated with factory)
Flue gasses for drying	- (to be negotiated with factory)
Bagasse	- (to be negotiated with factory)
Additional fuel	2.00
Molasses, 0.5 ton	12.50
Repairs and Maintenance	2.00
Bags, second hand @ 20 cents	4.40
Supplies and lubricants	.40
General & Administrative	4.00
Total	$ 44.50

Charcoal is usually valued at $75.00 to $100.00 per ton. Depending upon the deal negotiated with the sugar factory for the supply of electric power, flue gas and bagasse and assuming Governmental policies that would discourage "poaching" of "free" wood for charcoal from national forests, charcoal production from bagasse could be a profitable project.

Because of the extreme importance of preventing the destruction of the remaining forests and the denuding of the hillsides and resulting danger, it is believed that a project to produce household charcoal and a firewood substitute from surplus bagasse should merit assistance from not only the Government of Dominican Republic but also from various U.S. and International Agencies. As there are presently few commerical bagasse based charcoal/firewood ventures in the world, and as the technology used is still somewhat primitive and not fully perfected, a semi-commercial demonstration project may be indicated, with participation by both public and private sector and assistance from U.S. and/or international agencies.

CUT FLOWER PRODUCTION FOR EXPORT

1. Executive Description

The cut flower industry in the Dominican Republic is in its infancy with about $300,000 in export sales in 1984. There are dreams of a $25 million industry by 1990. The production of cut flowers is a capital intensive venture that generates large sales in a relatively short time. The major competition for the American market is from Colombia and Dominican production will have to meet some stiff quality standards to win a share of this market. However, the Dominican Republic does have a wide range of micro-climates which make the production of many floral varieties possible, and is situated much closer to the eastern U.S. market. The venture analysis outlined here show internal rates of return between 20 and 76% on five different crops.

2. Market and Sales

Less than twenty years ago, Colombia had no export industry for cut flowers. Today, it exports over a $100 million of cut flowers a year and is a dominant factor in the production and sales of pompoms, carnations and roses. These are the three major flowers used in the U.S. market and all three as well as some other popular varieties can be grown economically in the Dominican Republic. In 1983, there were seven Dominican flower exporters who shipped a total of $296,000 to the U.S.. During this year an organization (CODOFLORES) was formed by flower growers to promote increased exportation of flowers. In 1984, these seven growers employed 700 people on less than 100 acres of production. Much of the production has gone to the national market which has supported new ventures since 1983 when restrictions were placed on flower imports. Approximately 5000 acres of potential production area has been identified as being suitable for floral production.

Most of the floral exports are marketed by wholesalers in Miami or New York and this will continue to be so. However, in 1985, the combination of severe cold weather in Bogota at holiday time and a glut of flowers in the market has created a very tight market. A close working relationship between wholesaler and grower will be needed to insure that a good product mix and quality reach the ultimate customer. This service is an additional value that should insure ones' place in the market.

3. Technical Feasibility, Manpower, and Raw Material Resources

A major factor affecting the feasibility of flower production in a given area is the microclimate of the location. A very interesting factor in the Dominican Republic is the interaction of day length and altitude (night temperature) on the flowering response of chrysanthemums. Basically, chrysanthemums can be grown year-round without artificial shading within 13° - 15° North Latitude and 13° - 15° South Latitude and Dominican Republic lies about 18° north latitude. Thus, some shading (short day-lengths) should be required during the summer months. The Jarabacoa area (2325 ft.) requires shading. The quality of pompoms in Constonza (3875 ft.) showed that shading was not absolutely necessary for flowering but the quality would have been improved with shading. In Valle Nuevo (6200 ft.), the quality was comparable to Colombia quality during the summer. Table 1 lists some major floral crops, ideal conditions and potential locations for production.

(PLEASE FIND TABLE I: MICROCLIMATE/CUT-FLOWER PRODUCTION ON FOLLOWING PAGE)

TABLE I - MICROCLIMATE FOR CUT-FLOWER PRODUCTION

Crop	Altitude (feet)	Day Temperature °F	Night Temperature °F	Locations	Comments
Chrysanthemum					
Cushion - Polaris	5000-7500	65 - 80	40 - 55	Valle Nuevo Constanza Jarabocoa (winter)	
Cushion - Others	2500-5000	65 - 80	48 - 60	Constanza Jarabocoa (winter)	
Daisies	2500-5000	65 - 80	48 - 60	Constanza Jarabocoa (winter)	
STD Mum & Fuji	2500-5000	65 - 80	50 - 60	Constanza Jarabocoa (winter)	
Carnation					
Standard	5000-7500	60 - 75	35 - 55	Valle Nuevo	
Miniature	3500-6000	60 - 80	45 - 60	Valle Nuevo Constanza	
Rose					
European Hybrids	5000-6500	60 - 75	40 - 55	Valle Nuevo Constanza	good ventilation for cooling is needed at Jarabacoa
American Hybrids	2500-4000	60 - 80	50 - 60	Constanza Jarabacoa	
Anthurium	500-1500	70 - 85	60 - 70	Many Lower Locations	
Orchids (Vandaceous)	500-1500	70 - 85	60 - 70	Many Lower Locations	
Gerbera	2500-4000	65 - 80	45 - 60	Jarabacoa	white fly may limit production in Constanza
Gypsophila	2500-5000	60 - 75	40 - 55	Jarabacoa Constanza	

Table II: Elevations of Major Production Areas

Location	Altitude meters	Altitude feet
JARABOCOA	750	2325
CONSTANZA	1250	3875
VALLE NUEVO	2000	6200

Soils in the above three areas are relatively good and are well drained. Water supplies are deemed adequate from rivers, aqueducts and wells but this should be determined prior to purchasing and obtaining clear title to the land. No major soil or fertility related problems were noted. Both authurium and orchids are grown in artificial media and only require good surface drainage.

The Constanza valley has a large vegetable production area of cabbage, brocolli, cauliflower, lettuce, potato, snow peas, and celery. This agricultural activity has permitted a heavy infestation of white fly to develop which may be impossible to control by a single grower. For this reason, crops that are susceptible to white fly (such as gerbera) should be avoided at this time. A cooperative effort in combining biological control with chemical applications would be ideal for this production area.

Both Constanza and Jarabacoa areas will require some form of shading for year-round mum production. Likewise, these areas can build-up relatively high temperatures under plastic, so effort should be made to provide tall houses with good ventilation to insure good quality flowers. Extremely high winds are not common in the interior parts of the country.

This study has concentrated on several commonly grown crops used by the American market. Five of these crops have had financial feasibility analysis done for them as individual operations. The size of operations is determined by the crop and potential yield. The size of operations is given in Table III.

TABLE III: SIZE OF OPERATIONS (acres)

Crop	Sample Size	Small	Medium	Large	Ex Large
Carnation	30	0-4	5-10	11-25	26+
Chrysanthemum	25	0-10	11-30	31-50	51+
Orchid	10	0-6	7-25	26-50	51+
Anthurium	10	0-4	5-10	11-25	26+
Gerbera	NA	0-4	5-10	11-25	26+
Gypsophila	NA	0-10	11-30	31-50	51+
Roses	10	0-4	5-10	10-25	25+

NA: Data not used in analyses

For the financial analysis, an operation at the upper limit of a medium size was used for comparisons. Typically a small to medium size operation is originally planned. Future expansion to an economical size is generally financed through the cash flow of the operation thus reducing the "up-front" cash requirements for a larger operation.

Technical equipment, supplies and expertise have been imported predominantly from the United States. However, the Dutch, Israelies and Colombians are also very active on the island. Even construction material (wood or metal greenhouses) and plastic coverings must be imported as there are no lumber or plastic industries present in the country.

At the present time, there is no core of good Dominican flower growers with the experience necessary to manage a large export-oriented operation. In fact, the somewhat lax standards of the national market may be a handicap for an established operation to switch to an export market. Several operations already have foreign growers or management from the United States, Colombia, Israel and Holland. However, the remote locations of Constanza and Valle Nuevo do create some disadvantages for on-site management.

There are some other disadvantages that need to be corrected in order to encourage an export flower market. They are as follows:

1. Roads between Santo Domingo and the production areas are terrible. Some efforts are being made to improve the roads out of Santo Domingo and access between La Vega and Jarabacoa. Constanza has some problems but the road to Valle Nuevo will likely be a very low national priority unless the flower growers work cooperatively to encourage improvements.

2. Air cargo capacity to Miami and New York is limited and may be further reduced if tourism growth is not promoted which would increase scheduled flights.

3. There is a small cooler located at the Santo Domingo airport that is used to store all perishable items (fruits, vegetables, etc.) which is unsatisfactory for floral crops that are very sensitive to low levels of ethylene gas released by ripening fruits. A cooler at the airport devoted exclusively for roses, carnations, pompoms and other flowers requiring temperatures below 40°F is necessary to maintain good quality and uniform shipments of flowers regardless of changes in flight schedules.

4. Electrical service is undependable and very expensive in the Dominican Republic. It is expensive because of a great deal of electricity theft from the system and the poor maintenance of the electrical system. Thus, cyclic lighting systems should be used for chrysanthemums and an electrical generator should be used as a back-up for lighting and on-farm coolers.

5. Although laws are on the books to encourage agricultural imports that support export markets, there appear to be excessive delays at customs in getting propagation material, supplies and chemicals through in a reasonable length of time.

The above comments are not to dampen one's spirits but to provide some "food-for-thought" in getting an operation started in the Dominican Republic. There is great potential but also some serious challenges to address before making a commitment.

4. Investment Requirements and Financial Analysis

It was decided that a separate financial analysis would be done for each type of flower. In some cases a combination of products might be produced at the same location. For example, orchids and anthuriums might be a logical combination at the same location with economic advantages due to market diversification. But entrepreneurs often prefer to specialize due to micro climate characteristics or to take advantage of economies of specialization. A brief description of the results of the financial analysis for each product is therefore provided.

Orchids

The project consists of 10 acres of orchids with a total land requirement of 20 acres. Marketable yields were conservatively projected at 130,000 sprays per acre.

Based on an analysis of New York City prices for orchids we have assumed average prices of $.70 per spray, F.O.B. Santo Domingo.

The tables following the text (Tables F-1 thru F-4) present investment cost assumptions, enterprise budgets and cash flow analysis for three years and proforma profit and loss statements for five years.

Fixed investment requirements total $1,222,000, including $800 per acre for land at current market prices. Land costs in some areas could be slightly higher, but suitable land is available at the assumed price. In the production of orchids soil characteristics are not a major factor since non-soil growing mediums are normally used. The availability of a good quality and abundant source of low cost water for irrigation is an important consideration.

It was assumed that about 50 percent or $675,000 of the total capital requirement would be funded from equity with the balance funded through a combination of long term credit and a working capital facility. To accomplish that about 50 percent of the capital investment cost would be funded through a three year loan with the first payment due at the end of the first year and equal annual installments for the next two years. The long term loan would peak early in the first year at $611,000. Short term working capital needs would also reach a peak of $60,000 in the first year after major investments have been made and before the first sales are completed.

Under those assumptions, the venture produces a small net loss in the first year, a net profit of over $630,000 in each of the succeeding years. Assuming, at the end of year 5, that the venture is worth twice it's earning capacity, the internal rate of return on equity would be 58 percent. The break-even yield would be about 56,000 sprays less than half the projected yield.

While these are attractive potential returns, a word of caution is in order. There are considerable risks associated with this type of venture. First, there are biological and climatological risks. Varieties may not respond to the conditions of soil water and climate as one expects. Diseases, viruses and pests may take a heavy toil on yields and or quality. Second, there are significant market risks. Orchid prices are normally not as volatile as some perishable products but they can be unpredictable. Prices can dip significantly without warning. And finally there are transport availability and cost uncertainties. Any or all of these risk factors could substantially reduce the returns to invested capital. A combined negative variation of 10 to 20 percent in yields, prices and transport costs would produce losses. Good management, however, can devise strategies to manage those risks.

Chrysanthemum

The venture consists of 25 acres of chrysanthemum with a total land requirement of 50 acres. It is assumed that three crops of four different

types of mums are grown each year. The four varieties include single stem pompoms, single stem standard, pinched pompoms and pinched standard. Marketable yields were conservatively projected at 31,500 bunches, 250,000 units, 26,600 bunches and 220,000 units per acre for each respective variety.

Based on an analysis of New York City prices we have assumed average prices as shown in the enterprise budget in Tables F-5 thru F-5.2.

The tables following the text (Tables F-5 thru F-8) present investment cost assumptions, enterprise budgets and cash flow analysis for three years and proforma profit and loss statements for five years.

Fixed investment requirements total $1,030,500, including $800 per acre for land at current market prices. Land costs in some areas could be significantly higher, but suitable land is available at the assumed price. In the production of mums, soil characteristics are a major factor. Detailed soil analysis should be carried as an important part of the final location decision. The availability of a good quality and abundant source of low cost water for irrigation is also an important consideration.

It was assumed that about 50 percent or $900,000 of the total capital requirement would be funded from equity, with the balance funded through a combination of long term credit and a working capital facility. To accomplish that about 50 percent of the capital investment cost would be funded through a three year loan with the first payment due at the end of the first year and equal annual installments for the next two years. The long term loan would peak early in the first year at $515,000. Short term working capital needs would also reach a peak of $507,000 in the first year after major investments have been made and before the first sales are completed.

Under those assumptions, the venture produces a $936,000 net loss in the first year, a net profit of over $621,00 in each of the succeeding years. Assuming, at the end of year 5, that the venture is worth twice

it's earning capacity, the internal rate of return on equity would be 23 percent. The break-even yields for each of the varieties would be:

single stem pompoms	25,000 bunches
single stem standard	200,000 units
pinched pompoms	20,000 bunches
pinched standard	185,000 units

There are considerable risks associated with this type of venture. First, there are biological and climatological risks. Varieties may not respond to the conditions of soil, water and climate as one expects. Diseases, viruses and pests may take a heavy toll on yields and or quality. Second, there are significant market risks. Flower prices can be volatile and unpredictable. There is no way to predict when prices might drop drastically. And finally there are transport availability and cost uncertainties. Any or all of these risk factors could substantially reduce the returns to invested capital. A combined negative variation of 10 to 20 percent in yields, prices and transport costs would produce heavy losses. Good management, however, can devise strategies to manage those risks.

Roses

The venture consists of 10 acres of roses with a total land requirement of 20 acres. Several different varieties would be included in the plantings. Marketable yields were conservatively projected at 545,000 units per acre per year.

Based on an analysis of New York City prices we have assumed average prices of $.24 per stem, F.O.B. Santo Domingo.

The tables following the text (Tables F-9 thru F-12) present investment cost assumptions, enterprise budgets and cash flow analysis for three years and proforma profit and loss statements for five years.

Fixed investment requirements total $1,817,000, including $800 per acre for land at current market prices. Land costs in some areas could be significantly higher, but suitable land is available at the assumed price. In the production of roses, soil characteristics are a major factor. Detailed soil analysis should be carried as an important part of the final location decision. The availability of a good quality and abundant source of low cost water for irrigation is also an important consideration. It is assumed that the cost of planting material can be capitalized since plantings will continue producing for many years if properly maintained.

It was assumed that about 50 percent or $1,000,000 of the total capital requirement would be funded from equity, with the balance funded through a combination of long term credit and a working capital facility. To accomplish that about 50 percent of the capital investment cost would be funded through a three year loan with the first payment due at the end of the first year and equal annual installments for the next two years. The long term loan would peak early in the first year at $909,000. Short term working capital needs would also reach a peak of $55,000 in the first year after major investments have been made and before the first sales are completed.

Under those assumptions, the venture produces a small net profit in the first year, a net profit of over $935,000 in each of the succeeding years. Assuming, at the end of year 5, that the venture is worth twice it's earning capacity, the internal rate of return on equity would be 61 percent. The break-even yield would be 225,000 stems or less than half the projected yield.

The risk factors described for orchids are present in the rose venture. Potential investors should carefully evaluate their ability to withstand substantial losses in any given year as a result of those risk factors.

Anthurium

This venture consists of 10 acres of anthurium primarily for export to the United States. The total land requirement is 20 acres. Several different varieties would be included in the plantings. Marketable yields were conservatively projected at 250,000 blossoms per acre per year. Based on an analysis of New York City prices we have assumed average prices of $.45 per stem, F.O.B. Santo Domingo.

The tables following the text (Tables F-13 thru F-16) present investment cost assumptions, enterprise budgets and cash flow analysis for three years and proforma profit and loss statements for five years.

Fixed investment requirements total $952,000, including $800 per acre for land at current market prices. Land costs in some areas could be significantly higher, but suitable land is available at the assumed price. The availability of a good quality and abundant source of low cost water for irrigation is an important consideration. It is assumed that the cost of planting material can be capitalized since plantings will continue producing for many years if properly maintained. Planting materials are the most important single fixed investment amounting to over $630,000.

It was assumed that about 50 percent or $500,000 of the total capital requirement would be funded from equity, with the balance funded through a combination of long term credit and a working capital facility. To accomplish that about 50 percent of the capital investment cost would be funded through a three year loan with the first payment due at the end of the first year and equal annual installments for the next two years. The long term loan would peak early in the first year at $476,000. Short term working capital needs would also reach a peak of $53,000 in the first year after major investments have been made and before the first sales are completed.

Under those assumptions, the venture produces a net profit of over $278,000 in the first year, and a net profit of over $872,000 in each of the succeeding years. Assuming, at the end of year 5, that the venture is

worth twice it's earning capacity, the internal rate of return on equity would be 113 percent. The break-even yield would only be about 75,000 flowers, or about one third of the projected yield.

While that is an extremely attractive rate of return, it should be recognized that anthurium is a relatively new product in the U.S. flower trade. It has been enthusiastically accepted, but the rapid growth in demand may be linked to a fad. Few observers believe the high level of prices characteristic of the product in recent years can be maintained. In addition the same risk factors described for other export flowers are present in this venture. Potential investors should carefully evaluate their ability to withstand substantial losses in any given year as a result of those risk factors.

Carnations

The venture consists of 30 acres of carnations with a total land requirement of 60 acres. It is assumed that both miniature and standard carnations are grown each year. Marketable yields were conservatively projected at 65,000 bunches and 250,000 units respectively.

Based on an analysis of New York City prices we have assumed average prices of $.80 per bunch of miniature carnations and $.08 per stem for the standard carnation, F.O.B. Santo Domingo.

The tables following the text (Tables F-17 thru F-20) present cost assumptions, enterprise budgets and cash flow analysis for three years and proforma profit and loss statements for five years.

Fixed investment requirements total $940,500, including $500 per acre for land at current market prices. Land costs in some areas could be higher, but suitable land is available at the assumed price. In the production of carnations, soil characteristics are a major factor. Detailed soil analysis should be carried out as an important part of the final location decision. The availability of a good quality and abundant source of low cost water for irrigation is also an important consideration.

It was assumed that about 50 percent or $800,000 of the total capital requirement would be funded from equity, with the balance funded through a combination of long term credit and a working capital facility. To accomplish that about 50 percent of the capital investment cost would be funded through a three year loan with the first payment due at the end of the first year and equal annual installments for the next two years. The long terms working capital needs would also reach a peak of $439,000 and reach that same level early in the second year.

Under those assumptions, the venture produces a $230,000 net loss in the first year, a net profit of over $1,471,554 in year two and then settles back to annual profits of over $937,000 in succeeding years. Assuming, at the end of year 5, that the venture is worth twice it's earning capacity, the internal rate of return on equity would be 71 percent. The break-even yields for each of the types would be:

miniature	29,000 bunches
standard	414,000 units

Most of the same risk factors described earlier for other flower products apply here. And a further risk factor for carnations has to do with the uncertainty of competition from Colombia. Colombian producers have several years of highly successful and profitable experience. It is likely that those producers can and may drive prices down as they continue to expand production and increase productivity in an effort to keep profits up. It is not yet clear that Dominican producers can be competitive in a market of declining prices in competition with Colombia.

5. Government Support and Regulations

The Dominican government in its policy making in recent years has been providing incentives for foreign investment to support the build-up of integrated agribusinesses, especially those producing and exporting non-traditional products. Law No. 409, the Agro-industrial Promotion Law would offer considerable incentives including tax exemptions to this type of project. Further discussion of investment regulations is taken up in

the Reconnaissance Survey Report which is available from ASAC International or the Trade and Development Program.

6. Time Scale

Each crop analyzed has its own time scale based on how quickly the crop can be brought into production. With good planning, construction and planting can be carried out simultaneously or within 3 - 4 months after start-ups. All five crops can begin generating a sizeable cash flow within the first year. Most prices for equipment and supplies are based upon U.S. quotes. In some instances, other foreign sources may be substituted but replacement parts, etc. may be difficult to obtain in any emergency.

7. Potential Sponsors

1. Mr. Michel Sjak-Shie
   Orquideas Exoticas Orquiexo, S.A.
   P.O. Box 22126
   Huacal
   Santo Domingo, Dominican Republic
   Desires joint ventures with orchid, anthurium, gerbera and leatherleaf production. Has had considerable experience with orchids and potential suppliers.

2. Mr. Jose Delio Guzman, S.
   Flores de Valle Nuevo, C por A
   Calle Robert Scout No. 9 (Naco)
   Santo Domingo, Dominican Republic
   Telephone: 565-5412
   Looking for financial and technical assistance in expanding pompom production and other flowers.

3. Mr. Pedro Tomas Villamin
   Flores Purama, C por A
   Ave. Bolivar #907

Santo Domingo, Dominican Republic
Telephone: 687-2011
Has farm in Constanza growing roses and pompoms. Interested in expanding production area.

4. Mr. Miguel Crouch
Flores Antillanas, C por A
Apartado Postal 77-2
Santo Domingo, Dominican Republic
Telephone: 533-4111
Interested in expanding present production area.

5. Mr. Jose A. Vicini
Vicini & Vicini Bachi
Calle Duarte #315
Santo Domingo, Dominican Republic
Telephone: 682-1110
Has land between Jarabocoa and Constanza that may be suitable for flower production. Wishes joint venture as they have no experience in flower production or marketing.

6. Mr. Raul Alfonso Martinez Mera
Informatica & Comunicaciones, S.A.
Calle 30 de Marzo, No. 27
Santiago de los Caballeros, Dominican Republic
Telephone: 582-2991
Has land in the Valle Nuevo area that may be suitable for flower production. Wishes joint venture as they have little experience in flower production and marketing.

7. Mr. Samuel Rodriguez
Flores de Sol, S.A.
Palo Blanco
Jarabacoa, Dominican Republic
Telephone: 574-2582
Established firm presently expanding onto new land and may be interested in a joint venture.

8. Mrs. Mercedes Guevara
Consorcio Dominicano de Floricultores (CODOFLORES)
Cervantes #158
Apartado Postal 20412
Santo Domingo, Dominican Republic
Telephone: 687-4054
This is the flower growers organization that should be helpful in assessing potential investments.

TABLE F-1

ENTERPRISE BUDGET, YEAR 1

BASIC ASSUMPTIONS:

	ORCHIDS	
ACRES PLANTED	10.0 ACRES PRODUCING	3.3
YIELD/ACRE(SPRAYS)		130000
REVENUE/SPRAY		0.70
REVENUE (DOLLARS):		300,300.00

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ORCHIDS
LAND PREPARATION	600.00
PLANTS(See fixed investmt)	0.00
FERTILIZER	400.00
PESTICIDES	400.00
ELECTRICITY	250.00
LABOR	3,120.00
	0.00
TOTAL	4,770.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	6,000.00
PLANTS	0.00
FERTILIZER	4,000.00
PESTICIDES	4,000.00
ELECTRICITY	2,500.00
LABOR	31,200.00
TOTAL	47,700.00
TOTAL OPERATING EXPENSES	47,700.00
OPERATING INCOME:	252,600.00

TABLE F-1.1
ENTERPRISE BUDGET, YEAR 2

BASIC ASSUMPTIONS:

	ORCHIDS
ACRES PLANTED	10
YIELD/ACRE(SPRAYS)	130000
REVENUE/SPRAY	0.70
REVENUE (DOLLARS):	910,000.00

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ORCHIDS
LAND PREPARATION	100.00
PLANTS (See fixed investmt	0.00
FERTILIZER	400.00
PESTICIDES	400.00
ELECTRICITY	250.00
LABOR	3,120.00
	0.00
TOTAL	4,270.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	1,000.00
PLANTS	0.00
FERTILIZER	4,000.00
PESTICIDES	4,000.00
ELECTRICITY	2,500.00
LABOR	31,200.00
TOTAL	42,700.00
TOTAL OPERATING EXPENSES	42,700.00
OPERATING INCOME:	867,300.00

TABLE F-1.2
ENTERPRISE BUDGET, YEAR 3

BASIC ASSUMPTIONS:

	ORCHIDS
ACRES PLANTED	10
YIELD/ACRE(SPRAYS)	130000
REVENUE/SPRAY	0.70
REVENUE (DOLLARS):	910,000.00

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ORCHIDS
LAND PREPARATION	100.00
PLANTS (See fixed investmt	0.00
FERTILIZER	400.00
PESTICIDES	400.00
ELECTRICITY	250.00
LABOR	3,120.00
	0.00
TOTAL	4,270.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	1,000.00
PLANTS	0.00
FERTILIZER	4,000.00
PESTICIDES	4,000.00
ELECTRICITY	2,500.00
LABOR	31,200.00
TOTAL	42,700.00
TOTAL OPERATING EXPENSES	42,700.00
OPERATING INCOME:	867,300.00

TABLE F-2

FIXED INVESTMENT REQUIREMENT

ENTERPRISE: ORCHIDS .ACRES PRODUCT: 10

	COST/ACRE (U.S. DOLLARS)	TOTAL COST
LAND (20 ACRES TOTAL)	800	16,000
GREENHOUSE (20 ACRES @ $.40/SQ.FT)	18,000	180,000
FERT AND IRRIG EQUIP	1,800	18,000
ELECTRICAL	600	6,000
PLANTING MATERIAL	88,200	882,000
PACKINGHOUSE	2,500	25,000
COLDROOM	500	5,000
REFRIGERATION	-	0
OFFICE & STOREROOM	2,500	25,000
VEHICLES	5,000	50,000
MISCELLANEOUS	1,500	15,000
TOTAL	121,400	1,222,000

TABLE F-3

PROJECTED CASH FLOW - ORCHIDS
YEAR 1
(Thousands of U.S. Dollars)

	START UP	1	2	3	4	5	6	7	8	9	10	11	12
EQUITY	675												
LONG TERM DEBT	122												
TOTAL	797												
CASH ON HAND		797	514	379	243	105	0	0	0	0	0	27	86
CASH IN		0	122	122	122	122	0	15	30	46	61	76	76
Sales revenue								15	30	46	61	76	76
Add'l L. T. debt			122	122	122	122	0	0	0	0	0	0	0
CASH AVAILABLE		797	636	501	365	227	0	15	30	46	61	103	162
CASH OUT		283	257	259	260	262	18	18	18	18	18	17	221
Capital expenditures:		244	244	244	244	244							
Operating expenses:													
Land preparation		1	1	1	1	1	0			0			0
Plants			0	0	0	0	0						
Fertilizer		4											
Pesticides		4											
Electricity		0	0	0	0	0	0	0	0	0	0	0	0
Labor		3	3	3	3	3	3	3	3	3	3	3	3
Management		5	5	5	5	5	5	5	5	5	5	5	5
Interest		0	1	3	4	6	8	8	8	8	7	7	7
Accounting and legal		20	1	1	1	1	1	1	1	1	1	1	1
Office operations		2	2	2	2	2	2	2	2	2	2	2	2
Organization & Development		0	0	0	0	0	0	0	0	0	0	0	0
Total operating expense		39	13	14	16	17	18	18	18	18	18	17	17
Amortization L. T. Debt:													204
CASH FLOW THIS MONTH		(283)	(135)	(137)	(138)	(139)	(16)	(3)	12	28	43	58	(145)
CUMULATIVE CASH FLOW		(283)	(418)	(555)	(693)	(832)	(850)	(853)	(840)	(813)	(770)	(711)	(857)
CASH POSITION BEFORE STP		514	379	243	105	(35)	(18)	(3)	12	28	43	86	(60)
Short term: borrowing		0	0	0	0	35	18	3	0	0	0	0	60
repayment		0	0	0	0	0	0	0	12	28	16	0	0
Outstanding S. T. debt	0	0	0	0	0	35	53	56	43	16	0	0	60
CASH POSITION		514	379	243	105	0	0	0	0	0	27	86	0
Outstanding L. T. debt		122	244	367	489	611	611	611	611	611	611	611	407

TABLE F-3.1

PROJECTED CASH FLOW - ORCHIDS
YEAR 2
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	0	51	52	112	173	234	295	355	416	477	538	599
CASH IN	76	76	76	76	76	76	76	76	76	76	76	76
Sales revenue	76	76	76	76	76	76	76	76	76	76	76	76
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	76	127	127	188	249	310	371	431	492	553	614	674
CASH OUT	25	16	15	15	15	15	15	15	15	15	15	219
Capital expenditures:	0	0										
Operating expenses:												
Land	1					0			0			0
Plant	0											
Fertilizer	4											
Pesticides	4											
Electricity	0	0	0	0	0	0	0	0	0	0	0	0
Labor	3	3	3	3	3	3	3	3	3	3	3	3
Management	5	5	5	5	5	5	5	5	5	5	5	5
Interest	5	5	5	5	5	5	5	5	5	5	5	5
Accounting and legal	1	1	1	1	1	1	1	1	1	1	1	1
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	25	16	15	15	15	15	15	15	15	15	15	15
Amortization L. T. Debt:												204
CASH FLOW THIS MONTH	51	60	61	61	61	61	61	61	61	61	61	(143)
CUMULATIVE CASH FLOW	51	111	172	233	293	354	415	476	537	597	658	515
CASH POSITION BEFORE STF	51	111	112	173	234	295	355	416	477	538	599	456
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	60	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	60	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	51	52	112	173	234	295	355	416	477	538	599	456
Outstanding L. T. debt	407	407	407	407	407	407	407	407	407	407	407	204

TABLE F-3.2
PROJECTED CASH FLOW - ORCHIDS
YEAR 3
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	456	510	573	636	699	762	826	889	952	1,015	1,078	1,141
CASH IN	76	76	76	76	76	76	76	76	76	76	76	76
Sales revenue	76	76	76	76	76	76	76	76	76	76	76	76
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	532	586	649	712	775	838	901	965	1,028	1,091	1,154	1,217
CASH OUT	22	13	13	13	13	13	13	13	13	13	13	216
Capital expenditures:												
Operating expenses:												
Land	1											
Plant	0					0			0			0
Fertilizer	4											
Pesticides	4											
Electricity	0	0	0	0	0	0	0	0	0	0	0	0
Labor	3	3	3	3	3	3	3	3	3	3	3	3
Management	5	5	5	5	5	5	5	5	5	5	5	5
Interest	2	2	2	2	2	2	2	2	2	2	2	2
Accounting and legal	1	1	1	1	1	1	1	1	1	1	1	1
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	22	13	13	13	13	13	13	13	13	13	13	13
Amortization L. T. Debt:												204
CASH FLOW THIS MONTH	54	63	63	63	63	63	63	63	63	63	63	(141)
CUMULATIVE CASH FLOW	569	633	696	759	822	885	948	1,011	1,075	1,138	1,201	1,060
CASH POSITION BEFORE STF	510	573	636	699	762	826	889	952	1,015	1,078	1,141	1,001
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	510	573	636	699	762	826	889	952	1,015	1,078	1,141	1,001
Outstanding L. T. debt	204	204	204	204	204	204	204	204	204	204	204	(0)

TABLE F-4

PRO FORMA INCOME STATEMENT - ORCHIDS
(U. S. Dollars)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
REVENUE					
Orchid sales	300,300	910,000	910,000	910,000	910,000
Other	300,300	910,000	910,000	910,000	910,000
	0	0	0	0	0
Total Revenue	300,300	910,000	910,000	910,000	910,000
COSTS					
Production	47,700	42,700	42,700	42,700	42,700
General Administration	263,817	236,722	201,943	201,943	201,943
Management	60,000	60,000	60,000	60,000	60,000
Depreciation	88,306	88,306	88,306	88,306	88,306
Interest	66,511	58,416	26,137	26,137	26,137
Accounting and Legal	31,000	12,000	11,000	11,000	11,000
Office Operations	18,000	18,000	16,500	16,500	16,500
Other	0	0	0	0	0
Total Costs	311,517	279,422	244,643	244,643	244,643
Net Profit Before Tax	(11,217)	630,578	665,357	665,357	665,357
Internal Rate of Return	58 %				

TABLE F-5

ENTERPRISE BUDGET, YEAR 1

BASIC ASSUMPTIONS: CRYSANTHEMUMS :25 ACRES WITH THREE CROPS PER YEAR FOR EACH VARIETY

	MUMS-SSPOM	MUMS-SSSTD	MUMS-PIPOM
ACRES HARVESTED	26	22	15
YIELD(BUNCH OR UNIT)/ACRE	31,500	250,000	26,600
REVENUE/BUNCH OR UNIT	0.80	0.20	0.80
REVENUE:	655,200.00	1,100,000.00	319,200.00
OPERATING EXPENSES:			
VARIABLE PRODUCTION EXPENSE (PER ACRE):			
DOLLARS PER ACRE	MUMS-SSPOM	MUMS-SSSTD	MUMS-PIPOM
LAND PREPARATION	500.00	500.00	500.00
PLANTS	25,200.00	25,200.00	8,750.00
FERTILIZER	275.00	275.00	275.00
PESTICIDES	400.00	400.00	400.00
ELECTRICITY	400.00	400.00	400.00
LABOR	1,400.00	1,800.00	1,400.00
TOTAL	28,175.00	28,575.00	11,725.00
TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:			
LAND PREPARATION	13,000.00	11,000.00	7,500.00
PLANTS	655,200.00	554,400.00	131,250.00
FERTILIZER	7,150.00	6,050.00	4,125.00
PESTICIDES	10,400.00	8,800.00	6,000.00
ELECTRICITY	10,400.00	8,800.00	6,000.00
LABOR	36,400.00	39,600.00	21,000.00
TOTAL	732,550.00	628,650.00	175,875.00
TOTAL OPERATING EXPENSES	732,550.00	628,650.00	175,875.00
OPERATING INCOME:	(77,350.00)	471,350.00	143,325.00

TABLE F-5.1

ENTERPRISE BUDGET, YEAR 2

BASIC ASSUMPTIONS: CRYSANTHEMUMS :25 ACRES WITH THREE CROPS PER YEAR FOR EACH VARIETY

	MUMS-SSPOM	MUMS-SSSTD	MUMS-PIPOM
ACRES HARVESTED	26	22	15
YIELD(BUNCH OR UNIT)/ACRE	31,500	250,000	26,600
REVENUE/BUNCH OR UNIT	0.80	0.20	0.80
REVENUE:	655,200.00	1,100,000.00	319,200.00
OPERATING EXPENSES:			
VARIABLE PRODUCTION EXPENSE (PER ACRE):			
DOLLARS PER ACRE	MUMS-SSPOM	MUMS-SSSTD	MUMS-PIPOM
LAND PREPARATION	500.00	500.00	500.00
PLANTS	25,200.00	25,200.00	8,750.00
FERTILIZER	275.00	275.00	275.00
PESTICIDES	400.00	400.00	400.00
ELECTRICITY	400.00	400.00	400.00
LABOR	1,400.00	1,800.00	1,400.00
TOTAL	28,175.00	28,575.00	11,725.00
TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:			
LAND PREPARATION	13,000.00	11,000.00	7,500.00
PLANTS	655,200.00	554,400.00	131,250.00
FERTILIZER	7,150.00	6,050.00	4,125.00
PESTICIDES	10,400.00	8,800.00	6,000.00
ELECTRICITY	10,400.00	8,800.00	6,000.00
LABOR	36,400.00	39,600.00	21,000.00
TOTAL	732,550.00	628,650.00	175,875.00
TOTAL OPERATING EXPENSES	732,550.00	628,650.00	175,875.00
OPERATING INCOME:	(77,350.00)	471,350.00	143,325.00

TABLE F-5.2

ENTERPRISE BUDGET, YEAR 3

BASIC ASSUMPTIONS:	CHRYSANTHEMUMS :25 ACRES WITH THREE CROPS PER YEAR FOR EACH VARIETY MUMS-SSPOM	MUMS-SSSTD	MUMS-PIPOM
ACRES HARVESTED	26	22	15
YIELD(BUNCH OR UNIT)/ACRE	31,500	250,000	26,600
REVENUE/BUNCH OR UNIT	0.80	0.20	0.80
REVENUE:	655,200.00	1,100,000.00	319,200.00
OPERATING EXPENSES:			
VARIABLE PRODUCTION EXPENSE (PER ACRE):			
DOLLARS PER ACRE	MUMS-SSPOM	MUMS-SSSTD	MUMS-PIPOM
LAND PREPARATION	500.00	500.00	500.00
PLANTS	25,200.00	25,200.00	8,750.00
FERTILIZER	275.00	275.00	275.00
PESTICIDES	400.00	400.00	400.00
ELECTRICITY	400.00	400.00	400.00
LABOR	1,400.00	1,800.00	1,400.00
TOTAL	28,175.00	28,575.00	11,725.00
TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:			
LAND PREPARATION	13,000.00	11,000.00	7,500.00
PLANTS	655,200.00	554,400.00	131,250.00
FERTILIZER	7,150.00	6,050.00	4,125.00
PESTICIDES	10,400.00	8,800.00	6,000.00
ELECTRICITY	10,400.00	8,800.00	6,000.00
LABOR	36,400.00	39,600.00	21,000.00
TOTAL	732,550.00	628,650.00	175,875.00
TOTAL OPERATING EXPENSES	732,550.00	628,650.00	175,875.00
OPERATING INCOME:	(77,350.00)	471,350.00	143,325.00

TABLE F-6
FIXED INVESTMENT REQUIREMENT

ENTERPRISE: CRYSANTHEMUMS :ACRES PRODUCT: 25

		COST/ACRE (U.S. DOLLARS)	TOTAL COST
LAND -TOTAL AC.	50	800	40,000
GREENHOUSE (25 ACRES @ $.70/SQ.FT)		30,000	750,000
FERT AND IRRIG EQUIP		1,320	33,000
ELECTRICAL		500	12,500
PROPAGATION		500	12,500
PACKINGHOUSE		1,500	37,500
COLDROOM		400	10,000
REFRIGERATION		300	7,500
OFFICE & STOREROOM		1,500	37,500
VEHICLES		2,600	65,000
MISCELLANEOUS		1,000	25,000
TOTAL		40,420	1,030,500

TABLE F-7

PROJECTED CASH FLOW - CHRYSANTHEMUMS
YEAR 1
(Thousands of U.S. Dollars)

	START UP	1	2	3	4	5	6	7	8	9	10	11	12
EQUITY	900												
LONG TERM DEBT	86												
TOTAL	986												
CASH ON HAND		986	760	638	369	125	0	0	0	0	0	0	0
CASH IN													
Sales revenue		0	86	86	86	86	86	0	217	217	217	217	217
Add'l L. T. debt			86	86	86	86	86	0	217 0	217 0	217 0	217 0	217 0
CASH AVAILABLE		986	846	724	455	211	86	0	217	217	217	217	217
CASH OUT													
Capital expenditures:		226 172	208 172	355 172	331 172	322 172	328 172	156	158	183	157	157	328
Operating expenses:													
Land preparation		9	9	9	9								
Plants				120	120	120	120	120	120	120	120	120	120
Fertilizer				10						10			
Pesticides				15						15			
Electricity		3	3	3	3	3	3	3	3	3	3	3	3
Labor		10	10	10	10	10	10	10	10	10	10	10	10
Management		10	10	10	10	10	10	10	10	10	10	10	10
Interest		0	1	2	3	4	6	10	12	11	11	10	9
Accounting and legal		20	2	2	2	2	2	2	2	2	2	2	2
Office operations		2	2	2	2	2	2	2	2	2	2	2	2
Organization & Development		0	0	0	0	0	0	0	0	0	0	0	0
Total operating expense		54	36	183	159	150	153	156	158	183	157	157	156
Amortization L. T. Debt:													172
CASH FLOW THIS MONTH		(226)	(122)	(269)	(245)	(236)	(239)	(156)	59	34	60	60	(111)
CUMULATIVE CASH FLOW		(226)	(348)	(617)	(861)	(1,097)	(1,336)	(1,492)	(1,434)	(1,400)	(1,340)	(1,280)	(1,391)
CASH POSITION BEFORE STF		760	638	369	125	(112)	(239)	(156)	59	34	60	60	(111)
Short term: borrowing		0	0	0	0	112	239	156	0	0	0	0	111
repayment		0	0	0	0	0	0	0	59	34	60	60	0
Outstanding S. T. debt	0	0	0	0	0	112	350	507	448	414	354	294	405
CASH POSITION		760	638	369	125	0	0	0	0	0	0	0	0
Outstanding L. T. debt		86	172	258	344	429	515	515	515	515	515	515	344

TABLE F-7.1

PROJECTED CASH FLOW - CHRYSANTHEMUMS
YEAR 2
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	0	64	0	0	0	0	0	9	75	107	173	240
CASH IN	217	217	217	217	217	217	217	217	217	217	217	217
Sales revenue	217	217	217	217	217	217	217	217	217	217	217	217
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	217	281	217	217	217	217	217	226	292	324	390	457
CASH OUT	153	155	179	153	152	161	151	150	185	150	150	332
Capital expenditures:	0	0										
Operating expenses:												
Land						9			9			9
Plant	120	120	120	120	120	120	120	120	120	120	120	120
Fertilizer			10						10			
Pesticides	6		15						15			
Electricity	3	3	3	3	3	3	3	3	3	3	3	3
Labor	10	10	10	10	10	10	10	10	10	10	10	10
Management	10	10	10	10	10	10	10	10	10	10	10	10
Interest	0	9	7	7	6	5	5	4	4	4	4	4
Accounting and legal	2	2	2	2	2	2	2	2	2	2	2	2
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	153	155	179	153	152	161	151	150	185	150	150	160
Amortization L. T. Debt:												172
CASH FLOW THIS MONTH	64	62	38	64	64	56	66	66	32	66	66	(115)
CUMULATIVE CASH FLOW	64	126	164	227	292	348	413	480	512	578	645	530
CASH POSITION BEFORE STF	64	126	38	64	64	56	66	75	107	173	240	125
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	126	38	64	64	56	57	0	0	0	0	0
Outstanding S. T. debt	405	279	241	177	113	57	0	0	0	0	0	0
CASH POSITION	64	0	0	0	0	0	9	75	107	173	240	125
Outstanding L. T. debt	344	344	344	344	344	344	344	344	344	344	344	172

TABLE F-7.2

PROJECTED CASH FLOW - CHRYSANTHEMUMS
YEAR 3
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	125	196	264	308	376	444	504	572	641	674	743	811
CASH IN												
Sales revenue	217	217	217	217	217	217	217	217	217	217	217	217
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	342	413	481	524	593	661	720	789	857	891	960	1,028
CASH OUT												
Capital expenditures:	146	148	174	148	148	158	148	148	183	148	148	329
	0	0										
Operating expenses:												
Land												
Plant						9			9			9
Fertilizer	120	120	120	120	120	120	120	120	120	120	120	120
Pesticides			10						10			
Electricity			15						15			
Labor	3	3	3	3	3	3	3	3	3	3	3	3
Management	10	10	10	10	10	10	10	10	10	10	10	10
Interest	10	10	10	10	10	10	10	10	10	10	10	10
Accounting and legal	0	2	2	2	2	2	2	2	2	2	2	2
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	2	2	2	2	2	2	2	2	2	2	2	2
	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	146	148	174	148	148	158	148	148	183	148	148	158
Amortization L. T. Debt:												172
CASH FLOW THIS MONTH	70	68	43	68	68	59	68	68	34	68	68	(113)
CUMULATIVE CASH FLOW	601	669	712	781	849	908	977	1,045	1,079	1,148	1,216	1,104
CASH POSITION BEFORE STF	196	264	308	376	444	504	572	641	674	743	811	699
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	196	264	308	376	444	504	572	641	674	743	811	699
Outstanding L. T. debt	172	172	172	172	172	172	172	172	172	172	172	0

TABLE F-8

PRO FORMA INCOME STATEMENT - CRYSANTHEMUMS
(U. S. Dollars)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
REVENUE	1,084,333	2,602,400	2,602,400	2,602,400	2,602,400
Crysanthemums	1,084,333	2,602,400	2,602,400	$2,602,400.00	2,602,400
Other	0	0	0	0	0
Total Revenue	1,084,333	2,602,400	2,602,400	2,602,400	2,602,400
COSTS					
Production	1,682,575	1,682,575	1,582,575	1,682,575	1,682,575
General Administration	337,950	298,356	257,974	257,974	257,974
Management	120,000	120,000	120,000	120,000	120,000
Depreciation	77,433	77,433	77,433	77,433	77,433
Interest	80,017	58,923	22,041	22,041	22,041
Accounting and Legal	36,500	18,000	16,500	16,500	16,500
Office Operations	24,000	24,000	22,000	22,000	22,000
Other	0	0	0	0	0
Total Costs	2,020,525	1,980,931	1,940,549	1,940,549	1,940,549
Net Profit Before Tax	(936,192)	621,469	661,851	661,851	661,851
Internal Rate of Return	23 %				

TABLE F-9

ENTERPRISE BUDGET, YEAR 1

BASIC ASSUMPTIONS:

ROSE MIX

ACRES PLANTED	10.0 ACRES PRODUCING	3.8
YIELD/ACRE(FLOWERS)		545,000
REVENUE/FLOWERS		0.24
REVENUE:		490,500.00

OPERATING EXPENSES:

VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ROSE MIX
LAND PREPARATION	1,000.00
PLANTS(See fixed investmt)	0.00
FERTILIZER	600.00
PESTICIDES	600.00
ELECTRICITY	400.00
LABOR	4,160.00
	0.00
TOTAL	6,760.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	10,000.00
PLANTS	0.00
FERTILIZER	6,000.00
PESTICIDES	6,000.00
ELECTRICITY	4,000.00
LABOR	41,600.00
TOTAL	67,600.00
TOTAL OPERATING EXPENSES	67,600.00
OPERATING INCOME:	422,900.00

TABLE F-9.1

ENTERPRISE BUDGET, YEAR 2

BASIC ASSUMPTIONS:

	ROSE MIX
ACRES PLANTED	10.0
YIELD/ACRE(FLOWERS)	545,000
REVENUE/FLOWERS	0.24
REVENUE:	1,308,000.00

OPERATING EXPENSES:

VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ROSE MIX
LAND PREPARATION	0.00
PLANTS(See fixed investmt)	0.00
FERTILIZER	600.00
PESTICIDES	600.00
ELECTRICITY	400.00
LABOR	4,160.00
	0.00
TOTAL	5,760.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	0.00
PLANTS	0.00
FERTILIZER	6,000.00
PESTICIDES	6,000.00
ELECTRICITY	4,000.00
LABOR	41,600.00
TOTAL	57,600.00
TOTAL OPERATING EXPENSES	57,600.00
OPERATING INCOME:	1,250,400.00

TABLE F-9.2

ENTERPRISE BUDGET, YEAR 3

BASIC ASSUMPTIONS:

	ROSE MIX
ACRES PLANTED	10.0
YIELD/ACRE(FLOWERS)	545,000
REVENUE/FLOWERS	0.24
REVENUE:	1,308,000.00

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ROSE MIX
LAND PREPARATION	0.00
PLANTS(See fixed investmt)	0.00
FERTILIZER	600.00
PESTICIDES	600.00
ELECTRICITY	400.00
LABOR	4,160.00
	0.00
TOTAL	5,760.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	0.00
PLANTS	0.00
FERTILIZER	6,000.00
PESTICIDES	6,000.00
ELECTRICITY	4,000.00
LABOR	41,600.00
TOTAL	57,600.00
TOTAL OPERATING EXPENSES	57,600.00
OPERATING INCOME:	1,250,400.00

TABLE F-10

FIXED INVESTMENT REQUIREMENT

ENTERPRISE: ROSE MIX ACRES PRODUCT: 10

		COST/ACRE (U.S. DOLLARS)	TOTAL COST
LAND -TOTAL AC.	20	800	16,000
GREENHOUSE (10 ACRES @ $1.40/SQ FT)		62,000	620,000
FERT AND IRRIG EQUIP		1,800	18,000
ELECTRICAL		1,000	10,000
PLANTING MATERIAL		100,800	1,008,000
PACKINGHOUSE		3,750	37,500
COLDROOM		1,000	10,000
REFRIGERATION		750	7,500
OFFICE & STOREROOM		2,500	25,000
VEHICLES		5,000	50,000
MISCELLANEOUS		1,500	15,000
		0	
TOTAL		180,900	1,817,000

TABLE F-11

PROJECTED CASH FLOW - ROSE MIX
YEAR 1
(Thousands of U.S. Dollars)

	START UP	1	2	3	4	5	6	7	8	9	10	11	12
EQUITY	1,000												
LONG TERM DEBT	182												
TOTAL	1,182												
CASH ON HAND		1,182	774	575	375	173	0	0	0	0	38	124	211
CASH IN		0	182	182	182	182	0	27	55	82	109	109	109
Sales revenue								27	55	82	109	109	109
Add'l L. T. debt			182	182	182	182	0	0	0	0	0	0	0
CASH AVAILABLE		1,182	955	757	557	354	0	27	55	82	147	233	320
CASH OUT		408	380	382	384	386	23	24	23	23	23	23	326
Capital expenditures:		363	363	363	363	363							
Operating expenses:													
Land preparation		2	2	2	2	2	0			0			0
Plants			0	0	0	0	0						
Fertilizer		6											
Pesticides		6											
Electricity		0	0	0	0	0	0	0	0	0	0	0	0
Labor		3	3	3	3	3	3	3	3	3	3	3	3
Management		5	5	5	5	5	5	5	5	5	5	5	5
Interest		0	2	4	6	8	11	11	11	11	11	11	11
Accounting and legal		20	2	2	2	2	2	2	2	2	2	2	2
Office operations		2	2	2	2	2	2	2	2	2	2	2	2
Organization & Development		0	0	0	0	0	0	0	0	0	0	0	0
Total operating expense		45	16	19	21	23	23	24	23	23	23	23	23
Amortization L. T. Debt:													303
CASH FLOW THIS MONTH		(408)	(198)	(200)	(202)	(204)	(23)	4	31	59	86	86	(217)
CUMULATIVE CASH FLOW		(408)	(606)	(807)	(1,009)	(1,213)	(1,237)	(1,233)	(1,202)	(1,143)	(1,057)	(971)	(1,188)
CASH POSITION BEFORE STF		774	575	375	173	(32)	(23)	4	31	59	124	211	(6)
Short term: borrowing		0	0	0	0	32	23	0	0	0	0	0	6
repayment		0	0	0	0	0	0	4	31	20	0	0	0
Outstanding S. T. debt	0	0	0	0	0	32	55	51	20	0	0	0	6
CASH POSITION		774	575	375	173	0	0	0	0	38	124	211	0
Outstanding L. T. debt		182	363	545	727	909	909	909	909	909	909	909	606

TABLE F-11.1

PROJECTED CASH FLOW - ROSE MIX
YEAR 2
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	0	78	161	251	340	430	519	609	699	788	878	968
CASH IN	109	109	109	109	109	109	109	109	109	109	109	109
Sales revenue	109	109	109	109	109	109	109	109	109	109	109	109
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	109	187	270	360	449	539	628	718	808	897	987	1,077
CASH OUT	31	19	19	19	19	19	19	19	19	19	19	322
Capital expenditures:	0	0										
Operating expenses:												
Land	0					0			0			0
Plant	0											
Fertilizer	6											
Pesticides	6											
Electricity	0	0	0	0	0	0	0	0	0	0	0	0
Labor	3	3	3	3	3	3	3	3	3	3	3	3
Management	5	5	5	5	5	5	5	5	5	5	5	5
Interest	7	7	7	7	7	7	7	7	7	7	7	7
Accounting and legal	2	2	2	2	2	2	2	2	2	2	2	2
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	31	19	19	19	19	19	19	19	19	19	19	19
Amortization L. T. Debt:												303
CASH FLOW THIS MONTH	78	90	90	90	90	90	90	90	90	90	90	(213)
CUMULATIVE CASH FLOW	78	167	257	346	436	526	615	705	795	884	974	761
CASH POSITION BEFORE STF	78	167	251	340	430	519	609	699	788	878	968	754
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	6	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	6	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	78	161	251	340	430	519	609	699	788	878	968	754
Outstanding L. T. debt	606	606	606	606	606	606	606	606	606	606	606	303

TABLE F-11.2

PROJECTED CASH FLOW - ROSE MIX
YEAR 3
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	754	836	929	1,022	1,115	1,208	1,301	1,395	1,488	1,581	1,674	1,767
CASH IN	109	109	109	109	109	109	109	109	109	109	109	109
Sales revenue	109	109	109	109	109	109	109	109	109	109	109	109
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	863	945	1,038	1,131	1,224	1,317	1,410	1,504	1,597	1,690	1,783	1,876
CASH OUT	28	16	16	16	16	16	16	16	16	16	16	319
Capital expenditures:	0	0										
Operating expenses:												
Land	0					0			0			0
Plant	0											
Fertilizer	6											
Pesticides	6											
Electricity	0	0	0	0	0	0	0	0	0	0	0	0
Labor	3	3	3	3	3	3	3	3	3	3	3	3
Management	5	5	5	5	5	5	5	5	5	5	5	5
Interest	4	4	4	4	4	4	4	4	4	4	4	4
Accounting and legal	2	2	2	2	2	2	2	2	2	2	2	2
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	28	16	16	16	16	16	16	16	16	16	16	16
Amortization L. T. Debt:												303
CASH FLOW THIS MONTH	81	93	93	93	93	93	93	93	93	93	93	(210)
CUMULATIVE CASH FLOW	842	935	1,028	1,121	1,214	1,308	1,401	1,494	1,587	1,680	1,773	1,564
CASH POSITION BEFORE STF	836	929	1,022	1,115	1,208	1,301	1,395	1,488	1,581	1,674	1,767	1,558
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	836	929	1,022	1,115	1,208	1,301	1,395	1,488	1,581	1,674	1,767	1,558
Outstanding L. T. debt	303	303	303	303	303	303	303	303	303	303	303	0

TABLE F-12

PRO FORMA INCOME STATEMENT - ROSE MIX

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
REVENUE					
Rose mix	490,500	1,308,000	1,308,000	1,308,000	1,308,000
Other	490,500	1,308,000	1,308,000	1,308,000	1,308,000
	0	0	0	0	0
Total Revenue	490,500	1,308,000	1,308,000	1,308,000	1,308,000
COSTS					
Production	67,600	57,600	57,600	57,600	57,600
General Administration	345,314	314,513	264,940	264,940	264,940
Management	60,000	60,000	60,000	60,000	60,000
Depreciation	127,576	127,576	127,576	127,576	127,576
Interest	97,238	84,937	38,864	38,864	38,864
Accounting and Legal	36,500	18,000	16,500	16,500	16,500
Office Operations	24,000	24,000	22,000	22,000	22,000
Other	0	0	0	0	0
Total Costs	412,914	372,113	322,540	322,540	322,540
Net Profit Before Tax	77,586	935,887	985,460	985,460	985,460
Internal Rate of Return	61 %				

TABLE F-13

ENTERPRISE BUDGET, YEAR 1

BASIC ASSUMPTIONS:

ANTHURIUM

ACRES PLANTED	10.0	ACRES PRODUCING	5.0
YIELD/ACRE(FLOWERS)			250,000
REVENUE/FLOWERS			0.45
REVENUE:			562,500.00

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ANTHURIUM
LAND PREPARATION	600.00
PLANTS(See fixed investmt)	0.00
FERTILIZER	400.00
PESTICIDES	400.00
ELECTRICITY	250.00
LABOR	3,120.00
	0.00
TOTAL	4,770.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	6,000.00
PLANTS	0.00
FERTILIZER	4,000.00
PESTICIDES	4,000.00
ELECTRICITY	2,500.00
LABOR	31,200.00
TOTAL	47,700.00
TOTAL OPERATING EXPENSES	47,700.00
OPERATING INCOME:	514,800.00

TABLE F-13.1
ENTERPRISE BUDGET, YEAR 2

BASIC ASSUMPTIONS:

	ANTHURIUM
ACRES PLANTED	10
YIELD/ACRE(FLOWERS)	250,000
REVENUE/FLOWERS	0.45
REVENUE:	1,125,000.00

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ANTHURIUM
LAND PREPARATION	600.00
PLANTS(See fixed investmt)	0.00
FERTILIZER	400.00
PESTICIDES	400.00
ELECTRICITY	250.00
LABOR	3,120.00
	0.00
TOTAL	4,770.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	6,000.00
PLANTS	0.00
FERTILIZER	4,000.00
PESTICIDES	4,000.00
ELECTRICITY	2,500.00
LABOR	31,200.00
TOTAL	47,700.00
TOTAL OPERATING EXPENSES	47,700.00
OPERATING INCOME:	1,077,300.00

TABLE F-13.2
ENTERPRISE BUDGET, YEAR 3

BASIC ASSUMPTIONS:

	ANTHURIUM
ACRES PLANTED	10
YIELD/ACRE(FLOWERS)	250,000
REVENUE/FLOWERS	0.45
REVENUE:	1,125,000.00

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (PER ACRE):

DOLLARS PER ACRE	ANTHURIUM
LAND PREPARATION	600.00
PLANTS(See fixed investmt)	0.00
FERTILIZER	400.00
PESTICIDES	400.00
ELECTRICITY	250.00
LABOR	3,120.00
	0.00
TOTAL	4,770.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	6,000.00
PLANTS	0.00
FERTILIZER	4,000.00
PESTICIDES	4,000.00
ELECTRICITY	2,500.00
LABOR	31,200.00
TOTAL	47,700.00
TOTAL OPERATING EXPENSES	47,700.00
OPERATING INCOME:	1,077,300.00

TABLE F-14
FIXED INVESTMENT REQUIREMENT

ENTERPRISE: ANTHURIUM PRODUCING ACRES 10

		COST/ACRE (U.S. DOLLARS)	TOTAL COST
LAND -TOTAL AC.	20	800	16,000
GREENHOUSE (10 ACRES @ $.40/SQ FT)		18,000	180,000
FERT AND IRRIG EQUIP		1,800	18,000
ELECTRICAL		300	3,000
PLANTING MATERIAL		63,000	630,000
PACKINGHOUSE		1,875	18,750
COLDROOM		250	2,500
REFRIGERATION		-	-
OFFICE & STOREROOM		1,875	18,750
VEHICLES		5,000	50,000
MISCELLANEOUS		1,500	15,000
TOTAL		94,400	952,000

TABLE F-15

PROJECTED CASH FLOW - ANTHURIUM
YEAR 1
(Thousands of U.S. Dollars)

	START UP	1	2	3	4	5	6	7	8	9	10	11	12
EQUITY	500												
LONG TERM DEBT	95												
TOTAL	595												
CASH ON HAND		595	366	258	150	40	0	0	8	67	145	223	301
CASH IN													
Sales revenue		0	95	95	95	114	38	56	75	94	94	94	94
Add'l L. T. debt						19	38	56	75	94	94	94	94
			95	95	95	95	0	0	0	0	0	0	0
CASH AVAILABLE		595	461	354	245	153	38	56	83	161	239	317	395
CASH OUT		229	203	204	205	206	16	16	16	16	16	16	175
Capital expenditures:		190	190	190	190	190							
Operating expenses:													
Land preparation		1	1	1	1	1	0			0			0
Plants			0	0	0	0	0						
Fertilizer		4											
Pesticides		4											
Electricity		0	0	0	0	0	0	0	0	0	0	0	0
Labor		3	3	3	3	3	3	3	3	3	3	3	3
Management		5	5	5	5	5	5	5	5	5	5	5	5
Interest		0	1	2	3	4	6	6	6	6	6	6	6
Accounting and legal		20	1	1	1	1	1	1	1	1	1	1	1
Office operations		2	2	2	2	2	2	2	2	2	2	2	2
Organization & Development		0	0	0	0	0	0	0	0	0	0	0	0
Total operating expense		39	13	14	15	16	16	16	16	16	16	16	16
Amortization L. T. Debt:													159
CASH FLOW THIS MONTH		(229)	(108)	(109)	(110)	(92)	21	40	59	78	78	78	(81)
CUMULATIVE CASH FLOW		(229)	(337)	(446)	(556)	(648)	(627)	(587)	(528)	(450)	(372)	(294)	(375)
CASH POSITION BEFORE STF		366	258	150	40	(53)	21	40	67	145	223	301	220
Short term: borrowing		0	0	0	0	53	0	0	0	0	0	0	0
repayment		0	0	0	0	0	21	32	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	53	32	0	0	0	0	0	0
CASH POSITION		366	258	150	40	0	0	8	67	145	223	301	220
Outstanding L. T. debt		95	190	286	381	476	476	476	476	476	476	476	317

TABLE F-15.1
PROJECTED CASH FLOW - ANTHURIUM
YEAR 2
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	220	286	366	445	525	605	685	764	844	924	1,004	1,083
CASH IN	94	94	94	94	94	94	94	94	94	94	94	94
Sales revenue	94	94	94	94	94	94	94	94	94	94	94	94
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	314	380	459	539	619	699	778	858	938	1,018	1,097	1,177
CASH OUT	28	14	14	14	14	14	14	14	14	14	14	173
Capital expenditures:	0	0										
Operating expenses:												
Land	6					0			0			0
Plant	0											
Fertilizer	4											
Pesticides	4											
Electricity	0	0	0	0	0	0	0	0	0	0	0	0
Labor	3	3	3	3	3	3	3	3	3	3	3	3
Management	5	5	5	5	5	5	5	5	5	5	5	5
Interest	4	4	4	4	4	4	4	4	4	4	4	4
Accounting and legal	1	1	1	1	1	1	1	1	1	1	1	1
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	28	14	14	14	14	14	14	14	14	14	14	14
Amortization L. T. Debt:												159
CASH FLOW THIS MONTH	66	80	80	80	80	80	80	80	80	80	80	(79)
CUMULATIVE CASH FLOW	66	145	225	305	385	464	544	624	704	783	863	784
CASH POSITION BEFORE STF	286	366	445	525	605	685	764	844	924	1,004	1,083	1,004
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	286	366	445	525	605	685	764	844	924	1,004	1,083	1,004
Outstanding L. T. debt	317	317	317	317	317	317	317	317	317	317	317	159

TABLE F-15.2

PROJECTED CASH FLOW - ANTHURIUM
YEAR 3
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	1,008	1,072	1,154	1,235	1,317	1,398	1,480	1,562	1,643	1,725	1,806	1,888
CASH IN	90	90	90	90	90	90	90	90	90	90	90	90
Sales revenue	90	90	90	90	90	90	90	90	90	90	90	90
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	1,098	1,166	1,247	1,329	1,410	1,492	1,574	1,655	1,737	1,818	1,900	1,982
CASH OUT	26	12	12	12	12	12	12	12	12	12	12	171
Capital expenditures:	0	0										
Operating expenses:												
Land	6											
Plant	0					0			0			0
Fertilizer	4											
Pesticides	4											
Electricity	0	0	0	0	0	0	0	0	0	0	0	0
Labor	3	3	3	3	3	3	3	3	3	3	3	3
Management	5	5	5	5	5	5	5	5	5	5	5	5
Interest	2	2	2	2	2	2	2	2	2	2	2	2
Accounting and legal	1	1	1	1	1	1	1	1	1	1	1	1
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	26	12	12	12	12	12	12	12	12	12	12	12
Amortization L. T. Debt:												159
CASH FLOW THIS MONTH	68	82	82	82	82	82	82	82	82	82	82	(77)
CUMULATIVE CASH FLOW	852	933	1,015	1,097	1,178	1,260	1,341	1,423	1,505	1,586	1,668	1,591
CASH POSITION BEFORE STF	1,072	1,154	1,235	1,317	1,398	1,480	1,562	1,643	1,725	1,806	1,888	1,811
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	1,072	1,154	1,235	1,317	1,398	1,480	1,562	1,643	1,725	1,806	1,888	1,811
Outstanding L. T. debt	159	159	159	159	159	159	159	159	159	159	159	(0)

TABLE F-16

PRO FORMA INCOME STATEMENT - ANTHURIUM
(U. S. Dollars)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
REVENUE					
Anthruium sales	562,500	1,125,000	1,125,000	1,125,000	1,125,000
Other	562,500	1,125,000	1,125,000	1,125,000	1,125,000
	0	0	0	0	0
Total Revenue	562,500	1,125,000	1,125,000	1,125,000	1,125,000
COSTS					
Production	47,700	47,700	47,700	47,700	47,700
General Administration	230,455	204,913	179,848	179,848	179,848
Management	60,000	60,000	60,000	60,000	60,000
Depreciation	70,486	70,486	70,486	70,486	70,486
Interest	50,969	44,427	20,362	20,362	20,362
Accounting and Legal	31,000	12,000	11,000	11,000	11,000
Office Operations	18,000	18,000	18,000	18,000	18,000
Other	0	0	0	0	0
Total Costs	278,155	252,613	227,548	227,548	227,548
Net Profit Before Tax	284,345	872,387	897,452	897,452	897,452
Internal Rate of Return	113 %				

TABLE F-17

ENTERPRISE BUDGET, YEAR 1

BASIC ASSUMPTIONS:	CARNATIONS MINIATURE	STANDARD
ACRES HARVESTED	3.6	3.6
YIELD(BUNCH OR UNIT)/ACRE	65,000	920,000
REVENUE/BUNCH OR UNIT	0.80	0.08
REVENUE:	187,512.00	265,401.60
OPERATING EXPENSES:		
VARIABLE PRODUCTION EXPENSE (PER ACRE):		
DOLLARS PER ACRE	MINIATURE	STANDARD
LAND PREPARATION	1,000.00	1,000.00
PLANTS	16,128.00	16,128.00
FERTILIZER	600.00	600.00
PESTICIDES	600.00	600.00
ELECTRICITY	400.00	400.00
LABOR	5,200.00	6,240.00
	0.00	0.00
TOTAL	23,928.00	24,968.00
TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:		
LAND PREPARATION	15,000.00	15,000.00
PLANTS	241,920.00	241,920.00
FERTILIZER	9,000.00	9,000.00
PESTICIDES	9,000.00	9,000.00
ELECTRICITY	6,000.00	6,000.00
LABOR	78,000.00	93,600.00
TOTAL	358,920.00	374,520.00
TOTAL OPERATING EXPENSES	358,920.00	374,520.00
OPERATING INCOME:	(171,408.00)	(109,118.40)

TABLE F-17.1

ENTERPRISE BUDGET, YEAR 2

BASIC ASSUMPTIONS:	CARNATIONS MINIATURE	STANDARD
ACRES HARVESTED	15.0	15.0
YIELD(BUNCH OR UNIT)/ACRE	65,000	920,000
REVENUE/BUNCH OR UNIT	0.80	0.08
REVENUE:	871,967.50	1,254,782.50
OPERATING EXPENSES:		
VARIABLE PRODUCTION EXPENSE (PER ACRE):		
DOLLARS PER ACRE	MINIATURE	STANDARD
LAND PREPARATION	1,000.00	1,000.00
PLANTS	16,128.00	16,128.00
FERTILIZER	600.00	600.00
PESTICIDES	600.00	600.00
ELECTRICITY	400.00	400.00
LABOR	5,200.00	6,240.00
	0.00	0.00
TOTAL	23,928.00	24,968.00
TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:		
LAND PREPARATION	15,000.00	15,000.00
PLANTS	241,920.00	241,920.00
FERTILIZER	9,000.00	9,000.00
PESTICIDES	9,000.00	9,000.00
ELECTRICITY	6,000.00	6,000.00
LABOR	78,000.00	93,600.00
TOTAL	358,920.00	374,520.00
TOTAL OPERATING EXPENSES	358,920.00	374,520.00
OPERATING INCOME:	513,047.50	880,262.50

TABLE F-17.2

ENTERPRISE BUDGET, YEAR 3

BASIC ASSUMPTIONS:	CARNATIONS MINIATURE	STANDARD
ACRES HARVESTED	15.0	15.0
YIELD(BUNCH OR UNIT)/ACRE	65,000	920,000
REVENUE/BUNCH OR UNIT	0.80	0.08
REVENUE:	634,987.50	913,762.50
OPERATING EXPENSES:		
VARIABLE PRODUCTION EXPENSE (PER ACRE):		
DOLLARS PER ACRE	MINIATURE	STANDARD
LAND PREPARATION	1,000.00	1,000.00
PLANTS	16,128.00	16,128.00
FERTILIZER	600.00	600.00
PESTICIDES	600.00	600.00
ELECTRICITY	400.00	400.00
LABOR	5,200.00	6,240.00
	0.00	0.00
TOTAL	23,928.00	24,968.00
TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:		
LAND PREPARATION	15,000.00	15,000.00
PLANTS	241,920.00	241,920.00
FERTILIZER	9,000.00	9,000.00
PESTICIDES	9,000.00	9,000.00
ELECTRICITY	6,000.00	6,000.00
LABOR	78,000.00	93,600.00
TOTAL	358,920.00	374,520.00
TOTAL OPERATING EXPENSES	358,920.00	374,520.00
OPERATING INCOME:	276,067.50	539,242.50

TABLE F-18

FIXED INVESTMENT REQUIREMENT

ENTERPRISE: CARNATIONS ACRES PRODUCT: 30

		COST/ACRE (U.S. DOLLARS)	TOTAL COST
LAND -TOTAL AC.	60	500	30,000
GREENHOUSE (30 ACRES @ $.50/SQ FT)		22,000	660,000
FERT AND IRRIG EQUIP		1,267	38,010
ELECTRICAL		250	7,500
PLANTING MATERIAL		417	12,510
PACKINGHOUSE		1,250	37,500
COLDROOM		333	9,990
REFRIGERATION		250	7,500
OFFICE & STOREROOM		1,250	37,500
VEHICLES		2,500	75,000
MISCELLANEOUS		833	24,990
TOTAL		30,850	940,500

TABLE F-19

PROJECTED CASH FLOW - CARNATIONS
YEAR 1
(Thousands of U.S. Dollars)

	START UP	1	2	3	4	5	6	7	8	9	10	11	12
EQUITY	800												
LONG TERM DEBT	78												
TOTAL	878												
CASH ON HAND		878	491	383	274	164	0	0	0	0	0	0	0
CASH IN		0	78	78	78	78	78	0	46	54	105	118	131
Sales revenue									46	54	105	118	131
Add'l L. T. debt			78	78	78	78	78	0	0	0	0	0	0
CASH AVAILABLE		878	569	461	352	242	78	0	46	54	105	118	131
CASH OUT		387	186	187	188	372	192	37	38	221	39	39	194
Capital expenditures:		157	157	157	157	157	157						
Operating expenses:													
Land preparation		10				10				10			
Plants		161				161				161			
Fertilizer		6				6				6			
Pesticides		6				6				6			
Electricity		1	1	1	1	1	1	1	1	1	1	1	1
Labor		14	14	14	14	14	14	14	14	14	14	14	14
Management		10	10	10	10	10	10	10	10	10	10	10	10
Interest		0	1	2	3	4	6	8	9	9	11	10	9
Accounting and legal		20	2	2	2	2	2	2	2	2	2	2	2
Office operations		2	2	2	2	2	2	2	2	2	2	2	2
Organization & Development		0	0	0	0	0	0	0	0	0	0	0	0
Total operating expense		231	30	31	32	216	35	37	38	221	39	39	38
Amortization L. T. Debt:													157
CASH FLOW THIS MONTH		(387)	(108)	(109)	(110)	(294)	(113)	(37)	8	(167)	65	79	(64)
CUMULATIVE CASH FLOW		(387)	(495)	(604)	(714)	(1,008)	(1,122)	(1,159)	(1,150)	(1,317)	(1,252)	(1,173)	(1,237)
CASH POSITION BEFORE STF		491	383	274	164	(130)	(113)	(37)	8	(167)	65	79	(64)
Short term: borrowing		0	0	0	0	130	113	37	0	167	0	0	64
repayment		0	0	0	0	0	0	0	8	0	65	79	0
Outstanding S. T. debt	0	0	0	0	0	130	243	280	272	439	374	295	358
CASH POSITION		491	383	274	164	0	0	0	0	0	0	0	0
Outstanding L. T. debt		78	157	235	314	392	470	470	470	470	470	470	314

TABLE F-19.1

PROJECTED CASH FLOW - CARNATIONS
YEAR 2
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	0	0	0	0	0	0	98	279	431	405	568	693
CASH IN	139	152	165	178	191	204	217	184	190	195	157	157
Sales revenue	139	152	165	178	191	204	217	184	190	195	157	157
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	139	152	165	178	191	204	311	463	620	600	725	850
CASH OUT	219	37	36	34	216	33	32	32	215	32	32	189
Capital expenditures:	0	0										
Operating expenses:												
Land	10				10							
Plant	161				167				10			0
Fertilizer	6				6				161			
Pesticides	6				6				6			
Electricity	1	1	1	1	1	1	1	1	6			
Labor	14	14	14	14	14	14	14	14	1	1	1	1
Management	10	10	10	10	10	10	10	10	14	14	14	14
Interest	8	9	7	6	4	5	4	4	10	10	10	10
Accounting and legal	2	2	2	2	2	2	2	2	4	4	4	4
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	2	2	2	2
Total operating expens	219	37	36	34	216	33	32	32	0	0	0	0
Amortization L. T. Debt:									215	32	32	32
												157
CASH FLOW THIS MONTH	(81)	115	129	144	(25)	171	185	152	(26)	163	125	(32)
CUMULATIVE CASH FLOW	(81)	34	163	306	281	452	637	789	763	926	1,051	1,020
CASH POSITION BEFORE STF	(81)	115	129	144	(25)	171	279	431	405	568	693	661
Short term: borrowing	81	0	0	0	25	0	0	0	0	0	0	0
repayment	0	115	129	144	0	77	0	0	0	0	0	0
Outstanding S. T. debt	439	325	196	52	77	0	0	0	0	0	0	0
CASH POSITION	0	0	0	0	0	98	279	431	405	568	693	661
Outstanding L. T. debt	314	314	314	314	314	314	314	314	314	314	314	157

TABLE F-19.2

PROJECTED CASH FLOW - CARNATIONS
YEAR 3
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	661	605	732	846	946	851	925	987	1,035	933	1,017	1,151
CASH IN	157	157	144	131	118	105	92	79	111	114	165	178
Sales revenue	157	157	144	131	118	105	92	79	111	114	165	178
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	818	762	876	976	1,064	955	1,017	1,065	1,146	1,047	1,181	1,329
CASH OUT	213	30	30	30	213	30	30	30	213	30	30	187
Capital expenditures:	0	0										
Operating expenses:												
Land	10											
Plant	161				10				10			0
Fertilizer	6				161				161			
Pesticides	6				6				6			
Electricity	1	1	1	1	6	1	1	1	6	1	1	1
Labor	14	14	14	14	14	14	14	14	14	14	14	14
Management	10	10	10	10	10	10	10	10	10	10	10	10
Interest	2	2	2	2	2	2	2	2	2	2	2	2
Accounting and legal	2	2	2	2	2	2	2	2	2	2	2	2
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Organization & Develop	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	213	30	30	30	213	30	30	30	213	30	30	30
Amortization L. T. Debt:												157
CASH FLOW THIS MONTH	(56)	127	114	101	(96)	75	61	48	(102)	83	135	(9)
CUMULATIVE CASH FLOW	963	1,090	1,204	1,305	1,209	1,284	1,345	1,393	1,291	1,375	1,510	1,500
CASH POSITION BEFORE STF	605	732	846	946	851	925	987	1,035	933	1,017	1,151	1,142
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	605	732	846	946	851	925	987	1,035	933	1,017	1,151	1,142
Outstanding L. T. debt	157	157	157	157	157	157	157	157	157	157	157	0

TABLE F-20

PRO FORMA INCOME STATEMENT - CARNATIONS
(U. S. Dollars)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
REVENUE	452,917	2,126,750	1,548,750	1,548,750	1,548,750
Carnations	452,917	2,126,750	1,548,750	1,548,750	1,548,750
Other	0	0	0	0	0
Total Revenue	452,917	2,126,750	1,548,750	1,548,750	1,548,750
COSTS					
Production	358,920	358,920	358,920	358,920	358,920
General Administration	324,350	296,276	252,108	252,108	252,108
Management	120,000	120,000	120,000	120,000	120,000
Depreciation	73,492	73,492	73,492	73,492	73,492
Interest	70,358	60,784	20,116	20,116	20,116
Accounting and Legal	36,500	18,000	16,500	16,500	16,500
Office Operations	24,000	24,000	22,000	22,000	22,000
Other	0	0	0	0	0
Total Costs	683,270	655,196	611,028	611,028	611,028
Net Profit Before Tax	(230,353)	1,471,554	937,722	937,722	937,722
Internal Rate of Return	71 %				

PINEAPPLE FOR FRESH FRUIT AND PROCESSING

1. Executive Description

Pineapple production in the Dominican Republic is a proven enterprise but to be successful, markets for the fresh pineapple as well as for concentrated juice must be developed, thus requiring a processing plant that can be operated on a year-round investment basis. This proposal outline is based upon a planting of 75 acres/month on a 26 month production cycle. High capital requirements needed for farm machinery for 1950 acres of production, a processing plant as well as for technical services for the small growers. The internal rate of return for this investment profile is 48 percent.

2. Market and Sales

There are 10 major producers of pineapple in the world with over 1,000,000 acres in production. Thailand is the major producer with 69 percent of the area. Less than 30 percent of the production area is integrated to provide both fresh fruit and juice. Due to high land and labor costs, Hawaiian production has decreased by over 30 percent in the last ten years whereas production in Mexico and the Philippines have greatly increased during this period. United Brands and Castle & Cook control the North American market.

The U.S. market has shown a dramatic increase for fresh pineapple of 338 percent between 1971 and 1982. However, juice demands have remained relatively constant around 75 million gallons of simple juice.

The total pineapple production in the Dominican Republic is approximately 1000 acres, all by very small growers. The common practice is to grow a local variety that does not provide a second crop, and plants typically do not produce a large percentage of exportable fruits necessary for an economical enterprise. The variety, F-153, at a density of 28,000 plants/acre is the recommended variety and spacing to provide a good

distribution of fruit sizes for the American market which prefers the 10-12 size (3.3-4.05 pounds/fruit). This provides 10-12 fruits per 40.5 pound carton. (See Tables on Pineapple Production)

3. Technical, Feasibility, Manpower and Raw Material Resources

Pineapples require an acid, well-drained soil that is relatively flat for tractor operations. Pineapples are generally grown in a relatively dry climate but have a steady requirement for water especially during fruit maturation and sizing. High light intensity during the day and cool nights (65° - 79°F) insures a high sugar content. The dryer areas of the Dominican Republic have alkaline soils and/or have high levels of soluble salts which are unsuitable for pineapples. An area with good quality water will be required for a uniform, year-round crop for the fresh market.

Asexual plantlets of F-153 are planted at a density of 28,000/acre. When plants reach maturity, an application of an ethylene-producing material is made to insure a uniform (98% induction) induction of flowering and subsequently of fruit maturity and harvest. Fertilizer rates and timing should be determined by the use of soil and foliar analysis. Timing of these activities and maintaining active growth are key criteria to insure a uniform supply of fresh fruits.

The first harvest of fresh pineapples should occur in about fourteen months with a yield of 42 tons/acre (tops and bottoms) with about 70% going to the fresh market (1453 boxes/acre). The remainder of 10.35 tons/acre of fruits (minus tops) are shipped to the processing plant and should yield 445 gallons/acre of 62° Brix concentrated juice.

After the harvest, the fields are renovated for a return crop often called a rattoon or retono in Spanish with the last harvest in about twelve months. The second crop should yield about 35 tons/acre. About 50% of the crop is exportable as fresh fruit. Approximately 14.8 tons/acre of fruits are processed to produce 636 gallons/acre of 62° Brix of concentrated juice. Prices used in the financial analysis were $3.75/box and $4.40/gallon, F.O.B. Santo Domingo.

Manpower requirements are relatively constant in this type of business and may be met by actually hiring labor or contracting small land owners to grow to ones' specifications. Several areas to the north of Santo Domingo (Villa Altagracia to Monte Plata) have extensive areas of sugar cane where alternatives for land and labor are being encouraged. At the present time, much of the fresh pineapple is being grown near Santiago where both land and labor are available. Although there are agronomists with good knowledge of pineapple, it does not appear that there are many who can properly manage a large commercial operation for the export market. Management will have to obtain an experienced agronomist and/or technical assistance to insure good production practices.

One potential restriction in this proposal will be managing to obtain enough uniform planting stock for such a venture. Additional stock may need to be imported from other production areas, thus increasing the cost of planting stock.

4. Investment Requirements and Financial Analysis

The following analysis assumes a total of 1950 acres devoted exclusively to the production of pineapple for export to the United States. The primary product would be fresh pineapple. Dominican producers have clearly proven their ability to produce a quality fresh pineapple for the U.S. market. The variety would be smooth cayenne. An important by-product would be concentrated pineapple juice.

Marketable fresh pineapple yields were conservatively projected at an annual equivalent of 2320 boxes per acre starting in the middle of the second year after planting. Juice concentrate yields were estimated to be about 1081 gallons per acre per year. These yield assumptions are well below average worldwide yields and are well within the range of yields being achieved by others in the Dominican Republic.

Based on an analysis of New York City prices for fresh pineapple we have assumed average prices of $12.00 per box for an F.O.B Santo Domingo price of $3.75 per box. Current prices for pineapple juice concentrate F.O.B. Santo Domingo are $4.40 per gallon.

The tables following the text (Tables P-6 thru P-10) present investment cost assumptions, enterprise budgets and cash flow analysis for three years, planting and harvesting schedules for five years, and proforma profit and loss statements for ten years.

Fixed investment requirements total $3,070,670. No land costs were included since it is assumed that the land could be leased on a long term basis. Operating costs include a liberal amount of $220 per year per acre for land rent. Given the current low world sugar prices and the fact that much sugar cane land possesses the characteristics necessary for pineapple production, it should be relatively easy to find plenty of land to lease at that rate. But investors must be careful to do a detailed soil study to determine that a given piece of land is indeed optimum for the production of pineapple.

It was assumed that about 50 percent of the total capital requirement would be funded from equity with the balance funded through a combination of long term credit and a working capital facility. It was assumed that 50 percent of the investment cost would be funded through a seven year loan with the first payment due at the end of the third year and equal annual installments for the next five years. The long term loan would peak early in the second year at $1,535,000. Short term working capital needs reach a peak of $1,238,000 early in the second year after major investments have been made and before the first sales are completed.

Under those assumptions the total requirement for the venture is $2,800,000. The venture produces a net loss of $2,405,523 in the first year, shows a small profit in the second year, and reaches a profit level of about $4.5 million in the fourth year. Assuming, at the end of year ten, that the venture is worth twice it's earning capacity, the internal rate of return on equity would be 48 percent.

While these are attractive potential returns, a word of caution is in order. There are considerable risks associated with this type of venture. First, there are biological and climatological risks. Varieties may not respond to the conditions of soil water and climate as one expects. Diseases, viruses and pests may take a heavy toll on yields and or quality.

Second, there are significant market risks. Fresh produce prices are extremely volatile and unpredictable. There is no way to predict when prices might drop drastically. And finally there are transport availability and cost uncertainties. Any or all of these risk factors could substantially reduce the returns to invested capital. A combined negative variation of 10 to 20 percent in yields, prices and transport costs would produce heavy losses. Good management, however, can devise strategies to manage those risks.

5. Government Support and Regulations

The Dominican government in its policy making in recent years has been providing incentives for foreign investment to support the build-up of integrated agribusinesses, especially those producing and exporting non-traditional products. Law No. 409, the Agro-industrial Promotion Law would offer considerable incentives including tax exemptions to this type of project. Further discussion of investment regulations is taken up in the Reconnaissance Survey Report which is available from ASAC International or the Trade and Development Program.

6. Time Scale

Planting can commence immediately upon contracting for land, obtaining tractors, equipment, and planting stock. However marketing and processing has a fourteen month lag period after planting commences.

7. Potential Partners

Mr. Jose Torres Morales
Exportadora de Productos Comerciales, S.A. (Exproco)
Torre San Geronimo
Av. Independencia No. 526
Suite 801
Santo Domingo, Dominican Republic
Telephone 533-8523

Has experience in marketing fresh pineapple to Europe and U.S.. Desires technical experts in production and additional marketing assistance.

Frutas Dominicanas, C por A
Apartado 521
Santo Domingo, Dominican Republic
Telex: Frudoca - ITT 346-0607
Has worked with United Brands and may desire additional financing.

Mr. Cesar Rodriguez
c/o Federacion Dominicana de Colonos Azucareros, Inc. (FEDOCA)
Paul P. Harris No. 3
Centro de Los Heroes, Zona 6
Santo Domingo, Dominican Republic
Telephone 533-5355
Has land presently in sugar cane. Desires technical assistance and marketing expertise

SEA & IAD
Organization has land in sugar cane. Desires technical assistance and marketing expertise.

TABLE P-1

PINEAPPLE PRODUCING COUNTRIES

Country	Acres	Percentage
Australia	10,000	.9%
Costa Rica	4,000	.4%
Hawaii	32,500	2.9%
Honduras	6,000	.6%
Ivory Coast	30,000	2.8%
Malaysia	47,500	4.4%
Mexico	36,750	3.4%
Philippines	100,000	9.2%
Puerto Rico	4,000	.4%
South Africa	42,500	3.9%
Taiwan	23,250	2.1%
Thailand	750,000	69.0%
	1,086,500	100.00%

Source: Department of Agriculture. Foreign Agricultural Service

TABLE P-2

PINEAPPLE PRODUCTION BY COUNTRY
(metric tons of fresh fruit)

Country \ Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980 1/
Australia	128,021	128,000	126,000	126,000	119,761	95,451	119,000	101,000	103,000	133,000	123,000
Ivory Coast	110,579	135,746	201,304	201,010	229,000	240,000	267,000	242,000	312,000	287,000	306,000
Malaysia	283,246	268,190	255,391	241,538	245,339	199,292	194,418	191,844	190,344	192,646	185,000
Mexico	248,800	297,300	218,200	268,300	397,800	371,300	442,000	510,000	568,300	632,100	604,600
Philippines	365,000	380,000	375,000	33,235	405,000	400,000	752,000	780,000	815,000	875,000	901,000
South Africa	160,539	173,506	173,994	147,389	184,226	169,374	172,317	158,825	167,300	212,119	210,535
Taiwan	338,191	358,529	334,384	327,982	307,851	318,978	278,830	282,193	249,627	244,119	233,291
Thailand	242,489	124,826	318,789	483,493	803,720	1,151,865	1,295,830	1,499,400	1,540,000	1,372,000	1,680,000
U.S.A.	865,453	854,567	859,103	734,819	635,029	653,172	616,885	625,957	612,349	617,792	596,020
	2,742,318	2,720,664	2,862,165	2,563,766	3,327,726	3,599,432	4,138,280	4,391,219	4,557,920	4,565,776	4,839,446

Estimated

Source: U.S. Department of Agriculture. Foreign Agriculture Service.

TABLE P-3

WORLD PINEAPPLE IMPORTS 1980

	Fresh Pineapple (1000 units of 40 lbs.)	Processed Pineapple (Metric Tons)
Japan	5,780	17,500
United States	3,800	232,323
France	2,180	2,900
Italy	990	7,475
United Kingdom	650	17,500
West Germany	690	48,400
Canada	560	12,000
Low Countries	440	15,700
Belgium-Luxembourg	310	3,060
Denmark	60	885
Saudi Arabia	160	16,727
Spain	330	6,000
Argentina	-	2,434
Others	-	82,334
Imports	25,950	465,228
Shipped from Hawaii to U.S.	3,690	
	19,640	

TABLE P-4

Total 5 Previous Years

	75	76	77	78	79
Fresh (millions of units of 40 lb)	9.4	9.5	10.9	14.4	15.6
Processed (1,000's of metric tons)	280	340	380	410	430

Source: U.S. Department Agriculture. Foreign Agriculture Service.

TABLE P-5

ESTIMATED MARKET SHARE OF NORTH AMERICAN FRESH PINEAPPLES
1978 - 1987

	Volume (000,000 units of 40 lbs.)				Percentage of Market (%)		
Year	U.B. CHIQUITA	C & C DOLE	OTHERS	TOTAL	U.B. CHIQUITA	C & C DOLE	OTHERS
1978	0	5.8	2.0	7.8	0	75	25
1979	0	6.0	2.0	8.0	0	75	25
1980	0.2	6.5	2.0	8.7	2	75	23
1981	0.4	7.0	2.0	9.4	4	74	22
1982	1.9	8.9	2.0	11.9	16	67	17
1983	3.4	8.0	2.0	13.4	25	60	15
1984	4.4	9.0	2.0	15.4	29	58	13
1985	5.0	10.0	2.0	16.0	31	56	13
1986	5.5	10.0	2.0	17.5	31	57	12
1987	5.8	10.0	2.0	17.8	33	56	11

TABLE P-6

PINEAPPLE ENTERPRISE BUDGET, YEAR 1

BASIC ASSUMPTIONS:

	FRESH	CONCENTRATE
ACRES PLANTED	900	900
ACRES HARVESTED	0	0
YIELD/ACRE(BOXES/GAL)	0	0
REVENUE/PACKAGE	0	0
REVENUE:	0	0

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (DOLLARS PER ACRE):

PER ACRE	FRESH	CONCENTRATE
LAND RENT	220.00	0.00
PLANTS	430.00	0.00
LAND PREPARATION	200.00	0.00
PLANTING COSTS	40.00	0.00
FERTILIZER & CHEM	820.00	0.00
FUEL AND MAINTENANCE	135.00	0.00
LABOUR	185.00	0.00
TOTAL	2,030.00	0.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND RENT	198,000	0
PLANTS	387,000	0
LAND PREPARATION	180,000	0
PLANTING COSTS	36,000	0
FERTILIZER & CHEM	738,000	0
FUEL AND MAINTENANCE	121,500	0
LABOUR	166,500	0
	0	0
	0	0
	0	0
	0	0
TOTAL	1,827,000	0

VARIABLE HARVESTING AND PROCESSING EXPENSE:

DOLLARS PER ACRE OR GAL.	FRESH	CONCENTRATE
PACKING CRATES	0.00	0.00
FUEL AND MAINTENANCE	0.00	0.00
LABOR	0.00	0.00
TRANSPORT TO PLANT	0.00	0.00
PROCESSING	0.00	0.00
TOTAL	0.00	0.00

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

PACKING CRATES	0	0
FUEL AND MAINTENANCE	0	0
LABOR	0	0
TRANSPORT TO PLANT	0	0
PROCESSING	0	0
TOTAL	0	0
TOTAL OPERATING EXPENSES	1,827,000	0
OPERATING INCOME:	(1,827,000)	0

TABLE P-6.1

PINEAPPLE ENTERPRISE BUDGET, YEAR 2

BASIC ASSUMPTIONS:

	FRESH	CONCENTRATE
ACRES PLANTED	900	900
ACRES HARVESTED	695	695
YIELD/CROP/ACRE(BOXES/GAL)	1,823	636
REVENUE/PACKAGE	3.75	4.40
REVENUE:	3,605,063	1,941,188

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (DOLLARS PER ACRE):

PER ACRE	FRESH	CONCENTRATE
LAND RENT	220.00	0.00
PLANTS	430.00	0.00
LAND PREPARATION	200.00	0.00
PLANTING COSTS	40.00	0.00
FERTILIZER & CHEM	820.00	0.00
FUEL AND MAINTENANCE	135.00	0.00
LABOUR	185.00	0.00
TOTAL	2,030.00	0.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND RENT	198,000	0
PLANTS	387,000	0
LAND PREPARATION	180,000	0
PLANTING COSTS	36,000	0
FERTILIZER & CHEM	738,000	0
FUEL AND MAINTENANCE	121,500	0
LABOUR	166,500	0
	0	0
	0	0
	0	0
	0	0
TOTAL	1,827,000	0

VARIABLE HARVESTING AND PROCESSING EXPENSE:

DOLLARS PER ACRE OR GAL.	FRESH	CONCENTRATE
PACKING CRATES	355.00	0.00
FUEL AND MAINTENANCE	550.00	0.00
LABOR	550.00	0.00
TRANSPORT TO PLANT	0.00	1.21
PROCESSING	0.00	2.81
TOTAL	1,455.00	4.02

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

PACKING CRATES	246,725	0
FUEL AND MAINTENANCE	382,250	0
LABOR	382,250	0
TRANSPORT TO PLANT	0	534,840
PROCESSING	0	1,243,462
TOTAL	1,011,225	1,778,302
TOTAL OPERATING EXPENSES	2,838,225	1,778,302
OPERATING INCOME:	766,838	162,885

TABLE P-6.2

PINEAPPLE ENTERPRISE BUDGET, YEAR 3

BASIC ASSUMPTIONS:	FRESH	CONCENTRATE
ACRES PLANTED	1,950	1,950
ACRES HARVESTED	835	835
YIELD/ACRE(BOXES/GAL)	2,320	1,081
REVENUE/PACKAGE	3.75	4.40
REVENUE:	7,280,813	3,920,438

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (DOLLARS PER ACRE):

PER ACRE	FRESH	CONCENTRATE
LAND RENT	220.00	0.00
PLANTS	430.00	0.00
LAND PREPARATION	200.00	0.00
PLANTING COSTS	40.00	0.00
FERTILIZER & CHEM	820.00	0.00
FUEL AND MAINTENANCE	135.00	0.00
LABOUR	185.00	0.00
TOTAL	2,030.00	0.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND RENT	429,000	0
PLANTS	838,500	0
LAND PREPARATION	390,000	0
PLANTING COSTS	78,000	0
FERTILIZER & CHEM	1,599,000	0
FUEL AND MAINTENANCE	263,250	0
LABOUR	360,750	0
	0	0
	0	0
	0	0
	0	0
TOTAL	3,958,500	0

VARIABLE HARVESTING AND PROCESSING EXPENSE:

DOLLARS PER ACRE OR GAL.	FRESH	CONCENTRATE	
PACKING CRATES	355.00	0.00	
FUEL AND MAINTENANCE	550.00	0.00	
LABOR	550.00	0.00	
TRANSPORT TO PLANT	0.00	1.21	
PROCESSING	0.00	2.81	.00
TOTAL	1,455.00	4.02	

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

PACKING CRATES	296,425	0
FUEL AND MAINTENANCE	459,250	0
LABOR	459,250	0
TRANSPORT TO PLANT	0	546,090
PROCESSING	0	1,269,618
TOTAL	1,214,925	1,815,708
TOTAL OPERATING EXPENSES	5,173,425	1,815,708
OPERATING INCOME:	2,107,388	2,104,730

TABLE P-7

PINEAPPLE PLANTING AND HARVESTING SCHEDULE - YEAR 1
(Acres and 1,000 U. S. Dollars)

	MONTH											
	1	2	3	4	5	6	7	8	9	10	11	12
ACREAGE PLANTED	75	75	75	75	75	75	75	75	75	75	75	75
TOTAL ACREAGE	75	150	225	300	375	450	525	600	675	750	825	900
1st HARVEST VALUE												
2nd HARVEST VALUE												
TOTAL HARVEST VALUE												
CUM. SALES YEAR 2												
CUM. SALES YEAR 3												
CUM. SALES YEAR 4												
CUM. SALES YEAR 5												

TABLE P-7.1

PINEAPPLE PLANTING AND HARVESTING SCHEDULE - YEAR 2
(Acres and 1,000 U. S. Dollars)

	13	14	15	16	17	18	19	20	21	22	23	24
ACREAGE PLANTED	75	75	75	75	75	75	75	75	75	75	75	75
TOTAL ACREAGE	975	1,050	1,125	1,200	1,275	1,350	1,425	1,500	1,575	1,650	1,725	1,800
1st HARVEST VALUE		556	556	556	556	556	556	556	556	556	556	556
2nd HARVEST VALUE												
TOTAL HARVEST VALUE		556	556	556	556	556	556	556	556	556	556	556
CUM. SALES YEAR 2		556	1,111	1,667	2,222	2,778	3,333	3,889	4,444	5,000	5,555	6,111
CUM. SALES YEAR 3												
CUM. SALES YEAR 4												
CUM. SALES YEAR 5												

TABLE P-7.2

PINEAPPLE PLANTING AND HARVESTING SCHEDULE - YEAR 3
(Acres and 1,000 U. S. Dollars)

	25	26	27	28	29	30	31	32	33	34	35	36
ACREAGE PLANTED	75	75	75	75	75	75	75	75	75	75	75	75
TOTAL ACREAGE	1,875	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950
1st HARVEST VALUE	556	556	556	556	556	556	556	556	556	556	556	556
2nd HARVEST VALUE		454	454	454	454	454	454	454	454	454	454	454
TOTAL HARVEST VALUE	556	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009
CUM. SALES YEAR 2												
CUM. SALES YEAR 3	556	1,565	2,574	3,583	4,592	5,602	6,611	7,620	8,629	9,639	10,648	11,657
CUM. SALES YEAR 4												
CUM. SALES YEAR 5												

TABLE P-7.3
PINEAPPLE PLANTING AND HARVESTING SCHEDULE - YEAR 4
(Acres and 1,000 U. S. Dollars)

	37	38	39	40	41	42	43	44	45	46	47	48
ACREAGE PLANTED	75	75	75	75	75	75	75	75	75	75	75	75
TOTAL ACREAGE	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950
1st HARVEST VALUE	556	556	556	556	556	556	556	556	556	556	556	556
2nd HARVEST VALUE	454	454	454	454	454	454	454	454	454	454	454	454
TOTAL HARVEST VALUE	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009
CUM. SALES YEAR 2												
CUM. SALES YEAR 3												
CUM. SALES YEAR 4	1,009	2,018	2,018	2,018	2,018	2,018	2,018	2,018	2,018	2,018	2,018	2,018
CUM. SALES YEAR 5												

TABLE P-7.4

PINEAPPLE PLANTING AND HARVESTING SCHEDULE - YEAR 5
(Acres and 1,000 U. S. Dollars)

	49	50	51	52	53	54	55	56	57	58	59	60
ACREAGE PLANTED	75	75	75	75	75	75	75	75	75	75	75	75
TOTAL ACREAGE	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950
1st HARVEST VALUE	556	556	556	556	556	556	556	556	556	556	556	556
2nd HARVEST VALUE	454	454	454	454	454	454	454	454	454	454	454	454
TOTAL HARVEST VALUE	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009
CUM. SALES YEAR 2												
CUM. SALES YEAR 3												
CUM. SALES YEAR 4												
CUM. SALES YEAR 5	1,009	2,018	3,028	4,037	5,046	6,055	7,065	8,074	9,083	10,092	11,102	12,111

TABLE P-8

INVESTMENT REQUIREMENTS

Pineapple

AGRICULTURAL EQUIPMENT	1,460,000
BUILDING AND STRUCTURES	685,335
PROCESSING PLANT	925,335
TOTAL	3,070,670

TABLE P-9

PROJECTED CASH FLOW - PINEAPPLE
YEAR 1
(Thousands of U.S. Dollars)

	START UP	1	2	3	4	5	6	7	8	9	10	11	12
EQUITY	2,800												
LONG TERM DEBT	125												
TOTAL	2,925												
CASH ON HAND		2,925	2,521	2,240	1,957	1,674	1,388	1,102	814	524	268	11	0
CASH IN													
Sales revenue		0	125	125	125	125	125	125	125	90	90	90	90
Add'l L. T. debt		0	0	0	0	0	0	0	0	0	0	0	0
			125	125	125	125	125	125	125	90	90	90	90
CASH AVAILABLE		2,925	2,645	2,364	2,082	1,798	1,513	1,226	938	614	358	101	90
CASH OUT													
Capital expenditures:		404	406	407	409	410	411	413	414	345	346	348	351
		249	249	249	249	249	249	249	249	179	179	179	179
Operating expenses:													
Land rent		8	8	8	8	8	8	8	8	8	8	8	8
Plants		15	15	15	15	15	15	15	15	15	15	15	15
Land preparation		7	7	7	7	7	7	7	7	7	7	7	7
Planting costs		1	1	1	1	1	1	1	1	1	1	1	1
Fertilizer & chemicals		46	46	46	46	46	46	46	46	46	46	46	46
Fuel & maintenance		5	5	5	5	5	5	5	5	5	5	5	5
Labor		6	6	6	6	6	6	6	6	6	6	6	6
Packing crates		0	0	0	0	0	0	0	0	0	0	0	0
Fuel & maintenance		0	0	0	0	0	0	0	0	0	0	0	0
Labor		0	0	0	0	0	0	0	0	0	0	0	0
Transport to plant		0	0	0	0	0	0	0	0	0	0	0	0
Processing		0	0	0	0	0	0	0	0	0	0	0	0
Management		31	31	31	31	31	31	31	31	31	31	31	31
Interest		0	1	3	4	6	7	9	10	12	13	14	18
Miscellaneous		9	9	9	9	9	9	9	9	9	9	9	9
Office operations		10	10	10	10	10	10	10	10	10	10	10	10
Technical services		17	17	17	17	17	17	17	17	17	17	17	17
Total operating expense		155	156	158	159	160	162	163	165	166	167	168	172
Amortization L. T. Debt:													
CASH FLOW THIS MONTH		(404)	(281)	(282)	(284)	(285)	(287)	(288)	(290)	(256)	(257)	(258)	(262)
CUMULATIVE CASH FLOW		(404)	(685)	(967)	(1,251)	(1,536)	(1,823)	(2,111)	(2,401)	(2,657)	(2,914)	(3,172)	(3,433)
CASH POSITION BEFORE STF		2,521	2,240	1,957	1,674	1,388	1,102	814	524	268	11	(247)	(262)
Short term: borrowing		0	0	0	0	0	0	0	0	0	0	247	262
repayment		0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	247	509
CASH POSITION		2,521	2,240	1,957	1,674	1,388	1,102	814	524	268	11	0	0
Outstanding L. T. debt		125	249	374	499	624	748	873	998	1,088	1,177	1,267	1,356

TABLE P-9.1

PROJECTED CASH FLOW - PINEAPPLE
YEAR 2
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	0	0	0	0	0	0	0	0	0	0	36	203
CASH IN	90	90	555	555	555	555	555	555	555	555	555	555
Sales revenue	0	0	555	555	555	555	555	555	555	555	555	555
Add'l L. T. debt	90	90	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	90	90	555	555	555	555	555	555	555	555	590	758
CASH OUT	356	553	402	400	398	396	395	393	391	389	387	387
Capital expenditures:	179	179										
Operating expenses:												
Land rent	8	8	8	8	8	8	8	8	8	8	8	8
Plants	15	15	15	15	15	15	15	15	15	15	15	15
Land preparation	7	7	7	7	7	7	7	7	7	7	7	7
Planting costs	1	1	1	1	1	1	1	1	1	1	1	1
Fertilizer & chemicals	46	46	68	68	68	68	68	68	68	68	68	68
Fuel & maintenance	5	5	5	5	5	5	5	5	5	5	5	5
Labor	6	6	6	6	6	6	6	6	6	6	6	6
Packing crates	0	16	16	16	16	16	16	16	16	16	16	16
Fuel & maintenance	0	23	23	23	23	23	23	23	23	23	23	23
Labor	0	23	23	23	23	23	23	23	23	23	23	23
Transport to plant	0	37	37	37	37	37	37	37	37	37	37	37
Processing	0	94	94	94	94	94	94	94	94	94	94	94
Management	31	31	31	31	31	31	31	31	31	31	31	31
Interest	26	26	32	31	29	27	25	23	21	19	18	18
Accounting and legal	9	9	9	9	9	9	9	9	9	9	9	9
Office operations	10	10	10	10	10	10	10	10	10	10	10	10
Technical services	17	17	17	17	17	17	17	17	17	17	17	17
Total operating expens	176	374	402	400	398	396	395	393	391	389	387	387
Amortization L. T. Debt:												
CASH FLOW THIS MONTH	(266)	(463)	153	155	156	158	160	162	164	166	167	167
CUMULATIVE CASH FLOW	(266)	(729)	(576)	(422)	(265)	(107)	53	215	379	544	712	879
CASH POSITION BEFORE STF	(266)	(463)	153	155	156	158	160	162	164	166	203	370
Short term: borrowing	266	463	0	0	0	0	0	0	0	0	0	0
repayment	0	0	153	155	156	158	160	162	164	130	0	0
Outstanding S. T. debt	775	1,238	1,085	930	774	616	456	294	130	0	0	0
CASH POSITION	0	0	0	0	0	0	0	0	0	36	203	370
Outstanding L. T. debt	1,446	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535

TABLE P-9.2

PROJECTED CASH FLOW - PINEAPPLE
YEAR 3
(Thousands of U.S. Dollars)

	1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	370	538	470	857	1,244	1,631	2,019	2,406	2,793	3,180	3,567	3,954
CASH IN	555	555	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009
Sales revenue	555	555	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	925	1,092	1,479	1,866	2,253	2,641	3,028	3,415	3,802	4,189	4,576	4,963
CASH OUT	387	622	622	622	622	622	622	622	622	622	622	929
Capital expenditures:	0											
Operating expenses:												
Land rent	8	8	8	8	8	8	8	8	8	8	8	8
Plants	15	15	15	15	15	15	15	15	15	15	15	15
Land preparation	7	7	7	7	7	7	7	7	7	7	7	7
Planting costs	1	1	1	1	1	1	1	1	1	1	1	1
Fertilizer & chemicals	68	68	68	68	68	68	68	68	68	68	68	68
Fuel & maintenance	5	5	5	5	5	5	5	5	5	5	5	5
Labor	6	6	6	6	6	6	6	6	6	6	6	6
Packing crates	16	27	27	27	27	27	27	27	27	27	27	27
Fuel & maintenance	23	41	41	41	41	41	41	41	41	41	41	41
Labor	23	41	41	41	41	41	41	41	41	41	41	41
Transport to plant	37	91	91	91	91	91	91	91	91	91	91	91
Processing	94	228	228	228	228	228	228	228	228	228	228	228
Management	31	31	31	31	31	31	31	31	31	31	31	31
Interest	18	18	18	18	18	18	18	18	18	18	18	18
Accounting and legal	9	9	9	9	9	9	9	9	9	9	9	9
Office operations	10	10	10	10	10	10	10	10	10	10	10	10
Technical services	17	17	17	17	17	17	17	17	17	17	17	17
Total operating expens	387	622	622	622	622	622	622	622	622	622	622	622
Amortization L. T. Debt:												307
CASH FLOW THIS MONTH	167	(67)	387	387	387	387	387	387	387	387	387	80
CUMULATIVE CASH FLOW	1,046	979	1,366	1,753	2,140	2,527	2,914	3,302	3,689	4,076	4,463	4,543
CASH POSITION BEFORE STF	538	470	857	1,244	1,631	2,019	2,406	2,793	3,180	3,567	3,954	4,034
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	538	470	857	1,244	1,631	2,019	2,406	2,793	3,180	3,567	3,954	4,034
Outstanding L. T. debt	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,228

TABLE P-10

PRO FORMA INCOME STATEMENT - PINEAPPLE
(U. S. Dollars)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
REVENUE										
Product Sales	0	5,546,250	11,201,250	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000
Pineapple & concentrate	0	5,546,250	11,201,250	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000
Other	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	5,546,250	11,201,250	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000	12,108,000
COSTS										
Production	1,051,615	1,269,115	1,312,615	1,312,615	1,312,615	1,312,615	1,312,615	1,312,615	1,312,615	1,312,615
Pineapple & concentrate	1,051,615	1,269,115	1,312,615	1,312,615	1,312,615	1,312,615	1,312,615	1,312,615	1,312,615	1,312,615
Other	0	0	0	0	0	0	0	0	0	0
Packing and All Marketing	0	2,123,440	4,898,279	5,132,988	5,132,988	5,132,988	5,132,988	5,132,988	5,132,988	5,132,988
Pineapple & concentrate	0	2,123,440	4,898,279	5,132,988	5,132,988	5,132,988	5,132,988	5,132,988	5,132,988	5,132,988
Other	0	0	0	0	0	0	0	0	0	0
General Administration	1,353,908	1,311,093	1,234,827	1,195,420	1,132,369	1,075,623	1,045,359	1,037,792	1,037,792	1,037,792
Management	368,635	368,635	368,635	368,635	368,635	368,635	368,635	368,635	368,635	368,635
Depreciation	453,067	453,067	453,067	453,067	453,067	453,067	453,067	453,067	453,067	453,067
Interest	96,471	273,300	197,035	157,628	94,577	37,831	7,566	0	0	0
Accounting and Legal	110,435	101,232	101,232	101,232	101,232	101,232	101,232	101,232	101,232	101,232
Office Operations	125,300	114,858	114,858	114,858	114,858	114,858	114,858	114,858	114,858	114,858
Technical services	200,000	183,333	183,333	183,333	183,333	183,333	183,333	183,333	183,333	183,333
Total Costs	2,405,523	4,703,648	7,445,721	7,641,024	7,577,972	7,521,226	7,490,962	7,483,396	7,483,396	7,483,396
Net profit before tax	(2,405,523)	842,602	3,755,529	4,466,976	4,530,028	4,586,774	4,617,038	4,624,604	4,624,604	4,624,604
IRR CALCULATION:	48 %									

CANTALOUPE PRODUCTION WITH SORGHUM ROTATION

1. Brief Project Description and its Rationale

The production of high quality cantaloupe for the U.S. winter market with a rotation of sorghum for domestic consumption forms the basis of this project. Favorable market factors coupled with excellent year-round growing conditions in the Dominican Republic create the opportunity for this venture. However, many such ventures in the Caribbean area are struggling because they did not adapt modern production expertise, planning, and control into their operation. Modern production methods should be used in the project to assure the needed quality and timely production with sufficient volume to gain market acceptance for Dominican produce which currently has an extremely limited share of the winter market along the U.S. eastern seaboard. Several Dominican entrepreneurs with land and some production experience have expressed specific interest in joint ventures with U.S. partners, and have been qualified by the consultant team as good contacts for U.S. investors interested in this project opportunity.

2. Market and Sales

The United States eastern seaboard represents a good seasonal (November-March) market for Dominican winter fruit and vegetable production. During the winter season there is little or no U.S. production of cantaloupe or honeydew melons, peppers, cucumbers, squash, etc. Other countries, principally Mexico, provide a reduced supply of these products to the U.S. market during the winter months. USDA statistics for the New York market over the last four years indicate that the limited supply resulted in premium wholesale prices being paid for produce items in the off season, with premium increases ranging from five to nearly forty percent over average in-season prices, depending upon the produce item. Cantaloupes are on the upper end of this range, receiving a thirty-seven percent premium increase during the winter months.

Because of its geographic proximity relatively well developed transportation network and the duty-free entry of its produce under the Caribbean Basin Initiative, the Dominican Republic enjoys a comparable economic advantage over other countries exporting produce to the U.S. eastern seaboard. Yet, Dominican produce exports share only a minimal portion of the winter market, typically only a fraction of one percent. With a year-round growing climate and abundant natural resources, the Dominican Republic could be a substantial supplier of this market.

Critical to obtaining satisfactory marketing contracts will be the project's production of high quality produce to satisfy U.S. consumer demands, the proper product packaging, and the timing of production operations to hit the market window with good volume.

As for the domestic market in sorghum, the animal feed industry and the Dominican flour industry present a considerable demand for the rotation production of sorghum, of the red and white varieties respectively.

3. Technical Feasibility, Manpower and Raw Material Resources

The planting of cantaloupes and other melons, along with selected high-value vegetables, should be scheduled so as to obtain a staggered harvest for shipment to the U.S. market during the premium winter months. Cantaloupe production should be rotated with red and/or white sorghum which will supply organic matter and nutrients to the soil for the following melon crop. For the needed high yields of quality cantaloupe, careful professional attention must be given to soil and water analysis and management as well as to the programming, execution, and monitoring of efficient production practices, including foliar analysis. Test plantings should be made for variety and other culture practice determinations. A start-up operation should have 500 to 1000 acres of production. To maintain melon quality, fast and reliable transportation to the packing shed and immediate processing through the hydro-cooler to quickly lower fruit temperature are critical factors. Careful scheduling of refrigerated, 40-foot containers must be done so as to assure rapid shipment of product to the U.S. ports.

Soils in both the southwestern and northwestern areas of the country are suitable for melons and other produce. They are of heavy texture (silty clay loam) and some have internal drainage and salt problems, which could become critical unless planned for and managed. An in-depth soil profile analysis should be done on each field for efficient production.

Irrigation will be required, and the flood system appears to be best. This will require land leveling for proper water management. Each source of water should be checked for quality, and managed according to soil conditions. Irrigation water is generally available within the two areas, but delivery systems may need attention. Since public-service electric power is unreliable, essential pumping systems would need a backup generator.

Fertilizers and pesticides are in good supply, with fertilizer costs only a little higher than stateside prices. Packaging supplies are available in quantity as there are no import restrictions at present.

Though tractors and field equipment are available on a custom basis from government agencies, factors of reliability and efficiency suggest that the project preferably purchase its own equipment or contract needed equipment services with private enterprises. Land forming for irrigation water control will be essential and require specialized equipment. Also, on heavy clay soils, deep chiseling is beneficial and local tractors are not powerful enough.

Manpower is abundant and low-cost in the areas under consideration, but arrangements may have to be made for some minimal housing and local worker transportation depending on the location of the production site. Workers are industrious but will require training, making this a major challenge to transfer basic production technology.

Rural roads in the north and southwest areas are adequate, and major highways connect the potential production sites with the principal ports located near Santo Domingo and Azua in the south, and Puerto Plata and

Monte Cristi in the north. Roll-on, roll-off refrigerated container service to the U.S. is offered by several shipping companies on a once or twice a week basis.

Large packaging plants with hydro-coolers are presently operating in the southwest area, and might well be available on a time-lease basis. In the northwest area, however, a packing plant with hydro-cooler would have to be built, which could offer service to several growers in the area. It's site would depend upon the location of production fields and the port of shipment.

Cantaloupes and winter vegetables are presently being grown in the southwest, in the area west of Azua. For the last two years, three Dominican companies, two with U.S. partners, have been making some shipments of produce to eastern U.S. ports from December through March. Most of their production land is leased from small farmers through cooperatives under the Land Reform Agency. These three operations are recommended as a pattern for this project.

4. Investment Requirements, Project Financing and Returns

The following analysis assumes a total of 1000 acres devoted exclusively to the production of cantaloupes during the peak U.S. winter season with an off crop of sorghum to be sold in the Dominican market. In practice a producer might choose to grow a rotation of vegetables in order to minimize disease and nematode problems and to spread market risks.

Marketable cantaloupe yields were conservatively projected at 275 packages per acre in the first year, 330 packages per year in the second year and 400 packages per year in the third and succeeding years. Sorghum yields were projected to increase from 4000 pounds per acre in the first year to 5500 pounds in the third and succeeding years. These yield assumptions are well below average U.S. yields and are within the range of yields being achieved by others in the Dominican Republic.

Based on an analysis of New York City prices for cantaloupe we have assumed average prices of $12.00 per package. Current government guaranteed prices for sorghum are $6.50 per hundred pounds.

The tables following the text (Tables C-1 thru C-4) present investment cost assumptions, enterprise budgets and cash flow analysis for three years and proforma profit and loss statements for five years.

Fixed investment requirements total $1,650,000, including $800 per acre for uncleared land at current market prices. Cleared land in the Azua area is somewhat higher and difficult to find in large contiguous tracts. Large amounts of uncleared land are still available in this price range in the Monte Cristi area but one must be careful to do a detailed soil study since much of the land in the area has heavy salt accumulations and soil types can vary considerably. It is also assumed that gravity flow irrigation methods can be used. That will require relatively flat lands with some leveling. Initial land preparation costs of $75.00 per acre have been included to cover clearing and leveling costs. Fixed investments also include a packing house with appropriate equipment and a hydro-cooler.

It was assumed that land clearing would begin in time to permit planting in the month of September in order to begin harvesting in December at the start of the peak U.S. winter market.

It was assumed that about 50 percent of the total capital requirement would be funded from equity with the balance funded through a combination of long term credit and a working capital facility. It was assumed that 50 percent of the investment cost would be funded through a three year loan with the first payment due at the end of the first year and equal annual installments for the next two years. The long term loan would peak early in the first year at $825,000. Short term working capital needs reach a peak of $448,000 early in the first year after major investments have been made and before the first sales are completed.

Under those assumptions the total equity requirement for the venture is $1,275,000. The venture produces a net profit of $359,000 in the first

year, $737,000 in the second year, with continually increasing profits through the fifth year.

Assuming, at the end of year 5, that the venture is worth twice it's earning capacity, the internal rate of return on equity would be 65 percent. The break-even yield would be about 225 packages of cantaloupe and 2500 pounds of sorghum per acre or about half the projected yield.

While these are attractive potential returns, a word of caution is in order. There are considerable risks associated with this type of venture. First, there are biological and climatological risks. Varieties may not respond to the conditions of soil, water and climate as one expects. Diseases, viruses and pests may take a heavy toll on yields and/or quality. Second, there are significant market risks. Fresh produce prices are extremely volatile and unpredictable. There is no way to predict when prices might drop drastically. And finally there are transport availability and cost uncertainties. Any or all of these risk factors could substantially reduce the returns to invested capital. A combined negative variation of 10 to 20 percent in yields, prices and transport costs would produce heavy losses. Good management, however, can devise strategies to manage those risks. Optimum yields could also greatly increase profits.

5. Government Support and Regulations

Law No. 409 for the Promotion, Incentive, and Protection of Agro-industry offers a 40-100% exemption from income tax and import duties on needed inputs for agro-industries producing and processing non-traditional products such as cantaloupes and winter vegetables. These benefits extend from ten to twenty years depending on such factors as creation of new employment, rural location of the industry, and its degree of integration. Location of the packing-export operation within a Free-Zone would likewise qualify an enterprise for tax exemptions and a 100% retention of all export earnings. Otherwise, there is a 5% excise tax on all non-traditional export products.

As for currency exchange, recent Dominican legislation allows the peso to float freely against the U.S. dollar. Maximum allowable profit remittances per year are limited to 25% of registered capital by Foreign Investment Law No. 861. Further information on investment regulations is contained in the Reconnaissance Survey Report which can be obtained from ASAC International or the Trade and Development Program.

6. Potential Partners

The team spent several days interviewing many growers and land owners, and made field inspections of production operations and land holdings. The parties listed below have been qualified by the team's evaluation as showing good potential as project partners for U.S. investors.

In the Northwest:

Industrias Veganas
C x A - INDUVECA
Pedro A. Rivera, President and Owner
La Vega, Dominican Republic
Tel: 573 - 3633/2551
573 - 2451
573 - 3777/2813

This integrated livestock and meat processing operation includes also a feed mill. Recently, the company acquired a 1000 acre tract of silty clay loam soil with a private irrigation canal system. During team inspection, grain sorghum was coming up on several fields to be used in their feed and cattle operations. Plantains were being planted for export. They desire a melon crop for rotation with the sorghum, and would welcome a partner-investor to provide some capital, technical know-how, special equipment, and marketing assistance.

Jorge Luis Nunez
Financial Manager
INDUVECA

Julio J. Penso
Manager
The Bank of Nova Scotia

La Vega, Dominican Republic
Tel: 573 - 3287
573 - 2500

Calle El Sol, esq. 30 de Marzo
P.O. Box 276
Santiago, Dominican Republic
Tel: 582 - 4152/2952

These two professionals represent a group of five Dominican entrepreneurs who have recently purchased a thousand acres of land in the northwest. When the team visited, they were harvesting a crop of irrigated grain sorghum. They are gradually expanding land holdings, and are interested in the production of winter fruits and vegetables. They would welcome capital assistance, and would need technical expertise and marketing assistance.

Jaime Dajer
P.O. Box 1155
Santiago, Dominican Republic
Tel: 582 - 0670
582 - 4536

Jose A. Dajer
Assistant Manager
Bank of Nova Scotia
Calle del Sol, esq. 30 de Marzo
P.O. Box 276
Santiago, Dominican Republic
Tel: 583 - 4381

These two brothers represent a family of large land owners who have done well in the aloe export business for 12 years. They would be interested also in the production of winter fruits and vegetables, and would need technical production expertise and marketing assistance. They have land both in the northwest and in the southwest areas of the Republic.

Arbaje Agroindustrial Group

This company, managed by Isaias Arbaje is presently clearing a large tract of land and installing an irrigation system for cotton production. They are interested in melons, grain sorghum and other crops for a rotation system, and will need some capital, managerial expertise for crop production, and marketing assistance.

In the Southwest:

Agroindustrial Kirigaza

Francisco Gomez is the manager of this company located in the Azua area, which has land and some production expertise, but needs assistance on growing and marketing.

Consercio Agroindustrial

Jose Mendez Cabral represents a group that has land in the Santo Domingo, Dominican Republic Azua area and some working capital, but are looking for crop production, managerial expertise and marketing.
Tel: 5621451

In Both Areas and Throughout the Country:

The Dominican Federation of Sugar Cane Growers, Inc.
(FEDOCA - Federacion Dominicana de Coloros Azucareros, Inc.)
Dr. Nicolas Casasnovas Chain, Presidente
Paul P. Harris No. 3
Centro de Los Heroes, Zona 6
Santo Domingo, Dominican Republic

The team spoke with several groups of growers. They know they need to diversify from sugar cane production, and are enthusiastic about the prospect of the production of high value crops. They would contribute their land and years of farming experience to a joint venture.

Two governmental agencies that contribute land, manual labor, and some field machinery as minority partners in negotiable joint venture arrangements. There are several ongoing mixed ventures with the following state agencies:

The Dominican Agrarian Institute
(IAD - Institute Agrario Dominicano)

Ing. Agron. Carlos Guillen Tatis, Director General
Plaza Independencia
Santo Domingo, Dominican Republic
Tels: 566 - 0141,/42-46
est. 224

The State Sugar Council
(CEA - Consejo Estatal del Azucar)
Ing. Victor Manuel Baez, Director Ejecutivo
Centro de los Heroes
Santo Domingo, Dominican Republic
Tels: 532 - 7535
533 - 1161
Telex: CEDAZO 326 - 4123 (RCA)
CEDAZO 346 - 0016 (ITT)

TABLE C-1

ENTERPRISE BUDGET, YEAR 1

BASIC ASSUMPTIONS:

	CANTALOUPE	SORGHUM	TOTAL
ACRES PLANTED	1000	1000	1000
YIELD/ACRE(pkg-lb)	275	4000	
REVENUE/pkg-lb	12	0.065	
REVENUE:	3,300,000	260,000	3,560,000

OPERATING EXPENSES:

VARIABLE PRODUCTION EXPENSE (DOLLARS PER ACRE):

PER ACRE	CANTALOUPE	SORGHUM
LAND PREPARATION	75.00	12.00
SEED	13.00	8.00
FERTILIZER	175.00	60.00
HERBICIDE	20.00	20.00
INSECTICIDE & FUMIGATION	150.00	5.00
FUNGICIDE	40.00	
FUEL	10.00	6.00
MISCELLANEOUS	30.00	10.00
LABOR	175.00	6.00
BEEHIVE	10.00	
TOTAL	698.00	127.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	75,000	12,000	87,000
SEED	13,000	8,000	21,000
FERTILIZER	175,000	60,000	235,000
HERBICIDE	20,000	20,000	40,000
INSECTICIDE & FUMIGATION	150,000	5,000	155,000
NEMATACIDE	0	0	0
FUNGICIDE	40,000	0	40,000
FUEL	10,000	6,000	16,000
MAINTENANCE	30,000	10,000	40,000
LABOR	175,000	6,000	181,000
BEEHIVE	10,000	0	10,000
TOTAL	698,000	127,000	825,000

VARIABLE MARKETING EXPENSE (FROM FIELD THRU SALES):

DOLLARS PER UNIT	CANTALOUPES/PKG	SORGHUM/LB
PACKING COSTS	1.60	0.004
FREIGHT TO SHIP	0.48	0.002
SHIPPING	2.70	
HANDLING	0.25	
SALES	1.44	
TOTAL	6.47	0.006

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

TOTAL PACKAGES	275,000	4,000,000	
PACKING CRATES	440,000	16,000	456,000
FREIGHT TO SHIP	132,000	8,000	140,000
SHIPPING	742,500	0	742,500
HANDLING	68,750	0	68,750
SALES	396,000	0	396,000
TOTAL	1,779,250	24,000	1,803,250
TOTAL OPERATING EXPENSES	2,477,250	151,000	2,628,250
OPERATING INCOME:	822,750	109,000	931,750

TABLE C-1.2

ENTERPRISE BUDGET, YEAR 2

BASIC ASSUMPTIONS:

	CANTALOUPE	SORGHUM	TOTAL
ACRES PLANTED	1000	1000	1000
YIELD/ACRE(pkg-lb)	330	4700	
REVENUE/pkg-lb	12	0.065	
REVENUE:	3,960,000	305,500	4,265,500
OPERATING EXPENSES:			

VARIABLE PRODUCTION EXPENSE (DOLLARS PER ACRE):

PER ACRE	CANTALOUPES	SORGHUM
LAND PREPARATION	75.00	12.00
SEED	13.00	8.00
FERTILIZER	175.00	60.00
HERBICIDE	20.00	20.00
INSECTICIDE & FUMIGATION	150.00	5.00
FUNGICIDE		
FUEL	40.00	
MISCELLANEOUS	10.00	6.00
LABOR	30.00	10.00
BEEHIVE	175.00	6.00
	10.00	
TOTAL	698.00	127.00

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	75,000	12,000	87,000
SEED	13,000	8,000	21,000
FERTILIZER	175,000	60,000	235,000
HERBICIDE	20,000	20,000	40,000
INSECTICIDE	150,000	5,000	155,000
NEMATACIDE	0	0	0
FUNGICIDE	40,000	0	40,000
FUEL	10,000	6,000	16,000
MAINTENANCE	30,000	10,000	40,000
LABOR	175,000	6,000	181,000
BEEHIVE	10,000	0	10,000
TOTAL	698,000	127,000	825,000

VARIABLE MARKETING EXPENSE (FROM FIELD THRU SALES):

DOLLARS PER UNIT	CANTALOUPES/PKG	SORGHUM/LB
PACKING COSTS	1.60	0.004
FREIGHT TO SHIP	0.48	0.002
SHIPPING	2.70	
HANDLING	0.25	
SALES	1.44	
TOTAL	6.47	0.006

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

TOTAL PACKAGES	330000	4700000	
PACKING CRATES	528,000	18,800	546,800
FREIGHT TO SHIP	158,400	9,400	167,800
SHIPPING	891,000	0	891,000
HANDLING	82,500	0	82,500
SALES	475,200	0	475,200
TOTAL	2,135,100	28,200	2,163,300
TOTAL OPERATING EXPENSES	2,833,100	155,200	2,988,300
OPERATING INCOME:	1,126,900	150,300	1,277,200

TABLE C-1.3

ENTERPRISE BUDGET, YEAR 3

BASIC ASSUMPTIONS:

	CANTALOUPE	SORGHUM	TOTAL
ACRES PLANTED	1000	1000	1000
YIELD/ACRE(packages)	400	5500	
REVENUE/PACKAGE	12	0.065	
REVENUE:	4,800,000	357,500	5,157,500

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE (DOLLARS PER ACRE):

PER ACRE	CUCUMBER	SORGHUM	
LAND PREPARATION	75.00	12.00	
SEED	13.00	8.00	
FERTILIZER	175.00	60.00	
HERBICIDE	20.00	20.00	
INSECTICIDE & FUMIGATION	150.00	5.00	
FUNGICIDE	40.00		
FUEL	10.00	6.00	
MISCELLANEOUS	30.00	10.00	
LABOR	175.00	6.00	
BEEHIVE	10.00		
TOTAL	698.00	127.00	

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

LAND PREPARATION	75,000	12,000	87,000
SEED	13,000	8,000	21,000
FERTILIZER	175,000	60,000	235,000
HERBICIDE	20,000	20,000	40,000
INSECTICIDE	150,000	5,000	155,000
NEMATACIDE	0	0	0
FUNGICIDE	40,000	0	40,000
FUEL	10,000	6,000	16,000
MAINTENANCE	30,000	10,000	40,000
LABOR	175,000	6,000	181,000
BEEHIVE	10,000	0	10,000
TOTAL	698,000	127,000	825,000

VARIABLE MARKETING EXPENSE (FROM FIELD THRU SALES):

DOLLARS PER UNIT	CANTALOUPES/PKG	SORGHUM/LB
PACKING COSTS	1.60	0.004
FREIGHT TO SHIP	0.48	0.002
SHIPPING	2.70	
HANDLING	0.25	
SALES	1.44	
TOTAL	6.47	0.006

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

TOTAL PACKAGES	400000	5500000	
PACKING CRATES	640,000	22,000	662,000
FREIGHT TO SHIP	192,000	11,000	203,000
SHIPPING	1,080,000	0	1,080,000
HANDLING	100,000	0	100,000
SALES	576,000	0	576,000
TOTAL	2,588,000	33,000	2,621,000
TOTAL OPERATING EXPENSES	3,286,000	160,000	3,446,000
OPERATING INCOME:	1,514,000	4,640,000	6,154,000

TABLE C-2

FIXED INVESTMENT REQUIREMENT

ENTERPRISE: CANTALOUPES/SORGHUM ACRES PRODUCT: 1000

		COST/ACRE (U.S. DOLLARS)	TOTAL COST
LAND -TOTAL AC.	1000	800	800,000
FARM EQUIPMENT		400	400,000
FERT AND IRRIG EQUIP		75	75,000
PACKINGHOUSE		85	85,000
HYDRO COOLER		150	150,000
OFFICE & STOREROOM		25	25,000
VEHICLES		75	75,000
MISCELLANEOUS		40	40,000
		0	0
TOTAL		1,650	1,650,000

TABLE C-3

PROJECTED CASH FLOW - CANTALOUPE AND SORGHUM YEAR 1

(Thousands of U.S. Dollars)

	START UP	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
EQUITY	1,275												
LONG TERM DEBT	660												
TOTAL	1,935												
CASH ON HAND		1,935	554	313	51	0	0	0	0	436	954	934	992
CASH IN													
Sales revenue		0	83	83	0	660	660	660	660	660	0	87	87
Add'l L. T. debt						660	660	660	660	660	0	87	87
			83	83									
CASH AVAILABLE		1,935	636	395	51	660	660	660	660	1,096	954	1,021	1,079
CASH OUT		1,381	323	344	499	582	481	512	181	142	20	28	303
Capital expenditures:		1,320	165	165									
Operating expenses:													
Land preparation		19	19	19	19			4	4	4			
Seed			3	3	3	3		3	3	3			
Fertilizer			44	44	44	44		20	20	20			
Herbicide			5	5	5	5		7	7	7			
Insecticide & fumigation			38	38	38	38		2	2	2			
Fungicide				10	10	10	10	0	0	0			
Fuel		3	3	3	3	3		2	2	2			
Maintenance		8	8	8	8	8		3	3	3			
Labor		22	22	22	22	22	22	24	24	2			
Beehive				10				0	0	0			
Packing costs					110	110	110	110				5	5
Freight to ship					33	33	33	33				3	3
Shipping					186	186	186	186					
Handling						17	17	17	17				
Sales						79	79	79	79	79			
Management		8	8	8	8	8	8	8	8	8	8	8	8
Interest		0	8	9	10	15	14	12	10	10	10	10	10
Accounting and legal		1	1	1	1	1	1	1	1	1	1	1	1
Office operations		1	1	1	1	1	1	1	1	1	1	1	1
Organization & Development													
Total operating expense		61	158	179	499	582	481	512	181	142	20	28	28
Amortization L. T. Debt:													275
CASH FLOW THIS MONTH		(1,381)	(241)	(262)	(499)	78	179	148	479	518	(20)	58	(217)
CUMULATIVE CASH FLOW		(1,381)	(1,622)	(1,884)	(2,383)	(2,305)	(2,126)	(1,978)	(1,499)	(981)	(1,001)	(943)	(1,159)
CASH POSITION BEFORE STF		554	313	51	(448)	78	179	148	479	954	934	992	776
Short term: borrowing		0	0	0	448	0	0	0	0	0	0	0	0
repayment		0	0	0	0	78	179	148	43	0	0	0	0
Outstanding S. T. debt	0	0	0	0	448	370	191	43	0	0	0	0	0
CASH POSITION		554	313	51	0	0	0	0	436	954	934	992	501
Outstanding L. T. debt		660	743	825	825	825	825	825	825	825	825	825	550

TABLE C-3.1

PROJECTED CASH FLOW - CANTALOUPE AND SORGHUM
YEAR 2
(Thousands of U.S. Dollars)

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
CASH ON HAND	501	510	353	186	0	0	163	431	1,046	1,699	1,682	1,758
CASH IN	87	0	0	0	796	796	796	792	792	0	102	102
Sales revenue	87				792	792	792	792	792	0	102	102
Add'l L. T. debt	0											
Packing Fees					4	4	4					
CASH AVAILABLE	587	510	353	186	796	796	960	1,223	1,838	1,699	1,784	1,860
CASH OUT	78	157	167	518	599	497	528	178	139	17	26	301
Capital expenditures:												
Operating expenses:												
Land preparation	19	19	19	19			4	4	4			
Seed		3	3	3	3		3	3	3			
Fertilizer		44	44	44	44		20	20	20			
Herbicide		5	5	5	5		7	7	7			
Insecticide & fumig		38	38	38	38		2	2	2			
Fungicide			10	10	10	10	0	0	0			
Fuel	3	3	3	3	3		2	2	2			
Maintenance	3	8	8	8	8		3	3	3			
Labor	22	22	22	22	22	22	24	24	2			
Beehive	10											
Packing costs				132	132	132	132				6	6
Freight to ship				33	33	33	33				3	3
Shipping				186	186	186	186					
Handling					17	17	17	17				
Sales					79	79	79	79	79			
Management	8	8	8	8	8	8	8	8	8	8	8	8
Interest	6	6	6	6	10	8	6	6	6	6	6	6
Accounting and legal	1	1	1	1	1	1	1	1	1	1	1	1
Office operations	1	1	1	1	1	1	1	1	1	1	1	1
Organization & Develop ent												
Total operating expens	78	157	167	518	599	497	528	178	139	17	26	26
Amortization L. T. Debt:												275
CASH FLOW THIS MONTH	9	(157)	(167)	(518)	197	299	268	614	653	(17)	75	(200)
CUMULATIVE CASH FLOW	(1,150)	(1,307)	(1,474)	(1,992)	(1,795)	(1,497)	(1,229)	(614)	39	22	98	(102)
CASH POSITION BEFORE STF	510	353	186	(332)	197	299	431	1,046	1,699	1,682	1,758	1,558
Short term: borrowing	0	0	0	332	0	0	0	0	0	0	0	0
repayment	0	0	0	0	197	135	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	332	135	0	0	0	0	0	0	0
CASH POSITION	510	353	186	0	0	163	431	1,046	1,699	1,682	1,758	1,283
Outstanding L. T. debt	550	550	550	550	550	550	550	550	550	550	550	275

TABLE C-3.2

PROJECTED CASH FLOW - CANTALOUPE AND SORGHUM
YEAR 3
(Thousands of U.S. Dollars)

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
CASH ON HAND	1,283	1,311	1,157	993	450	798	1,246	1,661	2,447	3,272	3,258	3,352
CASH IN	102	0	0	0	968	968	968	960	960	0	119	119
Sales revenue	102				960	960	960	960	960	0	119	119
Add'l L. T. debt	0											
Packing Fees					8	8	8					
CASH AVAILABLE	1,385	1,311	1,157	993	1,419	1,767	2,214	2,621	3,407	3,272	3,377	3,471
CASH OUT	74	154	164	543	620	521	553	174	135	14	25	300
Capital expenditures:												
Operating expenses:												
Land preparation	19	19	19	19			4	4	4			
Seed		3	3	3	3		3	3	3			
Fertilizer		44	44	44	44		20	20	20			
Herbicide		5	5	5	5		7	7	7			
Insecticide & fumig		38	38	38	38		2	2	2			
Fungicide			10	10	10	10	0	0	0			
Fuel	3	3	3	3	3		2	2	2			
Maintenance	8	8	8	8	8		3	3	3			
Labor	22	22	22	22	22	22	24	24	2			
Beehive	10											
Packing costs				160	160	160	160				7	7
Freight to ship				33	33	33	33				4	4
Shipping				186	186	186	186					
Handling					17	17	17	17				
Sales					79	79	79	79	79			
Management	8	8	8	8	8	8	8	8	8	8	8	8
Interest	3	3	3	3	3	3	3	3	3	3	3	3
Accounting and legal	1	1	1	1	1	1	1	1	1	1	1	1
Office operations	1	1	1	1	1	1	1	1	1	1	1	1
Organization & Develop ent												
Total operating expens	74	154	164	543	620	521	553	174	135	14	25	25
Amortization L. T. Debt:												275
CASH FLOW THIS MONTH	27	(154)	(164)	(543)	348	448	415	786	825	(14)	94	(181)
CUMULATIVE CASH FLOW	(74)	(228)	(392)	(935)	(587)	(139)	276	1,062	1,887	1,873	1,967	1,787
CASH POSITION BEFORE STF	1,311	1,157	993	450	798	1,246	1,661	2,447	3,272	3,258	3,352	3,172
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	1,311	1,157	993	450	798	1,246	1,661	2,447	3,272	3,258	3,352	2,897
Outstanding L. T. debt	275	275	275	275	275	275	275	275	275	275	275	0

TABLE C-4

PRO FORMA INCOME STATEMENT - CANTALOUPE AND SORGHUM
(U. S. Dollars)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
REVENUE					
Product Sales	3,560,000	4,265,500	5,157,500	5,931,125	6,820,794
Cantaloupe	3,300,000	3,960,000	4,800,000	5,520,000	6,348,000
Sorghum	260,000	305,500	357,500	411,125	472,794
					0
Total Revenue	3,560,000	4,265,500	5,157,500	5,931,125	6,820,794
COSTS					
Production	825,000	825,000	825,000	948,750	1,091,063
Cantaloupe	698,000	698,000	698,000	802,700	923,105
Sorghum	127,000	127,000	127,000	146,050	167,958
Packing and All Marketing	1,803,250	2,163,300	2,621,000	3,014,150	3,466,273
Cantaloupe	1,779,250	2,135,100	2,588,000	2,976,200	3,422,630
Sorghum	24,000	28,200	33,000	37,950	43,643
General Administration	572,286	539,453	495,500	512,050	530,255
Management	100,000	100,000	100,000	110,000	121,000
Depreciation	330,000	330,000	330,000	330,000	330,000
Interest	115,258	82,453	38,500	42,350	46,585
Accounting and Legal	15,000	15,000	15,000	16,500	16,150
Office Operations	12,000	12,000	12,000	13,200	14,520
Other	0	0	0	0	0
Total Costs	3,200,536	3,527,753	3,941,500	4,474,950	5,087,590
Net profit	359,464	737,747	1,216,000	1,456,175	1,733,204
IRR CALCULATION	65 %				

FRESH WATER SHRIMP PROJECT

1. Brief Description of Project and Its Rationale

This integrated venture includes the production and processing for export of fresh water shrimp, of the macrobrachium rosenbergii species. The nucleus project involves the production of shrimp through the hatchery, nursery, and grow-out stages. Larvae production and a packing facility, both for the venture proper and eventually for contract growers, will form part of the project. After harvest, the shrimp will be processed, packaged, and frozen for both the export and domestic markets. The nucleus project will also eventually provide technical assistance, larvae, and a ponds-side market for contract growers. The proximity of a large and growing U.S. market and the good production conditions of the Dominican Republic offer a sound footing for this project, whose projected rate of return on equity is 28 percent. From among several small Dominican operations, there are three which have been evaluated as good contacts for interested U.S. investors.

2. Market and Sales

Production is aimed at the large, growing U.S. market which showed a consumption of some 155,000 M.T. of imported shrimp in 1983, up considerably from previous years. The Dominican Republic, with only an approximate one-half of one percent share of the market, has tremendous room for growth. The local tourism industry which consumes a large portion of current production would continue to provide a reliable, though minor, market.

The production volume of the nucleus project will be based on the yield of 186 acres of grow-out ponds, with an average annual output of 4,330 lbs. of shrimp per acre for a total annual production of some 805,000 lbs. Gross annual sales revenues are projected to be $2,733,764, assuming an average FOB selling price of $3.41/lb. for headless, shell-on shrimp of the (21 - 25) size.

The relative closeness of the United States market and the duty free incentives of the Caribbean Basin Initiative (CBI) offer a comparative economic advantage to producers from the Dominican Republic over producers from other countries such as Ecuador. To gain market acceptance, the project will have to reach certain uniform levels of production quantity and quality. Advance contact (and contracts) with U.S. buyers and brokers should be established to provide the necessary standards and specifications for shrimp size, presentation, packaging, etc.

3. Technical Feasibility, Manpower and Raw Material Resources

The productive process will begin with the selection of shrimp for use as breeding stock in the hatchery, where the larvae will be bred, hatched, and reared until they reach the post-larval stage, when they will be transferred to a nursery pond. This is an intermediate staging area where intensive growth takes place till the shrimp reach the juvenile or fry stage when they are transferred to the grow out pond. Here, they receive a balanced supplemental feed until ready for harvesting. The harvested shrimp are to be trucked in fresh water tanks to the project's packing plant in the Santo Domingo or Puerto Plata area where they would be processed and packaged for export.

The special know-how of a U.S. marine biologist would be needed to program, control, and monitor all the conditions necessary to maximize production and minimize mortality rates. Water quality and temperature, oxygen and salinity levels, proper feed mixture are all critical factors which require competent technical management.

The required equipment - laboratory, pumps, packing plant, etc. - would come from the United States, as well as needed feed ingredients and fertilizers.

The basic physical conditions are all good. The subterranean water is of good quality and is found in abundance. The soils have the necessary impermeability to insure good water retention in the ponds, and a ph factor that needs little soil conditioning. Though electricity is available from

public utilities, the project should have its own generator to guarantee dependable electric service. The roads in the central area of the country are paved and offer adequate transport facility to Santo Domingo or Puerto Plata. A shortwave radio communications system should be established between the production and packing operations to provide needed coordination. As for the human element, there are educated Dominican technicians that would need on-hands, top notch technical training over 2-3 years to be able to perform competently in the critical technical and managerial positions. A low cost labor force for production work is abundant.

A start-up broodstock of adequate quality can be selected from the adult shrimp population of macrobrochium now being produced in the country. The needed feed ingredients and fertilizers are generally available within the country, but a total program, including contingency imports of some raw materials, should be worked out. The planting of feed grains and the use of shrimp heads to supply a small feed mill operation should eventually be considered by project entrepreneurs to guarantee future supplies of feed. Good quality packaging materials would have to be imported. Dominican law offers duty-free incentives for imports to be used in agro-industrial projects. The cost of the various materials is included in the financial analysis.

The proposed general area for project location, where small start-up ventures have begun to appear, is in the central sector of the Dominican Republic in the regions surrounding the towns of Monte Plata, La Vega, and Santiago. The country's major highway cuts through the area, facilitating the supply of inputs and the access to ports.

The projected project size will be the largest fresh water operation to be initiated, although there are two salt water shrimp operations of a similar size that have recently started up production activity with mixed results. A few fresh water production ventures with some 20 acres of ponds each have been in operation for two to three years, supplying part of the demand of the local hotels. The current proposal purports eventually to include these smaller operations as contract growers within the total project.

4. Investment Requirements and Financial Analysis

This analysis is based on a proposed venture size of 75 hectares or 186 acres of shrimp grow out ponds. A total of 100 hectares of land would be required. Average grow-out pond size is 0.72 hectares. Water would be supplied from tube wells with quality water being found at approximately 120 to 160 feet. Electric motors would be used to power the pumps.

Post larvae would be produced in the company's own hatchery. At some future time it would probably be desirable to expand the hatchery and provide post larvae to contract growers along with technical assistance, feed, processing and marketing services. However, this feasibility analysis does not assume any contract sales. It is believed that a production base must first be established to demonstrate the technical and economic feasibility of the venture before much success can be achieved with contract growers. It is recommended that the hatchery be expanded as soon as the concept is proven feasible. At that time it would also be advisable to consider construction of a feed mill to produce the specialized rations required for the company's own shrimp and for contract growers.

By producing it's own post larvae and using nursery ponds the company should be able to achieve a survival rate of 85 percent in the nursery and 75 percent in the grow-out ponds. It is assumed that 2.0 cycles per year can be achieved in the grow-out ponds with an average marketable production of 21-25 tails per pound.

Based on an analysis of New York City prices we have assumed average prices of $3.41 per pound. Market prices are higher for larger size shrimp, but some experimentation would be necessary to determine the optimum marketable size under Dominican growing conditions and costs. In recent years, Dominican producers have been able to sell all they can produce to hotels and restaurants serving the rapidly expanding tourist market in the Dominican Republic. R cent prices have been about U.S. $3.50 per pound with heads on.

The tables following the text (Tables S-1 thru S-4) present investment cost assumptions, enterprise budgets and cash flow analysis for three years and proforma profit and loss statements for five years. For simplicity it was assumed that construction would be completed in just six months so that the first batch of shrimp could be ready for market at the beginning of year two. It was assumed that approximately 50 percent of the total capital requirement would be funded from equity with the balance funded through a combination of long term credit and a working capital facility. It was assumed that 50 percent of the investment cost would be funded through a five year loan with the first payment due at the end of the second year and equal annual installments for the next four years. Short term working capital needs reach a peak of $350,000 at the end of the first year after major investments have been made and before the first sales are completed.

Under those assumptions the total equity requirement for the venture is $1,375,000. Without any sales in the first year there is a loss of $850,991. Profits in the second year, however, reach a level of $893,911 and increase slightly through year five. Assuming, at the end of year five, that the venture is worth twice it's annual earning capacity, the internal rate of return on equity would be 28 percent. The break-even yield would be about 6700 pounds per hectare or about 63 percent of the projected yield.

5. Government Support and Regulations

The Dominican government in its policy making in recent years has been providing incentives for foreign investment to support the build-up of integrated agribusinesses, especially those producing and exporting non-traditional products. Law No. 409, the Agro-industrial Promotion Law would offer considerable incentives including tax exemptions to this type of project. Further discussion of investment regulations is taken up in the Reconnaissance Survey Report which is available from ASAC International or the Trade and Development Program.

6. Potential Partners

For a U.S. investor interested in the opportunity presented by this project, team members recommend contact with the following three parties who have small start-up production operations, basic managerial competence, and the desire to work with U.S. technical production know-how, marketing expertise, and capital to improve and expand their existing operation. They are as follows:

CARIMPEX, S.A.
Av. Estrella Sohdola No. 1 — Tel: 583 - 6443
P.O. Box 691 — Telex: 3461119
Santiago, Dominican Republic

Jakob Mastenbroek, President
Jan Hagen, Vice-President

The principals are Dutch-born, and have been working assiduously at shrimp production for two to three years, beginning with the most basic knowledge of shrimp production. They have complete financial and technical records of their operations to date. They sell current production of shrimp whole to Dominican first class hotels and restaurants. They will need capital and both technical and marketing assistance.

QUINIGUA, S.A.
Production de Camerones
Calle San Luis No. 46 — Tel: 582 - 6693/94
Santiago, Dominican Republic

Dr. Luis Valdez Sabater, Director Ing. Luis Sabater Nunez, General Manager. This start-up operation with laboratory infrastructure and four ponds in production has been stunted by the lack of working and investment capital. Production has been semi abandoned at present for lack of funds, and the owner seems inclined to sell the operation as it is. In the case of a joint venture agreement, strong administrative and technical competence would be needed along with a considerable infusion of new capital.

Luis Ma. Guerrero Weber
Civil Engineer
Palo Hincado 206 - 2P
Santo Domingo, Dominican Republic
Tel: 685 - 3571

Claudio Pimentel
Butano Propano Industrial
Vice-President - Treasurer
Roberto Pastoriza No. 560
Santiago, Dominican Republic
Tel: 567 - 8586
567 - 2895

These two professionals have formed a partnership which has acquired land for shrimp production near Bayaquana, an hour's drive north of Santo Domingo. In the first year of production, they are working with 14 grow-out ponds of about an acre each, and are building a laboratory facility. Their future plans include a feed mill and packing project, and has acquired some basic production techniques by reading and observation. They expressed interest in U.S. participation especially in technical and marketing assistance, though capital investment would be required in the case of the feed mill and packing house.

TABLE S-1

FRESH WATER SHRIMP ENTERPRISE BUDGET, YEAR 1

BASIC ASSUMPTIONS: Survival rate: 75% Unheaded/lb.: 21-25
Cycles/year: 2.00 Post larvae/ha.: 120,000

POND AREA (HAS.)	75
POUNDS/HA./YEAR	0
REVENUE-DOLLARS/LB.	0.00
REVENUE:	0.00

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE

DOLLARS PER HECTARE	SHRIMP
FEED	0.00
FERTILIZER	0.00
ELECTRICITY	2,222.17
LABOR	1,152.67
REPAIRS & MAINTENANCE	888.83
TOTAL	4,263.67

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

FEED	0.00
FERTILIZER	0.00
ELECTRICITY	166,662.50
LABOR	86,450.00
REPAIRS	66,662.50
TOTAL	319,775.00

VARIABLE MARKETING EXPENSE (FROM POND THRU SALES):

DOLLARS PER POUND	SHRIMP
PACKING CRATES	0.21
LABOR AND OTHER	0.03
SHIPPING	0.14
HANDLING	0.01
SALES	0.34
TOTAL	0.73

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

TOTAL POUNDS	0.00
PACKING CRATES	0.00
LABOR AND OTHER	0.00
SHIPPING	0.00
HANDLING	0.00
SALES	0.00
TOTAL	0.00
TOTAL OPERATING EXPENSES	319,775.00
OPERATING INCOME:	(319,775.00)

TABLE S-1.1

FRESH WATER SHRIMP ENTERPRISE BUDGET, YEAR 2

BASIC ASSUMPTIONS:	Survival rate:	75%	Unheaded/lb.: 21-25
	Cycles/year:	2.00	Post larvae/ha.: 120,000

POND AREA (HAS.)	75
POUNDS/HA./YEAR	1069#
REVENUE-DOLLARS/LB.	3.41
REVENUE:	2,733,764.32

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE

DOLLARS PER HECTARE	SHRIMP
FEED	6,844.16
FERTILIZER	962.46
ELECTRICITY	2,222.17
LABOR	1,152.67
REPAIRS & MAINTENANCE	888.83
TOTAL	12,070.29

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

FEED	513,312.00
FERTILIZER	72,184.50
ELECTRICITY	166,662.50
LABOR	86,450.00
REPAIRS	66,662.50
TOTAL	905,271.50

VARIABLE MARKETING EXPENSE (FROM POND THRU SALES):

DOLLARS PER POUND	SHRIMP
PACKING CRATES	0.21
LABOR AND OTHER	0.03
SHIPPING	0.14
HANDLING	0.01
SALES	0.34
TOTAL	0.73

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

TOTAL POUNDS	802,050.00
PACKING CRATES	168,430.50
LABOR AND OTHER	24,061.50
SHIPPING	112,287.00
HANDLING	8,020.50
SALES	272,697.00
TOTAL	585,496.50
TOTAL OPERATING EXPENSES	1,490,768.00
OPERATING INCOME:	1,242,996.32

TABLE S-1.2

FRESH WATER SHRIMP ENTERPRISE BUDGET, YEAR 3

BASIC ASSUMPTIONS: Survival rate: 75% Unheaded/lb.: 21-25
Cycles/year: 2.00 Post larvae/ha.: 120,000

POND AREA (HAS.)	75
POUNDS/HA./YEAR	10694
REVENUE-DOLLARS/LB.	3.41
REVENUE:	2,733,764.32

OPERATING EXPENSES:
VARIABLE PRODUCTION EXPENSE

DOLLARS PER HECTARE	SHRIMP
FEED	6,844.16
FERTILIZER	962.46
ELECTRICITY	2,222.17
LABOR	1,152.67
REPAIRS & MAINTENANCE	888.83
TOTAL	12,070.29

TOTAL VARIABLE PRODUCTION EXPENSE IN DOLLARS:

FEED	513,312.00
FERTILIZER	72,184.50
ELECTRICITY	166,662.50
LABOR	86,450.00
REPAIRS	66,662.50
TOTAL	905,271.50

VARIABLE MARKETING EXPENSE (FROM POND THRU SALES):

DOLLARS PER POUND	SHRIMP
PACKING CRATES	0.21
LABOR AND OTHER	0.03
SHIPPING	0.14
HANDLING	0.01
SALES	0.34
TOTAL	0.73

TOTAL VARIABLE MARKETING EXPENSE IN DOLLARS:

TOTAL POUNDS	802,050.00
PACKING CRATES	168,430.50
LABOR AND OTHER	24,061.50
SHIPPING	112,287.00
HANDLING	8,020.50
SALES	272,697.00
TOTAL	585,496.50
TOTAL OPERATING EXPENSES	1,490,768.00
OPERATING INCOME:	1,242,996.32

TABLE S-2

INVESTMENT COST
(U. S. Dollars)

FRESH WATER SHRIMP		PER HECTARE	TOTAL
LAND-TOTAL HAS.	100	6,842	684,211
HATCHERY:			
Buildings & indoor tanks			206,250
Equipment & systems			112,500
Total hatchery			318,750
NURSERY & GROWOUT:			
Earthworks			256,250
Concrete nursery ponds			37,500
Buildings			50,000
Water wells			212,500
Water control structures			75,000
Equipment & systems			175,000
Total nursery & growout			806,250
PROCESSING PLANT:			
Building			37,500
Processing & freezing equipment			93,750
Other equipment			12,500
Total processing plant			143,750
NON ALLOCATED CAPITAL INVESTMENT:			
Office			12,000
Housing			25,000
Design & engineering			18,750
Electrical installation			43,750
Contingencies			22,000
Total unallocated			121,500
TOTAL			2,074,461

TABLE S-3

PROJECTED CASH FLOW - FRESH WATER SHRIMP
YEAR 1
(Thousands of U.S. Dollars)

	START UP	MONTH 1	2	3	4	5	6	7	8	9	10	11	12
EQUITY	1,375												
LONG TERM DEBT	507												
TOTAL	1,882												
CASH ON HAND		1,882	782	515	245	226	190	140	82	15	0	0	0
CASH IN		0	253	253	0	0	0	0	0	0	0	0	0
Sales revenue		0	0	0	0	0	0	0	0	0	0	0	0
Add'l L. T. debt		0	253	253	0	0	0	0	0	0	0	0	0
CASH AVAILABLE		1,882	1,035	768	245	226	190	140	82	15	0	0	0
CASH OUT		1,100	520	523	19	36	50	58	67	81	89	97	98
Capital expenditures:		1,013	507	507	0								
Production expenses:													
Feed		0	0	0	0	0	11	16	21	32	37	43	43
Fertilizer		0	0	0	0	0	2	2	3	5	5	6	6
Electricity		0	0	0	0	14	14	14	14	14	14	14	14
Labor		0	0	0	0	2	3	4	5	6	7	7	7
Repair		0	0	0	0	1	2	3	4	5	6	6	6
Marketing expenses:													
Packing crates													
Labor and other													
Shipping													
Handling													
Sales													
General & admin. expenses:													
Management		5	5	5	5	5	5	5	5	5	5	5	5
Interest		0	6	9	12	12	12	12	12	12	13	14	15
Accounting and legal		30	1	1	1	1	1	1	1	1	1	1	1
Office operations		2	2	2	2	2	2	2	2	2	2	2	2
Organization & Development		50	0	0	0	0	0	0	0	0	0	0	0
Total operating expense		87	13	16	19	36	50	58	67	81	89	97	98
Amortization L. T. Debt:													
CASH FLOW THIS MONTH		(1,100)	(267)	(270)	(19)	(36)	(50)	(58)	(67)	(81)	(89)	(97)	(98)
CUMULATIVE CASH FLOW		(1,100)	(1,366)	(1,636)	(1,655)	(1,692)	(1,742)	(1,800)	(1,867)	(1,948)	(2,037)	(2,134)	(2,232)
CASH POSITION BEFORE STF		782	515	245	226	190	140	82	15	(66)	(89)	(97)	(98)
Short term: borrowing		0	0	0	0	0	0	0	0	66	89	97	98
repayment		0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	66	156	252	350
CASH POSITION		782	515	245	226	190	140	82	15	0	0	0	0
Outstanding L. T. debt		507	760	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013

TABLE S-3.1

PROJECTED CASH FLOW - FRESH WATER SHRIMP
YEAR 2
(Thousands of U.S. Dollars)

	MONTH 1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	0	0	0	0	3	99	180	263	346	430	514	599
CASH IN												
.Sales revenue	228	228	228	228	228	228	228	228	228	228	228	228
Add'l L. T. debt	228	228	228	228	228	228	228	228	228	228	228	228
	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	228	228	228	228	231	327	408	490	574	658	742	826
CASH OUT												
Capital expenditures:	148	147	132	132	132	147	146	145	144	144	144	346
Production expenses:												
Feed	83	83	83	83	83	83	83	83	83	83	83	83
Fertilizer	6	6	6	6	6	6	6	6	6	6	6	6
Electricity	14	14	14	14	14	14	14	14	14	14	14	14
Labor	7	7	7	7	7	7	7	7	7	7	7	7
Repair	6	6	6	6	6	6	6	6	6	6	6	6
Marketing expenses:												
Packing crates	14	14	14	14	14	14	14	14	14	14	14	14
Labor and other	2	2	2	2	2	2	2	2	2	2	2	2
Shipping	9	9	9	9	9	9	9	9	9	9	9	9
Handling	1	1	1	1	1	1	1	1	1	1	1	1
Sales	23	23	23	23	23	23	23	23	23	23	23	23
General & Admin. expenses:												
Management	5	5	5	5	5	5	5	5	5	5	5	5
Interest	16	15	0	0	0	15	14	13	12	12	12	12
Accounting and legal	1	1	1	1	1	1	1	1	1	1	1	1
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Other	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	148	147	132	132	132	147	146	145	144	144	144	144
Amortization L. T. Debt:												203
CASH FLOW THIS MONTH	80	81	96	96	96	81	82	83	84	84	84	(118)
CUMULATIVE CASH FLOW	(2,152)	(2,070)	(1,974)	(1,878)	(1,782)	(1,701)	(1,619)	(1,536)	(1,452)	(1,367)	(1,283)	(1,401)
CASH POSITION BEFORE STF	80	81	96	96	99	180	263	346	430	514	599	480
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	80	81	96	93	0	0	0	0	0	0	0	0
Outstanding S. T. debt	270	189	93	0	0	0	0	0	0	0	0	0
CASH POSITION	0	0	0	3	99	180	263	346	430	514	599	480
Outstanding L. T. debt	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013	811

TABLE S-3.2

PROJECTED CASH FLOW - FRESH WATER SHRIMP
YEAR 3
(Thousands of U.S. Dollars)

	MONTH 1	2	3	4	5	6	7	8	9	10	11	12
CASH ON HAND	480	567	653	740	827	913	1,000	1,087	1,173	1,260	1,346	1,433
CASH IN	228	228	228	228	228	228	228	228	228	228	228	228
Sales revenue	228	228	228	228	228	228	228	228	228	228	228	228
Add'l L. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH AVAILABLE	708	795	881	968	1,054	1,141	1,228	1,314	1,401	1,488	1,574	1,661
CASH OUT	141	141	141	141	141	141	141	141	141	141	141	344
Capital expenditures:	0											
Production expenses:												
Feed	43	43	43	43	43	43	43	43	43	43	43	43
Fertilizer	6	6	6	6	6	6	6	6	6	6	6	6
Electricity	14	14	14	14	14	14	14	14	14	14	14	14
Labor	7	7	7	7	7	7	7	7	7	7	7	7
Repair	6	6	6	6	6	6	6	6	6	6	6	6
Marketing expenses:												
Packing crates	14	14	14	14	14	14	14	14	14	14	14	14
Labor and other	2	2	2	2	2	2	2	2	2	2	2	2
Shipping	9	9	9	9	9	9	9	9	9	9	9	9
Handling	1	1	1	1	1	1	1	1	1	1	1	1
Sales	23	23	23	23	23	23	23	23	23	23	23	23
General & Admin. expenses:												
Management	5	5	5	5	5	5	5	5	5	5	5	5
Interest	9	9	9	9	9	9	9	9	9	9	9	9
Accounting and legal	1	1	1	1	1	1	1	1	1	1	1	1
Office operations	2	2	2	2	2	2	2	2	2	2	2	2
Other	0	0	0	0	0	0	0	0	0	0	0	0
Total operating expens	141	141	141	141	141	141	141	141	141	141	141	141
Amortization L. T. Debt:												203
CASH FLOW THIS MONTH	87	87	87	87	87	87	87	87	87	87	87	(116)
CUMULATIVE CASH FLOW	(1,315)	(1,228)	(1,142)	(1,055)	(968)	(882)	(795)	(708)	(622)	(535)	(449)	(565)
CASH POSITION BEFORE STF	567	653	740	827	913	1,000	1,087	1,173	1,260	1,346	1,433	1,317
Short term: borrowing	0	0	0	0	0	0	0	0	0	0	0	0
repayment	0	0	0	0	0	0	0	0	0	0	0	0
Outstanding S. T. debt	0	0	0	0	0	0	0	0	0	0	0	0
CASH POSITION	567	653	740	827	913	1,000	1,087	1,173	1,260	1,346	1,433	1,317
Outstanding L. T. debt	811	811	811	811	811	811	811	811	811	811	811	608

TABLE S-4

PRO FORMA INCOME STATEMENT - FRESH WATER SHRIMP
(U. S. Dollars)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
REVENUE					
Product Sales	0	2,733,764	2,733,764	2,733,764	2,733,764
Shrimp and post larvae	0	2,733,764	2,733,764	2,733,764	2,733,764
Total Revenue	0	2,733,764	2,733,764	2,733,764	2,733,764
COSTS					
Production	416,234	905,272	905,272	905,272	905,272
Shrimp and post larvae	416,234	905,272	905,272	905,272	905,272
Packing and All Marketing	0	585,497	585,497	585,497	585,497
Shrimp and post larvae	0	585,497	585,497	585,497	585,497
General Administration	434,758	349,086	342,507	314,136	285,766
Management	60,000	60,000	60,000	60,000	60,000
Depreciation	139,025	139,025	139,025	139,025	139,025
Interest	126,705	120,061	113,482	85,111	56,741
Accounting and Legal	41,000	12,000	12,000	12,000	12,000
Office Operations	18,000	18,000	18,000	18,000	18,000
Other	50,000	0	0	0	0
Total Costs	850,991	1,839,854	1,833,275	1,804,904	1,776,534
Net profit before tax	(850,991)	893,911	900,490	928,860	957,230
IRR CALCULATION	28 %				

IV. OTHER PROJECT OPPORTUNITIES

In this section are reviewed other project possibilities that were reviewed but not formalized into a proposal as they initially received a lower priority rating than other more promising projects. Further investigation on a U.S. investor's part is encouraged if the following general comments on each project prove to be of particular interest.

1. High-Value Tropical Crops

Since the Dominican Republic has many different climatic zones as affected by rainfall, altitude and soil types, it has tremendous potential for many "minor" crops. These include the fruit crops (citrus, mango, avocado, passion fruit, etc.), and the nut crops (cashews and macadamia). These crops are relatively high value but the markets are not well-developed thus a small planting may be quite profitable but a larger planting may adversely affect the market as well as profitability. With the above understanding, we wish to identify four general areas that may show potential for growth.

a. A nursery industry capable of growing large numbers of clean, clonal plants for large-scale planting of citrus, mango, avocado, passion fruit, papaya, macadamia, cashew and forestry trees. In many areas, the limiting factor for commercial production was the lack of good quality plants from the nursery. Two nurseries showed interest in expansion and offer possible investment opportunities.

1 - Dr. William Kevin Darrow
Mr. Cesar E. Lopez
Los Arbolitos
Apartado 22368
Santo Domingo, Dominican Republic
Telephone 682-5472
This operation is a very modern facility near Villa Altagracia.

2 - Mr. Dennis Limo
Consorcio Agroindustrial "Delta", S.A.
Santo Domingo, Dominican Republic
This operation has grown citrus liners in the past.

b. Tree crops on the North Coast near the Puerto Plata area have a good possibility but good planning with different soil types is a necessity. The production of fresh fruits, fruit pulp and nuts could be evaluated with good economic advantage now since much of the land will likely be taken out of sugar cane production in the next few years with no substitute crop immediately in sight. Much of this area is within 30 - 60 minutes of the international airport and resort hotels, which may make it addedly attractive for a foreign investor.

Contact should be made with the Dominican Federation of Sugar Cane Growers in Santo Domingo, whose members are private land holders interested in the production of high value crops. The Federation's President is Dr. Nicolas Casasnovas, Federacion Dominicana de Colones Azucareros (FEDOCA), Paul Harris No. 3, Centro de los Heroes, Zona 6, Santo Domingo, tel: (809) 533-5355. He will put interested investors in contact with the local growers associations of Amistad and Monte Llano in the Puerto Plata area. The State Sugar Council also has lands available in the area which it is willing to contribute to a joint venture production effort. The State agency's name and address is as follows.

Consejo Estatal del Azucar (CEA)
Centro de los Heroes
Santo Domingo, Dominican Republic
tel: 532-7535
telex: CEDAZU 326-4123 (RCA)
CEDAZU 346-0016 (ITT)
Attn: Ing. Victor Manuel Baez, Executive Director

c. Fresh vegetable, small fruits and flowers could also be grown in the Puerto Plata region with emphasis on the hotel tourist trade.

There are some rich soils in this region which could compete favorably with U.S. production of winter crops such as strawberries, vegetables and fresh flowers that would also enhance the region as a resort area. Additional production could be sold within the Caribbean or possibly shipped into the U.S. market. Potential partners would again be the FEDOCA growers and the State Sugar Council.

d. Ornamental plants have been grown in this country for many years with cuttings shipped to the U.S. and Europe. Due to its proximity to the U.S., there is still great potential for increased production of these crops in several regions of the country. A facility with good marketing facilities abroad and good production of such crops as aglaonema, diefenbachia, dracaena, yucca, etc. should be a very profitable operation. However, good management and marketing are crucial. An interested investor should consult the Dominican contacts listed under the Cut Flower project investment profile.

2. Oil Seed Production and Processing

a. Soybeans

Domestic consumption of soybean oil and meal is expected to continue to increase. At present, both meal and oil are imported with volumes regulated by government policy. Although some beans are crushed domestically, it is presently more profitable to import oil due to government pricing policy. However, present crushing facilities cannot process the amount of oil presently imported, thus offering an opportunity to U.S. exporters of appropriate equipment and technology.

Large enterprises in the production of palm oil have been initiated but should only supply a part of the growing demand for vegetable oil, and the acreage of peanut production for oil is static. However, since peanuts are produced on small plots, the situation

should be examined for the possibility of improved production efficiency with better technology. At present, though, peanuts receive little attention and outlook for increased production is negative.

While the commercial growing of soybeans has not been tried, early research in the 1970's reported yields of 35 bu/acre. These experimental yields could be substantially increased since there are now good tropical varieties available. Recent growing efforts were hindered by inadequate availability and use of land, tractors, combines and pesticides. Crop observers have also reported apparent lack of fertilization and weed control.

Soybean varieties developed for the tropics in a cooperative breeding project with U.S.D.A. at Rio Farms in the Lower Rio Grande Valley of Texas should produce good yields in the Dominican Republic, if coupled with advanced production technology. Once proven production potential is established, a crushing plant near port facilities should be considered.

b. Cotton

The Dominican Republic imports cotton thread for its small textile industry as also many finished textiles. It would be economically beneficial to develop a labor intensive cotton lint processing and spinning industry to produce thread and cloth. A sewing industry based on the plentiful labor supply can produce finished textiles to reduce imports and increase exports to world markets. Also, cottonseed is needed domestically as a source of vegetable oil (which is mostly imported) and feed for the livestock and poultry industries.

Cotton is the one crop that can produce as many jobs as sugar cane, and have a multiplier effect on the economy. There can be many jobs in producing lint and seed, processing lint into textiles and converting seed into oil and feed products.

Cotton should be developed under present Dominican conditions as a labor intensive enterprise which can be produced at a low unit cost of production to compete on the world market. As a model the history of the U.S. cotton industry should be rolled back 50 years to before mechanization. The bountiful Dominican labor supply should be utilized even if it means retraining and relocation. However, sustained technical assistance in crop production methods utilizing hand labor for weed control and harvesting the cotton would be needed. Hand controlled ginning, seed delinting and old style seed crushing equipment could be used to advantage as labor is much more plentiful than capital.

Specifically, technical assistance would be required in these areas:

Irrigation: land leveling, water movement, flood irrigation management (timing, amount & salt control) & drainage.

Cultural: variety selection, planting, cultivation, weed & grass control, pest management and plant nutrition.

Labor Training: how to organize and train hand hoeing or weed control to eliminate expensive herbicides. Also how to organize, train and motivate hand pickers.

There are 2 areas of the country (in the northwest and southwest) with arid climate, soils and irrigation water that are favorably suited for cotton production. In these areas, there are several cotton operations in various stages of development. Only one has reached large scale production - The large ALGODOM Project near Mao, Valverde Providence which has some fields producing three bales of lint per acre. In contrast to the labor intensive project that is being recommended herein, this is a highly mechanized operation with land leveling, irrigation, mechanical pickers and high capacity gin and delinting seed plant. Though efficient, this operation is struggling under very high capital costs and the critical absence of a local lint processing and spinning industry.

The factors of good growing conditions, an abundant, low-cost labor supply, local and export market opportunities comprise the base that invites further investigation of the feasibility of establishing an integrated cotton production and processing industry in the Dominican Republic.

3. Meat Production and Processing

In the Dominican Republic the domestic demand for meats and meat products currently exceeds available supply. Considering that unfilled demand is occurring in a very depressed economy, improved economic conditions should produce an even larger unmet demand. The export opportunity offered by the U.S. market has not produced any benefits for the Dominican economy as U.S export quotas go unfilled.

Improved breeding, pasture and feed management could significantly improve and increase the production of beef, and allow the meat production and processing industry to profitably fill the demands of the domestic and export market. There are many good herds of Brahman cattle. Import of good breeding stock of other breeds to produce crossbred cattle would improve the quantity and quality of the beef produced. Some pastures give evidence of good management but there are many overgrazed pastures contributing to soil erosion and low levels of beef production. Pasture management technology and improved fertilizer practices would pay dividends. Most feed lots combine feeding a ration mainly of poultry manure, soybean meal, grain and rice bran while allowing the cattle only limited access to forage grazing. Feeds should be upgraded and the cattle given more access to grazing. Bulls are not castrated for the feed lot, but should be to improve growth ratios. This forage and grain fed beef has proven to be of good quality, which can be improved upon with better production and processing methods.

One potential partner for a U.S. investor would be Industrias Veganas C x A (INDUVECA), a local integrated food business. The

company started as a meat market and expanded to include a supermarket, slaughter and meat processing plant, cattle feed lot, swine farm with finishing pens and farming operations with production of grain sorghum and plantains for export.

The company is interested in pursuing export opportunities and would welcome talking with smaller U.S. meat companies about exporting meat products to Latin American countries. INDUVECA plans to enter the U.S. market and therefore is upgrading its packing plant and slaughter house to pass U.S.D.A. inspection. They would invite joint venture arrangements with investors who could provide marketing and meat processing skills as well as the practical expertise necessary for improving swine and beef production and the overall farming enterprises.

4. Citrus

Grapefruit and several varieties of oranges, lemons and limes are growing at many locations over most of the Dominican Republic. Due to lack of an ideal climate the fruit does not color or produce high sugar, though a few varieties did prove to have acceptable taste. Observations were made on a four year old orchard. The fruit set was good, taste was fair but the cultural practices indicated the need for basic production know-how. Citrus production on a commercial scale would require development of an entire industry from nursery for proper rootstock and quality bud wood to processing and shipping plants. Needed also would be production, harvesting, processing and packaging expertise and necessary equipment for fresh and processed products.

Due to freezing weather hazards in the U.S. there is a school of thought that the Caribbean Islands would be a suitable location for commercial citrus production. With effort, suitable soils could most likely be found in the Dominican Republic for commercial production. Several land owners near a good labor supply expressed interest in

cooperating in a citrus project. Their interest is well founded since the need for good citrus for the domestic market was evident, and world markets offer an opportunity for exports.

The citrus production in the Dominican Republic merits further study but the economic outlook is less promising than for some other crops.

5. Grain Sorghum

Production of grain sorghum is expanding in many areas of the Dominican Republic mainly as a rotational crop. Present government policy holds the price in the 6 to 7 U.S. dollar per cwt range, making current production in the 3,000 to 4,500 lb/acre range profitable. Production in 1985 is estimated at 54,000 MT.

Combines from the rice industry are now being utilized for harvest. As production expands and grain sorghum becomes a major crop, rather than a scavenger crop in a rotation, more equipment, fertilizers and farm chemicals will be needed. Basic field production technology was lacking in most of the fields observed. Bird or insect damage was not a major factor. Lack of fertilization and cultural practices appeared to be the main limiting factors on production.

The red low-tannin grain is being used in the feed industry. With very little corn production, there is much more grain needed for domestic livestock production.

There is a government encouraged effort to produce white grain sorghum to be blended with wheat in the production of food flour. All wheat is being imported at the rate of about 260,000 MT per year.

There is a profitable well established modern seed production and processing enterprise, PROSEDOCA, associated with PIONEER INTERNATIONAL which produces grain sorghum seed, as well as corn, rice, and other seeds.

High yields could be accomplished with improved production technology. This would require more tractors, farm equipment, combines, and production expertise from consultants. Increased production would also require the importation of more fertilizers and farm chemicals.

Grain sorghum enterprises would best be developed in association with other agricultural operations such as that of INDUVECA where the grain can be utilized in their feed operations. More intense investigation would be required for specific projects.

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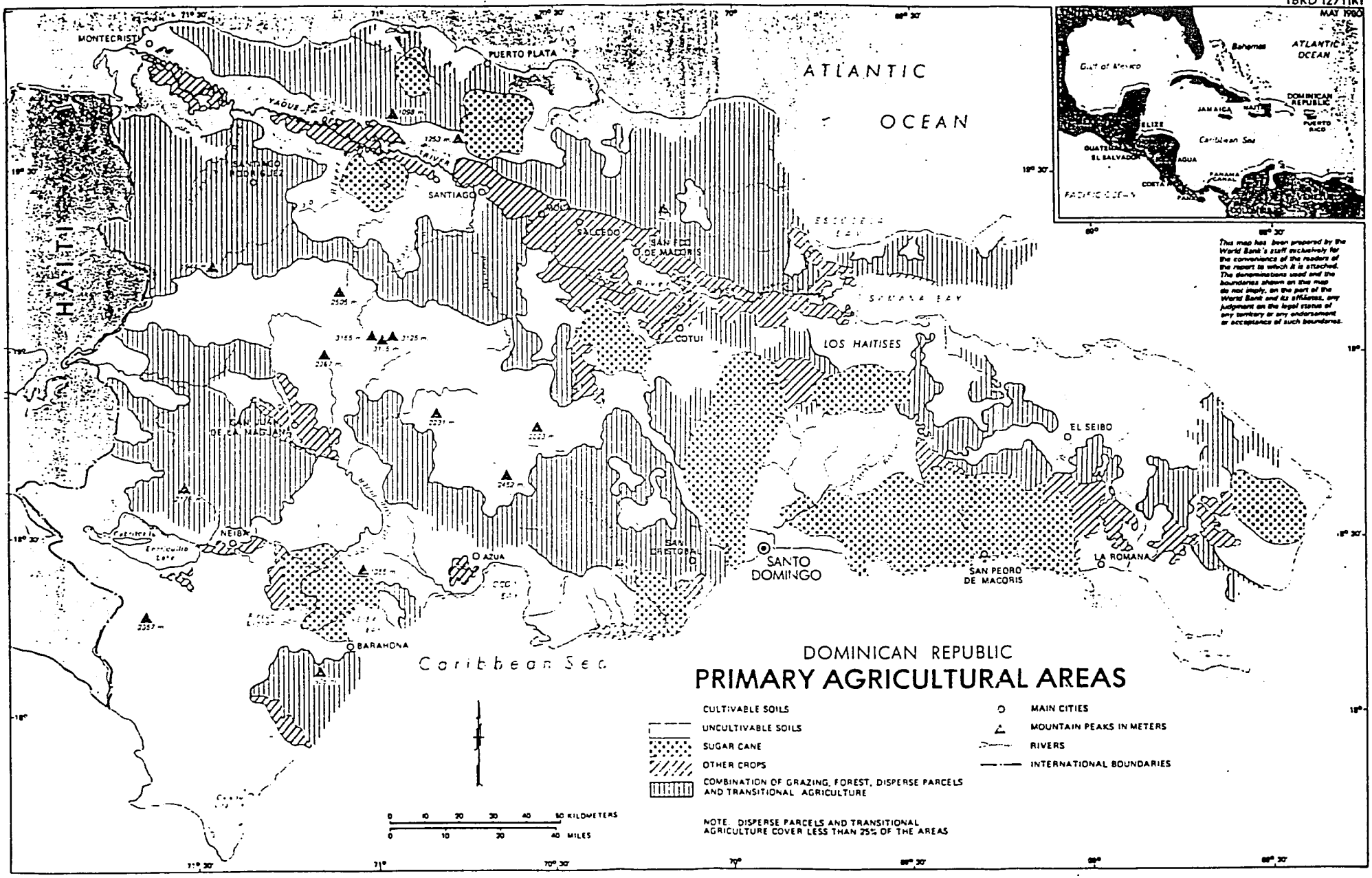

This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The denominations used and the boundaries shown on the map do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

DOMINICAN REPUBLIC

PRIMARY AGRICULTURAL AREAS

- CULTIVABLE SOILS
- UNCULTIVABLE SOILS
- SUGAR CANE
- OTHER CROPS
- COMBINATION OF GRAZING, FOREST, DISPERSE PARCELS AND TRANSITIONAL AGRICULTURE

- MAIN CITIES
- MOUNTAIN PEAKS IN METERS
- RIVERS
- INTERNATIONAL BOUNDARIES

NOTE: DISPERSE PARCELS AND TRANSITIONAL AGRICULTURE COVER LESS THAN 25% OF THE AREAS