



POLICY ENHANCEMENT AND PRODUCTIVITY PROJECT

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Transportation Logistic Model To Analyze the Export Cost of Poultry and Pig

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Prepared by: Dr. Klaus Beplat

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Submitted by: **PEP Project Chemonics International Inc., Edificio PALIC, Tercer Piso, Avenida
República de Chile, Colonia Palmira, Tegucigalpa, Honduras**
Telephone: **504-239-3439, 220-5562 Fax: 504-239-4188**
Contact: **Julio Paz, Chief of Party – PEP Project**
E-Mail address: **jpaz@proyecto pep.com.**

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Chemonics International Inc.
Policy Enhancement and Productivity Project (PEP)

Transportation Logistic Model To Analyze the Export Cost of Poultry and Pig

Within its Plan for Secondary Cities, the Policy Enhancement and Productivity Project (PEP) contemplates the economic reactivation of geographic areas, such as the Valle del Aguán, that despite its agricultural potential have been traditionally excluded from economic development plans.

The PEP project's initiative to reactivate the economy in rural areas complements the Honduran Ministry of Agriculture's desire to strengthen agro-industry through the development of agro-industry and agricultural exports. Honduras currently has an interest in participating in the Asian market.

Given the number of variables that affect transport costs between Honduras and Asia, the Ministry of Agriculture proposed a feasibility study to identify the different levels of maritime transport costs between the principal Central American ports and corresponding Asian ports.

The objective of this present study is to calculate the external transport cost for an export project to Asia as well as to comment on its basic logistical parameters. This report examines the feasibility of exporting poultry and pig through the application of a transportation logistic model designed by the consultant. The model calculates the cost of the principal logistics. For multiple scenarios, the model calculates the annual cost, broken down into to four components: (1) inbound cost maritime transport, (2) inbound cost land transport, (3) outbound cost land transport and (4) outbound cost maritime transport.

In the report, the consultant details the outbound and inbound movement necessary for this type of project. Successful transport of the product would depend on an uninterrupted logistical chain where frozen poultry and pig would be shipped via reefer containers.

The consultant met and interviewed several representatives from the transport industry in order to provide an overview of transport costs including both maritime and road transportation costs.

Lastly, this study makes recommendations regarding port selection as well as the location of the farming industry within Honduras. Five alternative locations were simulated by the consultant's model to determine the most appropriate farming industry site for the proposed project. The result of the model's sensitivity analysis strongly suggested locating the farming industry on the north coast. This would place the farming industry closest to Puerto Cortés, a port that meets the necessary conditions for the proposed international operation. Puerto Cortés would serve the project as both an inbound and outbound port.

SECTION I

Introduction

A. Concept of Chicken and Pig Farming for Export

The Honduran Ministry of Agriculture seeks to develop, encourage and support the farming of agricultural products, namely pork and chicken, on a large scale and to attract medium and small enterprises which will export these products to suitable markets, namely the Far East and North America.

Competitive farming of both chicken and pork requires a specific processing standard, which clearly defines not only the technical know how and the investment in production lines but also the necessary hygiene and sanitary requirements.

Large-scale production of chicken and pigs requires substantial investment. This investment includes clusters of silos, chicken and/or pig houses, hatchery, slaughterhouse, as well as refrigeration, medical, social, and office facilities. In addition, special precautions must be taken with water and energy supply and disposal /reprocessing of natural waste from this production. *Existing worldwide standards indicate the optimal allocation of these and other facilities in terms of quantity and physical location.*

Consequently, competitiveness of this said production depends largely on the availability of inexpensive and vast areas of land, labor force and energy/water supply. Furthermore, health related factors determine competitiveness. Since Honduras is said to have the internationally certified status of a country free of respective animal diseases and since many meat consuming countries present heavy environmental concerns in regards to this production, successful farming on a large scale in Honduras is considered feasible.

An important consideration is the inherent transport function of this production and marketing process. Honduras is neither located close to the market of foodstuff production (mainly corn, maize and soy beans) nor located close to the large consumer markets (Far East, North America, North Europe). However, this does not indicate that great distances will limit the trade by principle as shown in following table.

Table 1
Import of Pork and Chicken Meat into Japan 1999

	Total Import	Thereof from “Overseas”
Pork meat (‘000 USD)	2,860,035	2,296,163
Pork meat (t)	612,433	492,622
Pork meat (USD per t)	4,670	4,660
Chicken meat in ‘000 USD	938,963	293,740

Chicken meat, (t)	553,167	201,913
Chicken meat (USD per t)	1,697	1,450

Note: "From overseas" are the countries USA, Denmark, Canada, Mexico, and Brazil

Source: See Annex G

In terms of transport intensity, Honduras is located in the shadow of highly dense trade between the Far East, North America and northern Europe. Honduras is located outside of the low cost large vessel maritime transport employed in the North Pacific and North Atlantic. The port of Honduras presents disadvantages for low cost operation due to insufficient water depth and equipment standards, as well as sub-optimal transport organization. Land transport is seriously hampered by physical factors (mountains and inadequate road systems).

The objective of this study is to calculate the external transport cost of this project as well as to comment on its basic logistical parameters.

SECTION II

Transport Functions of the Model

A. Outbound Movement (Export of Meat)

The outbound (export) cargo would consist of ready cut pork and/or chicken meat that has been deep frozen to maintain its quality after transport over a long distance. These products are transported in reefer containers. Present design of reefer containers (contenedores frigoríficos) allows a wide range of temperature and humidity control.

Table 2
Transport Requirement as to Temperature Control (all in degrees Fahrenheit)

Product	Ideal Temperature	Legal Transport Requirements
Ultra frozen meat	- 8° or colder	0° or colder
Ultra frozen poultry	- 8° or colder	0° or colder
Frozen poultry, meat, etc	- 0° or colder	+10° or colder
Super refrigerated fresh meat	+ 30° to 32°	+ 35° to 44°
Packaged meat products	+ 28° to 30°	maximum 42°
Prepared meats	+ 30°	maximum 44°
Refrigerated poultry	+ 30°	maximum 39°

Source: Maersk-Line; Cool Facts

Table 3 shows that maximum filling of the container ranges from 26 cbm (of a twenty-foot container) up to 60 cbm (of a high cube container). Since deep frozen meat and chicken must be considered heavy load cargo, the volume capacity of the container does not present a limiting factor. The maximum loading capacity of a container as to weight ranges only slightly between different container sizes of 24 and 26 tons.

Table 3
Average Dimensions of Reefer Containers by Size and Type

	20' Container	40' Container (standard)	40' High Cube
Interior length (mm)	5,400	11,100	11,500
Interior width (mm)	2,250	2,250	2,250

Interior height (mm)	2,200	2,100	2,400
Capacity, volume (m ³)	26,2	52,4	60,5
Payload (Kg)	24,100	25,800	25,700
Tare	2,900	4,700	4,700

Source: Maersk, Hapag Lloyd

Since the meat will be packed in cartons and/or shrink folio, the net filling of one container with meat will be approximately 22 t (see remarks below).

Relevant to the transport, the following logistical chain must be observed.

1. Products will have to be pre-frozen to transport temperature in the agricultural plant prior to loading the container.
2. The container itself has to be chilled down to the required transport temperature prior to stuffing (loading the pre-cooled container with deep frozen meat) of the container.
3. The loading space at the cool house must be sufficient to accommodate several 40 feet containers at the same time.
4. During the stuffing, the container should be directly connected to the cool house in order to avoid the entrance of hot air through the open doors.
5. The container temperature will have to be constantly monitored during transport by the trucking company as well as by the shipping company. At places where the transport chain is interrupted (e.g. ports) sufficient energy supply will have to be supplied; a special trained staff (from the ports) will be responsible for the monitoring at these places.

The production of life food is a natural process that has its own rhythm. Any interruption or substantial failure in the flow of input factors (foodstuff, water supply, electricity supply) will have a fatal effect on the productivity. As well any distortion or substantial failure in the logistic flow of output factors will immediately result in serious damage to the products and its marketing potential.

In order to cope with probable distortions and unforeseeable events, the project's logistical factors must demonstrate substantial components of redundancy. Without presenting too much detail at this stage, the consultant highly recommends that at any given time there should be sufficient pre-cooled empty containers available in order to cope with cases of occasional shortage of reefer containers or substantial vessel delays that may interrupt the steady flow of outbound cargoes.

When basing the quantities of container movements to be considered on the parameters of "standard farms" (see Annex A), delays of up to 32 reefer-movements at a chicken plant must be considered. Delays of up to 32 reefer movements indicate 16 reefer containers to be delivered into the farm and stuffed and 16 reefer containers to be transported from the plant to the port. Considering a weekly service of the shipping line there will be 111 empty reefer containers to be

discharged at each call (to be transported near to the plant) and 111 full containers to be loaded. Each day of delay for a vessel puts a transport pressure of an additional 16 containers in either direction. Transit time of the transport should not exceed 30 days.

B. The Logistical Link between Output (export) and Input (import)

The project as designed is a pure value added production for the world-market: The meat is for export and the foodstuff to produce the meat in the farms has to be imported. The value added is created on the rural Honduran land with Honduran labor force, water and energy. In addition, there exists the possibility to deposit or reprocess not only the fecal parts of this production but also to deposit and/or reprocess the by-products of this production such as bones, feathers, guts (tripas, menudos), skin, intestines etc.

To determine the quantities of foodstuff to be imported for a given target of meat to be exported, the following conversion factors were applied.

Table 4
Conversion Factors Between MP (meat production) and FI (foodstuff input)

	Standard Pork Farm	Standard Chicken Farm
Life animal produced (unit)	493,600	83,200,000
Weight per animal (kg)	100	1.80
Life animals produced (t)	49,360	149,760
Exportable meat (%)	70	85
Meat export (t)	34,552	127,296
Foodstuff import (t)	133,272	235,498
Food input per life animal	2.70: 1	1.57: 1
Food input per meat export	3.86: 1	1.85: 1

Source: see Annex A

C. Inbound Movement (import of foodstuff)

Foodstuff like corn (maize), soybeans and other additives are necessary for the production of the agricultural products. Smaller quantities of additives are shipped in bags; then loaded in normal dry containers.

The majority of foodstuff, namely corn (maize) is imported in large shipment by bulk vessels, generally arriving from the US-Gulf region.

Considering the quantities produced in Table 4 and taking a medium-sized bulker with a carrying capacity of 15,000 tons, the project anticipates approximately 9 shipments (for pork production) to 15 shipments (for chicken production) per year.

It has not been established as to whether larger shipments with larger vessels and less calls (example 30,000 tons bulker, handled by pneumatic unloaders instead of grab-and-hopper operation, and stored in bigger silos) will reduce the overall transport costs.

Trucks will transport from the port to the site. Considering a net loading capacity of trucks to be at 24 tons, any discharge operation of a 15,000-ton bulker would result in 625 truckloads during the time of operating the vessel. Taking a productivity of 300 tons per hour and gang, and the employment of 2 gangs operating at the same time (600 t per vessel hour), a vessel will be discharged in 25 hours net working time (up to 2-3 days berthing time).

Since there are no silos existing in the ports of Honduras, a direct discharge of the vessels to waiting trucks will be necessary. Taking the productivity of 600 tons per hour and 24 tons per truck, approximately 25 trucks will be loaded in one hour. Depending on the distance a truck has to cover the number of trucks necessary are estimated as follows.

Table 5
Fleet of Trucks Employed in Direct Discharge of a Bulk Vessel

Scenario	Distance to the Site (km)	Distance of a Roundtrip in Km	Total Number of Trucks Engaged
Plant at the port	5	10	25
Plant in the area of a port	25	50	50
Plant outside this area	50	100	100
Plant far away	200	400	300

This calculation clearly demonstrates that the discharge of vessels (which should not be interrupted at any given time) requires a fleet of trucks, which – even if this fleet is available in Honduras – calls for a buffer storage near the port of discharge in order to reduce the engagement of too many trucks.

The feeding of the plants with foodstuff will have to be done permanently. The daily consumption is calculated to be 645 tons (see Annex A for a standard chicken farm) which requires a minimum of 30 trucks, which may or may not be owned by the plant.

In summary, the inbound movement of foodstuff will consist of the following four items.

1. Monthly contracting of a bulker for the foodstuff supply,
2. Subcontracting monthly trucks for the discharge operation,
3. Establishing an operational buffer (silos) “near” to the port,
4. Operating trucks for the transport between the buffer and the site.

In addition to the bulk operation, there are some additives for the farming, i.e. foodstuff in smaller quantities than corn (maize). It is assumed that these smaller quantities will come bagged and loaded in normal standard containers.

D. Ports as Logistical Link between Maritime and Land Transport

Although the ports do not produce transport functions in the sense of crossing distances, they play an important role in the logistics. They link the land-transport with the sea-transport. Ports absorb the logistical shock of voluminous bulk shipments and distribute these quantities.

Many small carrying units of land-transportation; ports collect single unit shipments of the land-transport and group them into larger shipments for one vessel.

Honduras has three ports which offer at present the minimum conditions for this international operation: Puerto Cortés and Puerto de Castilla on the Atlantic Coast and San Lorenzo on the Pacific Coast. The main characteristics of Puerto Cortés, Puerto Castilla and San Lorenzo are shown in Annex 2. Other ports on the mainland, i.e. La Ceiba, Tela, Lempira and Amapala serve the nation only as port for cabotaje, tourism and regional traffic.

Puerto Cortés is by far the largest and most important port in Honduras. In 1999, this port handled 84% of all vessels, 83% of all cargo volume (t) and 7 % of all containers. Puerto Cortés offers five berths and various cranes for the ship-to-shore operation, among them two container gantry cranes. Puerto Cortés is among the few large ports in Central America. Although Puerto Cortés is said to be one of the most expensive ports in Central America, it attracts enough traffic to fully utilize its capacity. Idle time of vessels waiting for service is rather the rule than the exception. Container vessels enjoy handling priority over bulk vessels. Puerto Cortés can serve the project as inbound and outbound port.

Puerto Castilla is a single-berth deep-water port. Handling priority is given to fruit company vessels. These companies have vast plantations in the vicinity of the port. Puerto Castilla is not called by any common user liner service. At present, Puerto Castilla may only serve the project as a port for discharging foodstuff to the agricultural plant, if located in the Valle Aguán

San Lorenzo is the only international port on the Pacific Coast. It is a single-berth port; the water depth along the pier and in the channel only allows the entrance of vessels with a draught of less than 20 feet. Petrol tankers have berthing priority and for this reason existing container operations frequently suffer. San Lorenzo may serve the project only as container port for the outbound logistics.

Main characteristics of the ports in the neighboring countries are shown in Annex C. Acajutla (San Salvador) and Corinto (Nicaragua) may be a choice of routing on the Pacific Coast, but it is Puerto Quetzal (Guatemala) that is actually used on a large scale to connect Honduras with regular liner services to the Far East. Puerto Quetzal occupies this important position due to its physical expansion, rehabilitation programs and its institutional reforms (privatization). All neighboring ports may serve the project as container ports for outbound movement.

Table 6
Ports Suitable for the Project

Port	As Inbound Port	As Outbound Port
Puerto Cortés	suitable	suitable
Puerto Castilla	suitable	unsuitable
San Lorenzo	unsuitable	suitable
Puerto Quetzal	unsuitable	suitable
Others	unsuitable	(suitable)

As to the selection of ports, the project can be based on a set of alternatives. This adds to the vital logistic and also provides operation and commercial alternatives.

SECTION III

Transport Costs

The following overview on transport costs is the result of several interviews with representatives from the transport industry. These prices may only serve as cost indicators since these quotes were made on specific dates (January 2001) and have not been negotiated. There will be some economies of scale in the development of the projects (employing larger vessels in the inbound logistic, organizing the road transport in lower cost round trips and eventually employing dedicated feeder services for the outbound logistics); however, the consultant has refrained from quantifying these effects, at a stage where too many parameters are still variables.

A. Maritime Transport

A substantial number of shipping lines regularly serve Honduras. The majority of these lines offer services to the US-Gulf and to the Caribbean along with direct liner services to the North Atlantic coasts and into the Mediterranean. There are several services that extend through the means of transshipment routing to any port in the world.

The Far East region is served by at least three shipping lines, all of them belonging to the top ten container operators. There is the direct service of NYK (Nippon Yusen Kaisha) that makes weekly stops in San Lorenzo. Maersk SeaLand and the competing Hapag Lloyd also connect Honduras to the Far East, by weekly transshipping the cargo to Kingston, Jamaica (Hapag Lloyd) and Manzanillo, Mexico (Hapag Lloyd) or to Freeport, USA (Maersk SeaLand). Additionally, there is a land transit service to Puerto Quetzal, Guatemala (Maersk SeaLand). All services have a transit time to the Far East of approximately 30 days or less.

These services all provide transport with reefer containers. The rates for this service are quoted between US \$4,000 and US \$5,600. These lines are prepared to sign service contracts, which contain guarantees of shipment within specific transit time.

It should be noted that at times there are outsiders and fly-by-night services that may undercut negotiated prices. Since this project depends on sophisticated logistics, the elements of service quality such as reliability, punctuality and preferential treatment may outweigh lower prices.

Table 7
Freight Rates

	Unit (net load in t)	USD per unit	USD per kg
Outbound			
Singapore	Container (22 t)	4,500	0.20
Keelung	Container (22 t)	4,000	0.18
Yokohama	Container (22 t)	4,000	0.18
Inbound			
New Orleans	Bulker (15,000 t)	320,000	0.02

The cost for port handlings is included in the above quotations (handling fees are valued at USD \$150, 00 per container and some USD \$2 per tons of bulk grain).

B. Road Transport

The project includes two directions of road-transport.

1. The transport of foodstuff from the port of discharge to the factory (eventually with the sub elements port to buffer silo – buffer silo to plant silo– plant silo to the meat factory). Truck-chassis combinations should perform this operation. The chassis should be of voluminous construction with devices to allow a fast discharge. Carrying capacity should be at 25 t per truck.
2. The transport of reefer containers from the factory to the port of loading is done by truck-chassis combinations, where the chassis should be of the flatbed-type with fixing cones at each corner; the engine of the truck supplies as well the reefer container with the energy to maintain the temperature inside the container at its required low level.

At the time of this report, the consultant had been told that there is a limited number of heavy grain chassis available in the market. The consultant assumes that once the project is launched that these chassis will appear in the market.

The road transport market in Honduras is fairly diversified, however, with inconsistent rates. The following rates had been found to be reasonable for this project

Table 8
Cost of Road Transportation (USD per km)

Type of Transport	Cost per Transport per Kilometer in USD
Transport of one reefer container under a cooled condition	1.50
Transport of one dry container, not needing additional energy	1.25
Transport of grain, loose with devices for fast discharge	1.00

Table 9
Transport Distances in Honduras (km)

	Puerto Cortés	Puerto Castilla	San Pedro Sula	Tegucigalpa	San Lorenzo
Puerto Cortés	0	410	57	303	411
Puerto Castilla	410	0	438	621	792
San Pedro Sula	57	438	0	246	354
Tegucigalpa	303	621	246	0	108
San Lorenzo	411	792	354	108	0

C. Other Cost Items

The above listed quotations are said to include all other items and should be considered as lump sum, i.e. all-inclusive rates. These rates include items such as THC (terminal handling charge), port dues, surcharges (theft surcharge and bunker surcharge) and supervision costs (to reduce risk of robbery during land transport). There are no storage fees expected as containers are free of storage fees between sailings of vessels, and as bulkers are discharged directly (no silos). The cost for storage in silos near the farming site (or eventually between the port and the site) is considered to be part of the project cost itself.

A market representative quoted these rates in awareness of the quantities envisaged. These quantities are doubtlessly so attractive that the values are already below standard level. However, it should be noted that the price levels presented are still “study prices” and not “negotiated” prices with the background of a concrete market opportunity.

SECTION IV

Transport Model

A transport model has been designed and is presented in Annex F. This model calculates the cost of the principal logistics. It calculates for each scenario the annual cost, broken down into four components: (1) inbound cost maritime transport, (2) inbound cost land transport, (3) outbound cost land transport and (4) outbound cost maritime transport. The model presents the cost in USD as a “total” as well as “per ton of meat exported”; by this the results of different scenarios are comparable.

The model requires the input of data, which are variables to the model, thus allowing for the calculation of numerous scenarios. The model requires the location of the farming facilities and the distance of these facilities to the ports; by this the model supports the decision process to optimize the location of the farming installations.

The quantities of foodstuff imported as bulk (corn) and in containers (additives) and the containers in export of meat (poultry or pork) must be input into the model. Using this information, the model supports the analysis of the two projects in its viability separately.

The model demands as input the freight-rates for bulk shipments, for container import (additives), for container export (meat) to the Far East, for road transportation containers per kilometer and for the road transportation of bulk grain per kilometer. As a result, the model supports the economical analysis in sensitivities of the cost producing elements and thus may participate in the commercial success of the projects.

In order to reduce the number of calculations to a workable minimum, the consultant proposes that only Puerto Cortés, Puerto Castilla and San Lorenzo be considered potential ports.

- Puerto Cortés (presently handling both import of grain bulk as well as container vessels)
- Puerto Castilla (presently handling mainly fruit vessels, but suitable as deep water port as well to handle grain import as well)
- San Lorenzo (presently handling some containers and bulk cargo)

A total number of five compositions within the ports have been considered for each type of project.

By doing so the consultant has limited the number to ten scenarios, however, it is evident that this model allows an unlimited number of calculations within the input/output parameters.

SECTION V

Conclusions

A. Level of the Transport Cost

The absolute level of the transport cost varies depending on the type of project and its location.

Table 10

Total Transport Cost in USD

Scenario	Pork Farming	Chicken Farming
Total transport cost		
Best case	9,463,671	29,293,653
Worst case	19,033,554	49,033,095
Cost per t of exported meat		
Best case	274	230
Worst case	551	385

See Annex F

Using Japan's import prices from 1999 as a reference, the ideal transport costs would represent some 6% of the imported pork meat value (4,660 per t) and 16% of the imported chicken meat value (1,450 per t).

B. Location of the Farming Industry

Five alternative farming locations were simulated by the model, two locations on the north coast, two locations in the center and one location on the south coast.

1. Province of Cortés, 10 km away from Puerto Cortés
2. Valle Aguán, 10 km away from Puerto Castilla
3. In the area of Comayagua, midway between the Atlantic and Pacific
4. Near the capital Tegucigalpa
5. Choluteca, 10 km away from San Lorenzo

The result of the sensitivity analysis highly suggests locating the farming industry on the north coast.

The south coast (Choluteca) has the logistical disadvantage of high transport costs for inbound movement, by routing the sea transport of foodstuff from New Orleans via the Panama Canal to San Lorenzo (which doubles not only the distance but as well the transport cost). These cost differentials are not compensated by eventual lower freight rates for the outbound movement from this coast.

The locations in the center of Honduras (Comayagua and Tegucigalpa) are heavily burdened by higher land, which could increase transport costs by USD \$50 in the case of chicken and up to USD \$100 in the case of the pork.

C. Selecting the Port

The model quantifies the logistical logic of the proposed projects. The most suitable location for the free-zone farming would be the port which can offer both the inbound as well the outbound logistic. This location minimizes costly land transportation. This supports the argument for establishing the farming location in Cortés near to the port of Puerto Cortés.

The Pacific Coast is not a choice for industrial farming, neither on the costing side, nor because of the fundamental disadvantages of San Lorenzo. This one-berth port cannot handle the demanding logistic of the voluminous bulk inbound flow and the steady outbound flow of reefer containers. Ironically, San Lorenzo will be of a high value in the strategic positioning of the project. The ability of San Lorenzo to handle outbound containers at present low freight rates makes San Lorenzo always a suitable alternative if the Atlantic ports fail in service (for adequate terms). San Lorenzo presents a competitive element for Puerto Quetzal that is called by the same shipping lines providing the Atlantic service.

D. Cost Structure

Taking the most favorable scenario as guideline, the following table presents the cost-structure of the logistics.

Table 11

Structure of the Transport

	Pork Meat	Pork Meat	Chicken Meat	Chicken Meat
	Cost per t export	in %	Cost per t export	in %
Sea freight foodstuff	85.3 USD	31.1 %	42.3 USD	18.4 %
Road freight foodstuff	1.6 USD	0.6 %	0.8 USD	0.3 %
Inbound cost, total	86.9 USD	31.7 %	43.1 USD	18.8 %
Sea transport export	186.4 USD	68.0 %	186.4 USD	81.0 %
Road transport, export	0.7 USD	0.3 %	0.7 USD	0.3 %
Export cost, total	187.1 USD	68.3 %	187.1 USD	81.3 %
Grand total	274.0 USD	100.0%	230.2 USD	100.0 %

Source: See Annex F

SECTION VI

Outlook

This study bases its findings on present market conditions. Consequently, the cost frame has been determined as if these projects already existed. It will take some years to realize these projects, and the present market with its varying conditions will evidently experience changes during this period.

In terms of future developments, there are two scenarios that are both related to the improvement of the Honduran ports. There are plans to modernize grain operation in Puerto Cortés by discharging grain vessels with pneumatic unloaders directly into a cluster of grain silos. This would result in faster bulk vessel operations. In addition, this would decrease costs for the inbound movement via the following market mechanism. Faster discharge causes less idle time for the vessels; less idle time will reduce the fixed cost of the vessel per day of stay; reduced costs will lead to a reduction of freight rates. To calculate the effects of such a reduction, the consultant refers to the findings presented in Table 11. A reduction of 10% in the inbound cost will result in an overall reduction in the range of 2% to 3% in logistic costs.

The possibility exists that Puerto Castilla will be rehabilitated and expanded to a two-berth operation. This would allow both a two-vessel operation and the possibility of adding container vessels on the list of priority berthing. This will again support the need for a weekly container reefer service from Puerto Castilla to Kingston, Jamaica where the containers will be transshipped for direct service to Far East. This would not only reduce the outbound cost by an estimated 7% to 8 %, but more importantly this would bring Valle Aguán into focus as the best choice for the location of farming sites.

ANNEX A

Quantities of the Project

Standard Chicken Farm

Output	per year	per week	per day
Production of chickens (units)	83,200,000	1,600,000	227,945
Average weight per chicken (kg)	1.80	1.80	1.80
Exportable meat per chicken in % of chicken weight	85%	85%	85%
Exportable meat per chicken in kg	1.5	1.5	1.5
Production of chicken meat (t)	127,296	2,448	349
Weight load per full container with chicken (tons)	22	22	22
Container (units)	5,786	111	16
Input			
Efficiency factor 1 (foodstuff in kg to create one kg of chicken meat)	1.85	1.85	1.85
Efficiency factor 2 (foodstuff in kg to create one kg of life chicken)	1.57	1.57	1.57
Foodstuff (tons)	235,498	4,529	645

Source: Paper submitted by the Ministry of Agriculture, interviews in the market, January 2001

Standard Pork farm

Output	per year	per week	per day
Breeding pigs (units)	24,000	24,000	24,000
Pigs produced (units)	493,600	9,492	1,352
Weight per pig (kg)	100	100	100
Weight of all pigs produced (t)	49,360	949	135
Meat exploration in % of total weight (net meat factor)	70%	70%	70%
Meat (t)	34,552	664	95
Weight load per full container with pig meat (tons)	22	22	22
Container (units)	1,571	30	4
Input			
Efficiency factor 1 (foodstuff in kg to create one kg of pig meat)	3.86	3.86	3.86
Efficiency factor 2 (foodstuff in kg to create one kg of life pigs)	2.70	2.70	2.70
Foodstuff (tons)	133,272	2,563	365

Source: Paper submitted by the Ministry of Agriculture, interviews in the market, January 2001

ANNEX B**International Ports of Honduras**

Characteristics	Puerto Cortes	Puerto Castilla	San Lorenzo
Coastal area	Atlantic	Atlantic	Pacific
Maritime access in hours per day	24	24	12
Water depth alongside berth	-11	-10	-7
Tides in m	0.7	0.6	3.7
Largest Vessel (draught)	-9	-12	n.a.
Pilotage	compulsory	compulsory	compulsory
Quays (units)	5	1	1
Length of berths (m)	1,158	150	295
Sheds No	3	2	2
Sheds sqm	14,300	3,000	3,000
Open storage in sqm	32,000	68,000	71,500
Storage for containers in sqm	100,300	80,000	30,000
Cranes	6	2	2
Container gantries	2	0	0
Tug Boats (number)	3	0	1
Production 1999	Puerto Cortes	Puerto Castilla	San Lorenzo
Throughput of cargo (in tons)	4,977,083	72,956	563,850
Traffic (in number of vessels)	1,728	65	130
Tons per vessel	2,880	1,122	4,337
... Thereof number of containers (in TEU)			
Import full container	64,715	735	1,549
Import empty container	7,828	873	0
Total number of import container	72,543	1,608	1,549
Export laden container	44,952	1,332	426
Export empty container	29,239	830	1,116
Total number of export container	74,191	2,162	1,542
Grad total of container handling (TEU)	146,734	3,770	3,091
Transport distances by road (km)	Puerto Cortes	Puerto Castilla	San Lorenzo
... To main cities			
Tegucigalpa	303	621	108
San Pedro Sula	57	438	354
... Port to port			
Puerto Cortes		410	411
Puerto Castilla	410		792
San Lorenzo	411	792	

Source: JICA, Estudio sobre el Mejoramiento de los Puertos, 1994

Source: Empremar, Ports of the WORLD 2000, Cocotram,

ANNEX C

Competitive Ports

	Guatemala Sto. Tomás	Guatemala Pto. Barrios	Guatemala Quetzal	El Salvador Acajutla	Honduras Pto. Cortes	Honduras Pto. Castilla	Honduras San Lorenzo
Profundidad del Canal	-11		-12	-15			
Muelles -13 m,>-13 m				301		150	
Muelles -12 m			820				
Muelles -11 m				300	674		
Muelles -10 m				360			
Muelles - 9 m	918				347		
Muelles - 8 m							
Muelles <-8 m		380					295
Gentrys			multi proposito		2		
Graneles solido	multi proposito		azucar	secos	bananero		
Graneles liquidos	si		si	si	si	si	
Carga 1994 (1999) en 000 t	2671	885	2815	4031	5091	519	524
Trafico 1998 TEU (000)	135	33	42	10	359	47	3
Trabajadores total	1688	100	715	1201	1086	500	n.a.
Tonelada por metro muelle	2910	2329	3433	1495	4986	3460	1776
Tonelada por trabajador	1582	8850	3937	3356	4688	1038	
Prioridades de proyectos	dragado contenedores graneles liquido	dragado prolongar	dragado contenedores cruceros	graneles solidos contenedores	rehabilitacion contenedores	ampliacion	
Mio USD de los Proyectos	86	12	55	35	74	7	

ANNEX D

Distances Between Ports

Direct nautical distances

From/to	Puerto Cortés (in sm) (in days)	Puerto Castilla (in sm) (in days)	San Lorenzo (in sm) (in days)
New Orleans	916 2.2	894 2.2	2,189 5.4
New York	1,764 4.3	1,742 4.3	2,763 6.8
Singapore	<i>11,281</i> 27.6	<i>11,083</i> 27.2	9,760 23.9
Keelung (Taiwan)	9,424 23.1	9,226 22.6	7,903 19.4
Yokohama (Japan)	8,458 20.7	8,260 20.2	6,937 17.0

Note *Figures in italic are routes via the Panama Canal*

Service distances

From/to	Puerto Cortés (in sm) (in days)	Puerto Castilla (in sm) (in days)	San Lorenzo (in sm) (in days)
New Orleans	916 2.2	894 2.2	2,189 5.4
New York	1,764 4.3	1,742 4.3	2,763 6.8
Singapore	<i>12,045</i> 29.5	<i>11,847</i> 29.0	10,035 24.6
Keelung (Taiwan)	9,988 24.5	9,790 24.0	7,978 19.6
Yokohama (Japan)	9,017 22.1	8,819 21.6	7,007 17.2

Note *Figures in italic are routes via the Panama Canal*
Service of Atlantic ports via Kingston/Panama/Los Angeles
Service of Pacific ports via Los Angeles

Distance to Junction Points

From/to	Puerto Cortés (in sm) (in days)	Puerto Castilla (in sm) (in days)	San Lorenzo (in sm) (in days)
Panama	776 1.9	578 1.4	745 1.8
Colon	733 1.8	535 1.3	793 1.9
Kingston	671 1.6	473 1.2	n.a. n.a.
Corinto	n.a. n.a.	n.a. n.a.	72 0.2
Puntarenas	n.a. n.a.	n.a. n.a.	329 0.8

Distance from Junction Points

From/to	Panama (in days)	Los Angeles (in days)	Kingston (in days)
New Orleans	1,444 3.5		
New York	2,018 4.9		1,474 3.6
Panama		2,913 7.1	594 1.5
Kingston	594 1.5		
Acajutla	833 2.0	2,131 5.2	
Corinto	683 1.7	2,281 5.6	
Los Angeles	2,913 7.1		
Singapore	10,505 25.7	7,867 19.3	
Keelung (Taiwan)	8,648 21.2	5,810 14.2	
Yokohama (Japan)	7,682 18.8	4,839 11.9	

Source National Imagery and Mapping Agency, USA, Tenth Edition 1999
in Sea miles, 1 Sea mile = 1.852 km
Average Speed of vessel 17 knots

ANNEX D

Distances Between Ports

Direct nautical distances

From/to	Puerto Cortés (in sm) (in days)	Puerto Castilla (in sm) (in days)	San Lorenzo (in sm) (in days)
New Orleans	916 2.2	894 2.2	2,189 5.4
New York	1,764 4.3	1,742 4.3	2,763 6.8
Singapore	<i>11,281</i> 27.6	<i>11,083</i> 27.2	9,760 23.9
Keelung (Taiwan)	9,424 23.1	9,226 22.6	7,903 19.4
Yokohama (Japan)	8,458 20.7	8,260 20.2	6,937 17.0

Note *Figures in italic are routes via the Panama Canal*

Service distances

From/to	Puerto Cortés (in sm) (in days)	Puerto Castilla (in sm) (in days)	San Lorenzo (in sm) (in days)
New Orleans	916 2.2	894 2.2	2,189 5.4
New York	1,764 4.3	1,742 4.3	2,763 6.8
Singapore	<i>12,045</i> 29.5	<i>11,847</i> 29.0	10,035 24.6
Keelung (Taiwan)	9,988 24.5	9,790 24.0	7,978 19.6
Yokohama (Japan)	9,017 22.1	8,819 21.6	7,007 17.2

Note *Figures in italic are routes via the Panama Canal*
Service of Atlantic ports via Kingston/ Panama/Los Angeles
Service of Pacific ports via Los Angeles

Distance to Junction Points

From/to	Puerto Cortés (in sm) (in days)	Puerto Castilla (in sm) (in days)	San Lorenzo (in sm) (in days)
Panama	776 1.9	578 1.4	745 1.8
Colon	733 1.8	535 1.3	793 1.9
Kingston	671 1.6	473 1.2	n.a. n.a.
Corinto	n.a. n.a.	n.a. n.a.	72 0.2
Puntarenas	n.a. n.a.	n.a. n.a.	329 0.8

Distance from Junction Points

From/to	Panama (in days)	Los Angeles (in days)	Kingston (in days)
New Orleans	1,444 3.5		
New York	2,018 4.9		1,474 3.6
Panama		2,913 7.1	594 1.5
Kingston	594 1.5		
Acajutla	833 2.0	2,131 5.2	
Corinto	683 1.7	2,281 5.6	
Los Angeles	2,913 7.1		
Singapore	10,505 25.7	7,867 19.3	
Keelung (Taiwan)	8,648 21.2	5,810 14.2	
Yokohama (Japan)	7,682 18.8	4,839 11.9	

Source National Imagery and Mapping Agency, USA, Tenth Edition 1999
in Sea miles, 1 Sea mile = 1.852 km
Average Speed of vessel 17 knots

ANNEX E

Transport Charges

Maritime Transport Container

from - to	USD	Type	Single shipment (t)	Distance (seamiles)	Dur
San Lorenzo - Taiwan/Far East	4,000	20'reefer	19	7,900	33
Puerto Cortés - Kaoshiung (Taiwan)	5,171	40'reefer	24	10,000	< 30
Puerto Cortés - Keelung (Taiwan)	5,371	40'reefer	24	10,000	< 30
Puerto Cortés - Yokohama (Japan)	5,375	40'reefer	24	9,000	< 30
Puerto Cortés - Singapore	5,750	40'reefer	24	12,000	< 30
Puerto Cortés - Yokohama	4,847	40'reefer	24	9,000	<30
Puerto Cortés - Keelung (Taiwan)	4,247	40'reefer	24	10,000	<30
Puerto Cortés - Singapore	3,847	40'reefer	24	12,000	<30
<i>Comparison</i>					
<i>Puerto Cortés - Newark</i>	3,790	40'reefer	24	1700	5 c
<i>Puerto Cortés - Long Beach</i>	3,940	40'reefer	24	3700	10
<i>Puerto Cortés - Taiwan</i>	4,000	40'dry	24	10000	26
<i>Puerto Cortés - Yokohama</i>	2,500	20'dry	18	9000	<30
<i>Chaluteca - Yokohama</i>	5,200	40'reefer	24	9000	<30
<i>Puerto Cortés - Yokohama</i>	2,600	20'dry	18	9000	45
Price estimation for the project (model input)	4,100	40'reefer container Puerto Cortés - Yokohama			
	3,900	40'reefer container San Lorenzo - Yokohama			

Source: Quotations from NYK, Maersk SeaLand, Hapag Lloyd, CSAV, Crowley and shipping agents (January 2001)

Note: All quotations include handling charges in both ports but free from delivery at the port of destination

Maritime Transport Foodstuff

... corn etc. as bulkshipment	USD	Type of shipment	Tons per shipment	Distance (seamiles)	Dur
New Orleans - Puerto Cortes	320,000	Bulk	15,000	916	2 c
New Orleans - Puerto Castilla	330,000	Bulk	15,000	1114	3 c
New Orleans - San Lorenzo via Panama Canal	750,000	Bulk	15,000	2190	7 c
... additives in standard container					
Miami - Puerto Cortés	2,267	20' container	20	800	2 c
Miami - Puerto Cortés	2,873	40' container	24	800	2 c
Miami - Puerto Cortés	2,377	45' container	28	800	2d

Note: Distance and Duration see Anexo 4

Note: All seafreight quotations include handling charges in both ports (loading and discharging)

Source: On containers = Crowley; on bulk shipment = estimation based on interviews

Annex E (continued)

Transport charges

Road Transport

from - to	USD	Type of shipment	Tons per shipment	Distance (kilometers)	Cost
Tegucigalpa - Puerto Cortes	500	40'reefer	22	303	1
Puerto Cortes - Tegucigalpa	543	40'reefer	22	303	1
San Pedro Sula - Puerto Qetzal	1,000	40'dry	22	700	1
San Pedro Sula - Puerto Cortés	250	40'reefer	22	57	4

San Pedro Sula - San Lorenzo	700	20'reefer	18	354	1
Tegucigalpa - Puerto Cortes	320	carga seca	18	303	1
Puerto Cortés - Quetzal	1,100	40'dry	22	700	1
Price estimation for the project (model input)	for any reefer container				1
	for any dry container				1
	for any carga seca not in container				1

Source: market interviews in January 2001

Price Information, Miscellaneous

Item	Miami	Puerto Cortés	San Pedro Sula
Handling cost container (per container)	150	180	
Surcharges Sea Transport (THC,Bunker,etc)		347	
Handling cost grain discharge (per ton)		5	
Theft Risk Surcharge Honduras (road transport)		39-50-61	
Surcharges Sea Transport (THC,Bunker,etc)		347	
Renting the truck head (per kilometer)			0.65
Renting a chassis (per kilometer)			0.25
Additional for energy for reefer transport (per kilometer)			0.30

Source: market interviews in January 2001

ANNEX F

Calculating the Sensitivity

Model Model to calculate principal cost of the logistics

Variables Quantities The model demands as input the quantities of ...
 ... foodstuff imported as bulk (corn) and in containers (additives)
 ... containers in export of meat (poultry or pork)

Rates The model demands as input the freight rates of ...
 ... bulk shipments of corn from the US Gulf
 ... container import (additives) from the USA
 ... container export (meat) to the Far East
 ... road transportation containers per kilometer
 ... road transportation of bulk grain per kilometer

Port The model demands as input the port of handling ...
 ... the bulk operation
 ... the container operation

Location The model demands the location of the farming facilities and the distance of these facilities to the port (s)

Output Cost The model calculates the cost as ...
 ... annual cost, broken down into its components (see below)
 ... cost per ton of meat exported

Layout The model presents the result per scenario as follows (example):

Location of the production >>	xxx	150	<< Distance to the port used
Sea freight >>	Sea foodstuff	3,000,000	<< Annual cost in USD
Inland freight >>	Road foodstuff	200,000	<< Annual cost in USD
Sea freight >>	Sea container	8,000,000	<< Annual cost in USD
Inland freight >>	Road container	400,000	<< Annual cost in USD
Total freight >>	Total p.a.	11,600,000	<< Annual cost in USD
Total freight >>	USD per t meat	336	<< USD per ton meat

Notes

- 1 Sea freight include all cost including port handling see Annex E
- 2 Inland freight include all cost including handling see Annex E
- 3 Distance to the ports are estimations see Annex B

Summary of 10 scenarios

Total Transport Cost per ton of Meat Exported

1. Pork meat

Scenario #	1	2	3	4	5	
Food via ...	Puerto Cortés	San Lorenzo	Puerto Castilla	Puerto Castilla	Puerto Cortés	
Container via ...	Puerto Cortés	San Lorenzo	Puerto Cortés	San Lorenzo	San Lorenzo	
Farm in ...						Average
... Cortés	274	464	335	352	291	343
... Aguán	363	551	300	317	380	382
... Comayagua	317	418	377	368	308	358
... Tegucigalpa	340	395	400	377	318	366
... Choluteca	363	374	423	387	328	375
Average	332	440	367	360	325	365

Source: See scenarios 1 - 5, attached

2. Chicken meat

Scenario #	6	7	8	9	10	
Food via ...	Puerto Cortés	San Lorenzo	Puerto Castilla	Puerto Castilla	Puerto Cortés	
Container via ...	Puerto Cortés	San Lorenzo	Puerto Cortés	San Lorenzo	San Lorenzo	
Farm in ...						Average
... Cortés	230	330	259	277	248	269
... Aguán	287	385	257	274	304	301
... Comayagua	258	301	286	277	249	274
... Tegucigalpa	272	286	300	278	250	277
... Choluteca	287	273	315	279	251	281
Average	267	315	283	277	260	280

Source: See scenarios 6 - 10, attached

Scenario 1	Type of meat	pork
-------------------	--------------	------

Quantities	Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
	Food import	133,272	132,000	53
	Meat export	34,552	0	1,571

Routing	Import of foodstuff is via ...	Puerto Cortés
	Export of meat is via ...	Puerto Cortés

Rates	Product	mode	tons/shipment	USD unit	shipments/year
	Corn	Sea freight	15,000	320,000 per shipment	8.8
		Road freight	24	1.00 per kilometer	5,500
	Additives	Sea freight	24	2,438 per shipment	53
		Road freight	24	1.25 per kilometer	53
	Pork meat	Sea freight	22	4,100 per shipment	1,571
		Road freight	22	1.50 per kilometer	1,571

Cost p.a.	Cortés	10
	Sea foodstuff	2,945,214
	Road foodstuff	55,663
	Sea container	6,439,236
	Road container	23,558
	Total p.a.	9,463,671
	<i>USD per t meat</i>	274

	Aguán	400
	Sea foodstuff	2,945,214
	Road foodstuff	2,226,500
	Sea container	6,439,236
	Road container	942,327
	Total p.a.	12,553,278
	<i>USD per t meat</i>	363

	Comayagua	200
	Sea foodstuff	2,945,214
	Road foodstuff	1,113,250
	Sea container	6,439,236
	Road container	471,164
	Total	10,968,864
	<i>USD per t meat</i>	317

	Tegucigalpa	300
	Sea foodstuff	2,945,214
	Road foodstuff	1,669,875
	Sea container	6,439,236
	Road container	706,745
	Total p.a.	11,761,071
	<i>USD per t meat</i>	340

	Choluteca	400
	Sea foodstuff	2,945,214
	Road foodstuff	2,226,500
	Sea container	6,439,236
	Road container	942,327
	Total	12,553,278
	<i>USD per t meat</i>	363

Scenario 2

Type of meat	pork
--------------	------

Quantities

Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
Food import	133,272	132,000	53
Meat export	34,552	0	1,571

Routing

Import of foodstuff is via ...	San Lorenzo
Export of meat is via ...	San Lorenzo

Rates

Product	mode	tons/shipment	USD unit	shipments/year
Corn	Sea freight	15,000	750,000 per shipment	8.8
	Road freight	24	1.00 per kilometer	5,500
Additives	Sea freight	24	2,438 per shipment	53
	Road freight	24	1.25 per kilometer	53
Pork meat	Sea freight	22	3,900 per shipment	1,571
	Road freight	22	1.50 per kilometer	1,571

Cost p.a.

Cortés	400
Sea foodstuff	6,729,214
Road foodstuff	2,226,500
Sea container	6,125,127
Road container	942,327
Total p.a.	16,023,169
<i>USD per t meat</i>	464

Aguán	780
Sea foodstuff	6,729,214
Road foodstuff	4,341,675
Sea container	6,125,127
Road container	1,837,538
Total p.a.	19,033,554
<i>USD per t meat</i>	551

Comayagua	200
Sea foodstuff	6,729,214
Road foodstuff	1,113,250
Sea container	6,125,127
Road container	471,164
Total	14,438,755
<i>USD per t meat</i>	418

Tegucigalpa	100
Sea foodstuff	6,729,214
Road foodstuff	556,625
Sea container	6,125,127
Road container	235,582
Total p.a.	13,646,548
<i>USD per t meat</i>	395

Choluteca	10
Sea foodstuff	6,729,214
Road foodstuff	55,663
Sea container	6,125,127
Road container	23,558
Total	12,933,562
<i>USD per t meat</i>	374

Scenario 3

Type of meat	pork
--------------	------

Quantities	Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
Food import		133,272	132,000	53
Meat export		34,552	0	1,571

Routing		
Import of foodstuff in bulk is via ...		Puerto Castilla
Import of foodstuff in container is via ...		Puerto Cortés
Export of meat is via ...		Puerto Cortés

Rates	Product	mode	tons/shipment	USD unit	shipments/year
Corn		Sea freight	15,000	315,000 per shipment	8.8
		Road freight	24	1.00 per kilometer	5,500
Additives		Sea freight	24	2,438 per shipment	53
		Road freight	24	1.25 per kilometer	53
Pork meat		Sea freight	22	4,100 per shipment	1,571
		Road freight	22	1.50 per kilometer	1,571

Cost p.a.	Cortés	400	Aguán	10
Sea foodstuff		2,901,214	Sea foodstuff	2,901,214
Road foodstuff		2,200,663	Road foodstuff	81,500
Sea container		6,439,236	Sea container	6,439,236
Road container		23,558	Road container	942,327
Total p.a.		11,564,671	Total p.a.	10,364,278
<i>USD per t meat</i>		335	<i>USD per t meat</i>	300
	Comayagua	580		
Sea foodstuff		2,901,214		
Road foodstuff		3,203,250		
Sea container		6,439,236		
Road container		471,164		
Total		13,014,864		
<i>USD per t meat</i>		377		

	Tegucigalpa	680
Sea foodstuff		2,901,214
Road foodstuff		3,759,875
Sea container		6,439,236
Road container		706,745
Total p.a.		13,807,071
<i>USD per t meat</i>		400
	Choluteca	780
Sea foodstuff		2,901,214
Road foodstuff		4,316,500
Sea container		6,439,236
Road container		942,327
Total		14,599,278
<i>USD per t meat</i>		423

Scenario 4

Type of meat	pork
--------------	------

Quantities	Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
	Food import	133,272	132,000	53
	Meat export	34,552	0	1,571

Routing	Import of foodstuff in bulk is via ...	Puerto Castilla
	Import of foodstuff in container is via ...	Puerto Cortés

Rates	Export of meat is via ...		San Lorenzo		
	Product	mode	tons/shipment	USD unit	shipments/year
Corn		Sea freight	15,000	315,000 per shipment	8.8
		Road freight	24	1.00 per kilometer	5,500
Additives		Sea freight	24	2,438 per shipment	53
		Road freight	24	1.25 per kilometer	53
Pork meat		Sea freight	22	3,900 per shipment	1,571
		Road freight	22	1.50 per kilometer	1,571

Cost p.a.	Cortés	400	Aguán	10
	Sea foodstuff	2,901,214	Sea foodstuff	2,901,214
	Road foodstuff	2,200,663	Road foodstuff	81,500
	Sea container	6,125,127	Sea container	6,125,127
	Road container	942,327	Road container	1,837,538
	Total p.a.	12,169,331	Total p.a.	10,945,379
	<i>USD per t meat</i>	352	<i>USD per t meat</i>	317

Comayagua	580
Sea foodstuff	2,901,214
Road foodstuff	3,203,250
Sea container	6,125,127
Road container	471,164
Total	12,700,755
<i>USD per t meat</i>	368

Tegucigalpa	680
Sea foodstuff	2,901,214
Road foodstuff	3,759,875
Sea container	6,125,127
Road container	235,582
Total p.a.	13,021,798
<i>USD per t meat</i>	377

Choluteca	780
Sea foodstuff	2,901,214
Road foodstuff	4,316,500
Sea container	6,125,127
Road container	23,558
Total	13,366,399
<i>USD per t meat</i>	387

Scenario 5	Type of meat	pork
-------------------	--------------	------

Quantities	Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
	Food import	133,272	132,000	53
	Meat export	34,552	0	1,571

Routing	Import of foodstuff is via ...	Puerto Cortés
	Export of meat is via ...	San Lorenzo

Rates	Product	mode	tons/shipment	USD	unit	shipments/year
	Corn	Sea freight	15,000	320,000	per shipment	8.8
		Road freight	24	1.00	per kilometer	5,500
	Additives	Sea freight	24	2,438	per shipment	53
		Road freight	24	1.25	per kilometer	53
	Pork meat	Sea freight	22	3,900	per shipment	1,571
		Road freight	22	1.50	per kilometer	1,571

Cost p.a.	Cortés	10	Aguán	400
	Sea foodstuff	2,945,214	Sea foodstuff	2,945,214
	Road foodstuff	55,663	Road foodstuff	2,226,500
	Sea container	6,125,127	Sea container	6,125,127
	Road container	942,327	Road container	1,837,538
	Total p.a.	10,068,331	Total p.a.	13,134,379
	USD per t meat	291	USD per t meat	380

Comayagua	200
Sea foodstuff	2,945,214
Road foodstuff	1,113,250
Sea container	6,125,127
Road container	471,164
Total	10,654,755
USD per t meat	308

Tegucigalpa	300
Sea foodstuff	2,945,214
Road foodstuff	1,669,875
Sea container	6,125,127
Road container	235,582
Total p.a.	10,975,798
USD per t meat	318

Choluteca	400
Sea foodstuff	2,945,214
Road foodstuff	2,226,500
Sea container	6,125,127
Road container	23,558
Total	11,320,399
USD per t meat	328

Scenario 6

Type of meat	chicken
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Quantities	Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
Food import		235,498	231,000	187
Meat export		127,296	0	5,786

Routing	Import of foodstuff is via ...	Puerto Cortés
	Export of meat is via ...	Puerto Cortés

Rates	Product	mode	tons/shipment	USD unit	shipments/year
Corn		Sea freight	15,000	320,000 per shipment	15.4
		Road freight	24	1.00 per kilometer	9,625
Additives		Sea freight	24	2,438 per shipment	187
		Road freight	24	1.25 per kilometer	187
Chicken meat		Sea freight	22	4,100 per shipment	5,786
		Road freight	22	1.50 per kilometer	5,786

Cost p.a.	Cortés	10
	Sea foodstuff	5,384,922
	Road foodstuff	98,593
	Sea container	23,723,345
	Road container	86,793
	Total p.a.	29,293,653
	USD per t meat	230
	Comayagua	200
	Sea foodstuff	5,384,922
	Road foodstuff	1,971,854
	Sea container	23,723,345
	Road container	1,735,855
	Total	32,815,976
	USD per t meat	258

	Aguán	400
	Sea foodstuff	5,384,922
	Road foodstuff	3,943,708
	Sea container	23,723,345
	Road container	3,471,709
	Total p.a.	36,523,685
	USD per t meat	287

	Tegucigalpa	300
	Sea foodstuff	5,384,922
	Road foodstuff	2,957,781
	Sea container	23,723,345
	Road container	2,603,782
	Total p.a.	34,669,830
	USD per t meat	272

	Choluteca	400
	Sea foodstuff	5,384,922
	Road foodstuff	3,943,708

	Sea container	23,723,345
	Road container	3,471,709
	Total	36,523,685
	<i>USD per t meat</i>	<i>287</i>
Scenario 7	Type of meat	chicken

Quantities	Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
	Food import	235,498	231,000	187
	Meat export	127,296	0	5,786

Routing	Import of foodstuff is via ...	San Lorenzo
	Export of meat is via ...	San Lorenzo

Rates	Product	mode	tons/shipment	USD unit	shipments/year
	Corn	Sea freight	15,000	750,000 per shipment	15.4
		Road freight	24	1.00 per kilometer	9,625
	Additives	Sea freight	24	2,438 per shipment	187
		Road freight	24	1.25 per kilometer	187
	Chicken meat	Sea freight	22	3,900 per shipment	5,786
		Road freight	22	1.50 per kilometer	5,786

Cost p.a.	Cortés	400		Aguán	780
	Sea foodstuff	12,006,922		Sea foodstuff	12,006,922
	Road foodstuff	3,943,708		Road foodstuff	7,690,231
	Sea container	22,566,109		Sea container	22,566,109
	Road container	3,471,709		Road container	6,769,833
	Total p.a.	41,988,448		Total p.a.	49,033,095
	<i>USD per t meat</i>	<i>330</i>		<i>USD per t meat</i>	<i>385</i>

Comayagua	200
Sea foodstuff	12,006,922
Road foodstuff	1,971,854
Sea container	22,566,109
Road container	1,735,855
Total	38,280,740
<i>USD per t meat</i>	<i>301</i>

Tegucigalpa	100
Sea foodstuff	12,006,922
Road foodstuff	985,927
Sea container	22,566,109
Road container	867,927
Total p.a.	36,426,885
<i>USD per t meat</i>	<i>286</i>
Choluteca	10
Sea foodstuff	12,006,922
Road foodstuff	98,593
Sea container	22,566,109

	Road container	86,793
	Total	34,758,416
	<i>USD per t meat</i>	<i>273</i>
Scenario 8	Type of meat	chicken

Quantities	Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
	Food import	235,498	231,000	187
	Meat export	127,296	0	5,786

Routing	Import of foodstuff in bulk is via ...	Puerto Castilla
	Import of foodstuff in container is via ...	Puerto Cortés
	Export of meat is via ...	Puerto Cortés

Rates	Product	mode	tons/shipment	USD unit	shipments/year
	Corn	Sea freight	15,000	315,000 per shipment	15.4
		Road freight	24	1.00 per kilometer	9,625
	Additives	Sea freight	24	2,438 per shipment	187
		Road freight	24	1.25 per kilometer	187
	Chicken meat	Sea freight	22	4,100 per shipment	5,786
		Road freight	22	1.50 per kilometer	5,786

Cost p.a.	Cortés	400		Aguán	10
	Sea foodstuff	5,307,922		Sea foodstuff	5,307,922
	Road foodstuff	3,852,343		Road foodstuff	189,958
	Sea container	23,723,345		Sea container	23,723,345
	Road container	86,793		Road container	3,471,709
	Total p.a.	32,970,403		Total p.a.	32,692,935
	<i>USD per t meat</i>	<i>259</i>		<i>USD per t meat</i>	<i>257</i>
	Comayagua	580			
	Sea foodstuff	5,307,922			
	Road foodstuff	5,629,354			
	Sea container	23,723,345			
	Road container	1,735,855			
	Total	36,396,476			
	<i>USD per t meat</i>	<i>286</i>			

	Tegucigalpa	680
	Sea foodstuff	5,307,922
	Road foodstuff	6,615,281
	Sea container	23,723,345
	Road container	2,603,782
	Total p.a.	38,250,330
	<i>USD per t meat</i>	<i>300</i>
	Choluteca	780
	Sea foodstuff	5,307,922
	Road foodstuff	7,601,208
	Sea container	23,723,345
	Road container	3,471,709

Total	40,104,185
<i>USD per t meat</i>	315

Scenario 9	Type of meat	chicken
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Quantities	Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
	Food import	235,498	231,000	187
	Meat export	127,296	0	5,786

Routing	Import of foodstuff in bulk is via ...	Puerto Castilla
	Import of foodstuff in container is via ...	Puerto Cortés
	Export of meat is via ...	San Lorenzo

Rates	Product	mode	tons/shipment	USD unit	shipments/year
	Corn	Sea freight	15,000	315,000 per shipment	15.4
		Road freight	24	1.00 per kilometer	9,625
	Additives	Sea freight	24	2,438 per shipment	187
		Road freight	24	1.25 per kilometer	187
	Chicken meat	Sea freight	22	3,900 per shipment	5,786
		Road freight	22	1.50 per kilometer	5,786

Cost p.a.	Cortés	400
	Sea foodstuff	5,307,922
	Road foodstuff	3,852,343
	Sea container	22,566,109
	Road container	3,471,709
	Total p.a.	35,198,083
	<i>USD per t meat</i>	277
	Comayagua	580
	Sea foodstuff	5,307,922
	Road foodstuff	5,629,354
Sea container	22,566,109	
Road container	1,735,855	
Total	35,239,240	
<i>USD per t meat</i>	277	

	Aguán	10
	Sea foodstuff	5,307,922
	Road foodstuff	189,958
	Sea container	22,566,109
	Road container	6,769,833
	Total p.a.	34,833,822
	<i>USD per t meat</i>	274

	Tegucigalpa	680
	Sea foodstuff	5,307,922
	Road foodstuff	6,615,281
	Sea container	22,566,109
	Road container	867,927
	Total p.a.	35,357,239
	<i>USD per t meat</i>	278

	Choluteca	780
	Sea foodstuff	5,307,922
	Road foodstuff	7,601,208
	Sea container	22,566,109
	Road container	86,793

Total	35,562,032
USD per t meat	279

Scenario 10 Type of meat chicken

Quantities p.a.	(t) p.a.	... as bulk (t)	..container (unit)
Food import	235,498	231,000	187
Meat export	127,296	0	5,786

Routing	Import of foodstuff is via ...	Puerto Cortés
	Export of meat is via ...	San Lorenzo

Rates	Product	mode	tons/shipment	USD unit	shipments/year
Corn		Sea freight	15,000	320,000 per shipment	15.4
		Road freight	24	1.00 per kilometer	9,625
Additives		Sea freight	24	2,438 per shipment	187
		Road freight	24	1.25 per kilometer	187
Chicken meat		Sea freight	22	3,900 per shipment	5,786
		Road freight	22	1.50 per kilometer	5,786

Cost p.a.

Cortés	10
Sea foodstuff	5,384,922
Road foodstuff	98,593
Sea container	22,566,109
Road container	3,471,709
Total p.a.	31,521,333
Comayagua	200
Sea foodstuff	5,384,922
Road foodstuff	1,971,854
Sea container	22,566,109
Road container	1,735,855
Total	31,658,740
USD per t meat	249

Aguán	400
Sea foodstuff	5,384,922
Road foodstuff	3,943,708
Sea container	22,566,109
Road container	6,769,833
Total p.a.	38,664,572

Tegucigalpa	300
Sea foodstuff	5,384,922
Road foodstuff	2,957,781
Sea container	22,566,109
Road container	867,927
Total p.a.	31,776,739
USD per t meat	250
Choluteca	400
Sea foodstuff	5,384,922
Road foodstuff	3,943,708
Sea container	22,566,109
Road container	86,793
Total	31,981,532
USD per t meat	251

ANNEX G

Import of Meat into Japan 1999

1. Pork Meat

From country	Value in '000 USD	Quantity in t	Import price USD/t	Import price USD/kg
USA	815,235	171,785	4,746	4.75
Denmark	802,803	174,582	4,598	4.60
Canada	435,073	94,700	4,594	4.59
Korea	384,327	81,274	4,729	4.73
Mexico	174,655	36,817	4,744	4.74
Netherlands	68,397	14,738	4,641	4.64
Others	179,545	38,537	4,659	4.66
Total	2,860,035	612,433	4,670	4.67

2. Chicken Meat

From country	Value in '000 USD	Quantity in t	Import price USD/t	Import price USD/kg
Bone-in-legs				
USA	71,226	70,611	1,009	1.01
Thailand	11,294	6,393	1,767	1.77
Others	8,799	5,134	1,714	1.71
Subtotal	91,319	82,138	1,112	1.11
Other Meat				
China	374,552	212,348	1,764	1.76
Thailand	245,815	124,250	1,978	1.98
Brazil	168,704	97,169	1,736	1.74
USA	52,810	34,133	1,547	1.55
Others	5,763	3,129	1,842	1.84
Subtotal		471,029	0	0.00
Grand total	91,319	553,167	165	0.17

Source: Custom Statistics of Japan, quoted by Mr. Toshiyuki Honda, FPX

ANNEX H

LIST OF INTERVIEWS

Nombre de la Empresa	Contacto	Teléfono	Fax	E-mail	Dirección
Comisión Nacional Supervisora de los Servicios Públicos	Rosalba Ramos	236-6212	236-6490	cnssp@optinet.hn	Castaño Sur Bloque F
Dippsa	Roberto Cardona	233-2246	234-4608		
Crowley Liner Services	Enna Duarte de Andino	225-1305	225-4883	andined@crowley.com	Zona Tiloarque Blvd. Fuerzas
Maersk Sealand	Elsenora Galindo	225-5532	225-5594	www.maersksealand.dk	Plaza Milenium 2do Piso Loc:
NYK Nippon Yusen Kaisha (Seposa)	Horst Jepsen	237-8000	237-1817	seposa@gbm.hn	Fte. Hospital Viera Edif. Plaz
Secretaria de Agricultura y Ganadería	Guillermo Alvarado D.	231-1921	232-5375	galvarad@dis-net.com	Edif. Recursos Naturales al P Injupem
Fedecamara	José Danilo Romero	232-1870	232-1870	fcamara.danilo@sigmanet.hn	Edif. Castañito 2do Nivel 6ta Edif. Los Próceres Ave. La P 18
Seabord Marine	Luis Vigil	220-6230	220-6245		
Global	Vilma Saucedo	239-4408	239-4408	globaltg@netsys.hn	Edif. Florencia 4to Piso # 406
Solymar	Aura Estela Rivera	239-5549	239-5550		Col. Palmira Calzada Brasilia
Emtrateca	Carlos Fonseca	227-3643	227-3143		Bld. Fuerzas Armadas Conti Shell
Marítima y Transportes Honduras	Holger R. Peters	553-4900	553-3730	hpeters@sigmanet.hn	Carretera Vieja La Lima Cont Smart
FPX	Medardo Galindo	566-3794	566-3852	fpx.honduras@mayanet.hn	Contiguo Academia Americar
Grupo Alcon	Bruce Burdeth	574-9668	574-8267	bruce_burdett@cargill.com	Búfalo, Villanueva Atrás de C
Tropical Shipping	Xiomara Osejo	550-9531	550-2333 805-7629	nubia@netsys.hn	Edif. Soler 7ave. 2 y 3 Calle N Guamilito
GMI	Roberto Bobadilla	557-9666	557-8876	rbob@netsys.hn	Edif. Plaza Local 11-A. San P 2da Calle 1era y 2da Ave. N.E Plaza 19-A
AHCORENA	Holger R. Peters	552-9094	552-4412	ahcorena@sigmanet.hn	
FPX	Toshiyuki Honda	566-3794	566-3852	fpx.honduras@mayanet.hn	Contiguo Academia Americar
Transportes H. Diaz	Emilio Arita	553-1357	550-2631		8 Ave.SO. 15 Calle 136 Bo. P Barahona
ANAVE	Leticia Beuth	553-2570	552-2192	anaveops@netsys.hn	Salida Vieja a La Lima
Hapag-Lloyd-Nordana Line	John Kiebitz	553-2570	552-2192	anavepco@netsys.hn	Salida Vieja a La Lima
Empresa Nacional Portuaria	Lic. Ravinou	238-3868	238-1570		Edif. Midence Soto 3er Piso L
Empresa Nacional Portuaria	Marvin Arias	881-2127	881-2145		Puerto de San Lorenzo