

Rural transport of food products in Central America and Panama

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The situation in Central America and Panama

High-quality agricultural production is the only guarantee of product competitiveness in domestic and international markets. Production and management must be very demanding where a high-quality product meeting consumer requirements is the target. Proper management is the key to maintaining the quality of perishable food products from harvest to final consumer.

From farm-gate to market, a food product has to be transported. Farmers employ a wide range of solutions: horses, carts, boats, small vehicles, truck, buses and other means. The transport chosen requires serious consideration. High costs and losses ensue where transport is not timely and well managed. Only very few farmers own vehicles for transporting goods to market. Those living in areas far from population centres tend to combine their own means of transportation (which may be a horse, boat, or something else), with hired transport.

For people moving food to market for immediate consumption, the goal is to arrive on time. The main impact of transport on the quality of agricultural products concerns the widespread lack of awareness of the correct food management, packing and transport practices for market.

Farmers are often unschooled in the minimum technical needs of food handling and packing. What they mostly want is just to get their goods to market – the quality of the goods is secondary. What some want is to get the maximum amount of produce to market and sold. This is particularly true of farmers paying freight costs, and who want to earn as much as possible from the sale of their products.

Transport options and sales points are the twin pillars of all operations designed to deliver agricultural products to the consumer via the various marketing channels. A spiralling rise in performance is essential for the opening of new markets and the use of more highly developed means of transport or improving existing technologies.

The general condition of the means of transport in use is one of the most important issues for the transport sector. These conditions include problems with sanitation, how the product is handled for transport to ensure it arrives at its destination in perfect condition, and whether transport is available at the right time to avoid reaching the market at a time of oversupply. Poor product quality and general labour chain disorganization, which is economically disadvantageous all down the line, are further issues.

All agricultural products need to be moved from one place to another. They need to be moved from the farm or orchard to market, whether the goal is immediate consumption or industrial processing. The transport stage is a very important step in the food chain. It may seem simple, but the process of loading a vehicle and reaching the market often entails details which farmers may fail to note. On unpaved roads and poorly maintained paved roads, goods are jostled and compressed. This combines with poor farmer handling practice to alter the integrity and quality of the product. An estimated ten percent of food product losses occur during transport.

Overland, maritime or air transport are the three different modes for moving agricultural products. Which of the three is chosen depends on such factors as destination, economic value, duration, amount, local temperature and humidity, time to final destination, availability, and the cost and quality of transport. In Central America and Panama, beasts of burden are still used to reach the nearest collection centre. Trucks may cover distances of over 200 km to deliver the product to buyers for distribution among the district markets of the capital cities of the region.

The farmer copes one way or another with these factors. The usual solution, however, is for an intermediary to take responsibility for getting the goods to market and negotiating at the farm gate. When the producer transports the goods on his own, he must assume the losses of raw materials

during transport. Otherwise the intermediary absorbs this cost, covering it with his own gains.

This is why many farmers prefer to deal directly with intermediaries, at once resolving the problem of losses and the fear that their product may not be well received in the market.

This study on the Central American and Caribbean region is intended as an input for planning and decision-making by high-level technical or strategic staff and authorities involved in planning, management, support or advisory services addressing the problems and needs of improving food transport for rural communities. It may also serve as a tool for acquiring a strategic overview of how to more efficiently transport food products from farm to market (and to consumers). Lastly, it may be useful as a methodological reference for specialized country studies on the definitive factors, variables and indicators affecting rural transport of food products in Central America and Panama where improvement plans and programmes are in the pipeline.

METHODOLOGY

The methodology used to prepare this study is described as follows:

- a Rapid Field Appraisal was prepared in different parts of Guatemala covering the rural transport of agricultural products (Table 1);
- a survey was carried out in Guatemala among producers, carriers and business people located in rural areas. Observation tours were also made of the collection centres for food products (Cooperativa Agrícola 4 Pinos, R.L.); wholesale markets (Central de Mayoreo, CENMA); regional markets of the municipal seats of Mazatenango, Retalhuleu, Santa Cruz del Quiché, Sololá, Jutiapa and Chiquimula, and local and district markets in the municipalities of these departments;
- the analysis was documented by photographing the food products from harvest to their transport to local markets;
- visits were made in Guatemala to government bodies concerned with food transport. These included the Ministry of Agriculture, Livestock and Food, the National Fund for Peace (FONAPAZ), the Regional International Organization for Plant Protection and Animal Health (OIRSA) and the Ministry of Economy;
- the last step was an exhaustive review of the literature relevant to the topic and or related Web pages.

TABLE 1
Form used for Rapid Field Appraisal to evaluate rural transport of agricultural products in Guatemala

General information: _____ Date: _____		
Name of producer: _____		
Place: _____		
Type of product: _____		
Fruit	1	<input type="checkbox"/>
Vegetables	2	<input type="checkbox"/>
Pulses	3	<input type="checkbox"/>
Cereals	4	<input type="checkbox"/>
Semi-processed	5	<input type="checkbox"/>
2. Product information:		
Own production	1	<input type="checkbox"/>
Purchased	2	<input type="checkbox"/>
Both	3	<input type="checkbox"/>
How much do you produce? ¹		
1-25 q	1	<input type="checkbox"/>
26-75 q	2	<input type="checkbox"/>
76-150 q	3	<input type="checkbox"/>
Over 151 q	4	<input type="checkbox"/>
How much do you purchase?		
1-74 q	1	<input type="checkbox"/>
26-75 q	2	<input type="checkbox"/>
76-150 q	3	<input type="checkbox"/>
Over 151 q	4	<input type="checkbox"/>
How do you rate the quality of your product?		
First	1	<input type="checkbox"/>
Second	2	<input type="checkbox"/>
Third	3	<input type="checkbox"/>
3. Transport information:		
Own	1	<input type="checkbox"/>
Hired	2	<input type="checkbox"/>
Other	3	<input type="checkbox"/>
What type of vehicle do you use to transport your products?		
Pick-up truck	1	<input type="checkbox"/>
Truck	2	<input type="checkbox"/>
Trailer	3	<input type="checkbox"/>
Is your product refrigerated during transport?		
Yes	1	<input type="checkbox"/>
No	2	<input type="checkbox"/>
Condition of the vehicle you use?		
Excellent	1	<input type="checkbox"/>
Good	2	<input type="checkbox"/>
Fair	3	<input type="checkbox"/>
Poor	4	<input type="checkbox"/>
How do you rate the cost of the transport you use?		
High	1	<input type="checkbox"/>
Average	2	<input type="checkbox"/>
Low	3	<input type="checkbox"/>

¹ q = quintal = 100 pounds = 45,36 kg

TABLE 1
Form used for Rapid Field Appraisal to evaluate rural transport of agricultural products in Guatemala (Continued)

How do you rate the transport supply?		
Good	1	<input type="checkbox"/>
Average	2	<input type="checkbox"/>
Poor	3	<input type="checkbox"/>
4. Marketing channels:		
Who buys your product?		
Middleman	1	<input type="checkbox"/>
Final consumer	2	<input type="checkbox"/>
Quantity purchased?		
Under 1 q	1	<input type="checkbox"/>
2-10 q	2	<input type="checkbox"/>
11-50 q	3	<input type="checkbox"/>
Over 50 q	4	<input type="checkbox"/>
5. Where do you take your product?		
Market:		
Local	1	<input type="checkbox"/>
Regional	2	<input type="checkbox"/>
Capital	3	<input type="checkbox"/>
International	4	<input type="checkbox"/>
Condition of market where you take your product?		
Excellent	1	<input type="checkbox"/>
Good	2	<input type="checkbox"/>
Fair	3	<input type="checkbox"/>
Poor	4	<input type="checkbox"/>
6. Is your product affected by road delays?		
Yes	1	<input type="checkbox"/>
No	2	<input type="checkbox"/>
7. Accidents?		
Very frequent?		
Yes	1	<input type="checkbox"/>
No	2	<input type="checkbox"/>
Reason?		
Speeding	1	<input type="checkbox"/>
Collision	2	<input type="checkbox"/>
Overloading	3	<input type="checkbox"/>
Lack of vehicle maintenance	4	<input type="checkbox"/>
Has your product been stolen during transport?		
Yes	1	<input type="checkbox"/>
No	2	<input type="checkbox"/>
How often?		
8. Road infrastructure		
Type of road on which your product is transported?		
Unpaved	1	<input type="checkbox"/>
Paved	2	<input type="checkbox"/>
Asphalt	3	<input type="checkbox"/>
Road conditions?		
Excellent	1	<input type="checkbox"/>
Average	2	<input type="checkbox"/>
Poor	3	<input type="checkbox"/>

TABLE 1

Form used for Rapid Field Appraisal to evaluate rural transport of agricultural products in Guatemala (Continued)

How far from production site to market?		
0 to 50 km	1	<input type="checkbox"/>
51 to 100 km	2	<input type="checkbox"/>
101 to 200 km	3	<input type="checkbox"/>
9. Effect of weather on transport		
Are you affected by lack of rainfall?		
Yes	1	<input type="checkbox"/>
No	2	<input type="checkbox"/>
In what way?		
Are you affected by excessive rainfall?		
Yes	1	<input type="checkbox"/>
No	2	<input type="checkbox"/>
In what way?		
10. Are you damaged during transport?		
Type of damage:		
Physical	1	<input type="checkbox"/>
Chemical	2	<input type="checkbox"/>
Biological	3	<input type="checkbox"/>
Extent of losses during transport?		
10%	1	<input type="checkbox"/>
25%	2	<input type="checkbox"/>
50%	3	<input type="checkbox"/>
100%	4	<input type="checkbox"/>
What do you do with the damaged product?		
Throw it away	1	<input type="checkbox"/>
Give it away	2	<input type="checkbox"/>
Process it	3	<input type="checkbox"/>
Do you believe there is some chance of developing a processing industry in your area for rejected or damaged products, or when there is overproduction?		
Yes	1	<input type="checkbox"/>
No	2	<input type="checkbox"/>
How could you help make this come about?		

Analysis of rural transport systems for food products in Central America and Panama

REGIONAL ECONOMIC, POLITICAL AND SOCIAL CONTEXT

The rapid pace and depth of change in Central America and Panama in recent years will have repercussions on present and future generations. The outstanding features of this change are globalization, the evolution and growth of science and technology (especially information and communications), and the growth and/or stagnation of social inequity and the gap between the haves and the have-nots. Some feel that the major challenge faced by Central America in the 1990s was the social impact of the “lost decade” crisis (1980) that played out against a backdrop of officially enacted stabilization and macroeconomic adjustment policies. For most Central Americans of that generation, the future was one of poverty, social and economic marginalization, inequity, and ecological decline. The situation was worse in countries such as El Salvador, Guatemala and Nicaragua, which also faced very unstable situations of domestic turmoil.

Existing problems of poverty, marginality, the skewed distribution of power and income, and the presence of hunger and undernutrition have only increased (though not at the same rate) throughout Central America since the “lost decade”. The Central American isthmus has lived through a time of social, economic and political transformation derived from the periods of boom and bust experienced by all these countries, though not to the same extent. In this scenario, policies of globalization, structural adjustment, stabilization and technological progress have brought about the rapid modernization of economies, a leaner and less powerful public sector, and the compression of social development initiatives: public health, food and nutrition have also undergone major alterations.

The 1990 decade consolidated a process of structural reforms in the commercial, financial, labour and social security areas, unevenly paced by area and by country. The results achieved

by the end of the decade, some positive and some negative, cannot be attributed solely to these reforms. They also reflect effects related to the international context and other regional processes that arose out of the debt crisis, and which were still having repercussions. They also depended on deep structural factors inherent in the historical framework of the isthmus, such as the high concentration of wealth and power in few hands, and its deeply segmented societies. Positive achievements in the social sphere included increased public spending, and efforts to restructure social services and improve the efficiency, accountability and effectiveness of public spending. In the political sphere, positive features included the rebirth of local life, the spread of democratic systems and the conquest of rights, visibility and recognition on the part of women.

The performance of Central American economies improved especially in 1990 and 1991. This was due to a combination of high economic growth thanks to a dynamic external trade sector, falling inflation, the reestablishment of domestic price and exchange systems, higher income levels and the correction of fiscal imbalances.

The data clearly show that many Latin American and Caribbean economies experienced recession in the second half of 1998 and in 1999, but on the whole Central America performed well. The exception was Honduras, which had negative growth in 1999. Generally speaking, the external sectors of all Central American economies have been expanding. This is fundamentally a result of the development of assembly industries aimed at the United States of America market, including traditional articles and electronic products. It needs to be pointed out, however, that the export base of Central American economies is still not very diversified.

Inflation has fallen, stabilizing at the lowest level in fifty years. Inflation fell from nearly 900 percent in 1993 to some 9.6 percent in 1999 for Latin America as a whole. Only Costa Rica and

Honduras are slightly above the regional average, whereas all other Central American countries can boast one-digit inflation rates.

Despite progress in economic recovery and major changes in such variables as life expectancy at birth, infant mortality, adult literacy and real per capita GDP (Tables 2 and 4) in the last 25 years for each and every country of Central America, one outstanding problem remains. An analysis of the food and nutrition situation reveals poverty as both a determinant and a consequence of prevalent levels of hunger and undernutrition in the subregion. The observed levels of food insecurity of large majorities of people living in the isthmus and their impoverishment are linked factors.

As indicated above, economic growth has occurred, but not at a level sufficient to breach the gap with the developed countries and do away with poverty. ECLAC calculations show that an annual growth rate of six to seven percent is necessary to reach this objective. Moreover, the domestic distribution of the fruits of this growth continues to be inequitable in all countries of the region, and the result is high rates of poverty. According to ECLAC, Latin America is the region with the least fair distribution of wealth or the “most extreme polarization of distribution in the world”, with ten percent of the richest households receiving 40 percent of all income.

It is also worthwhile to review government efforts in each country with respect to social development. One important explanation for the low levels of government investment in the social sector is the situation of the external debt with respect to the size of the economy. First we need to highlight the slowdown in growth of the external debt in these countries during that decade. In 1998 Panama with nearly 7 999 million US dollars of debt had liabilities amounting to 57 percent of its GDP. In 1999 Honduras owed the equivalent of 88 percent of its GDP and Nicaragua had a debt three times the size of its GDP. Belize, Costa Rica, El Salvador and Guatemala had manageable external debts. However, during the period 1991–1999, all countries showed an improvement in the ratio of the cost of the debt compared to GDP. Costa Rica, Honduras and Nicaragua made major efforts in this area. It is worth mentioning that the figure for debt servicing as a percentage of GDP rose from 1980 to 1988, especially in El Salvador, Guatemala, Honduras and Nicaragua (Tables 2 and 3).

The analysis of social expenditure shows that Latin America as a whole has seen a growing

TABLE 2
Central America: per capita growth of GDP during the second half of the twentieth century (average annual growth rates)

Decade	Annual per capita regional GDP growth rate (a)	Annual per capita regional GDP growth rate (b)	Annual per capita regional GDP growth rate (c)
1950 – 1960	1.7	2.1	1.7
1960 – 1970	2.9	2.6	3.1
1970 – 1980	1.7	2.1	0.5
1980 – 1990	-2.0	-1.1	-3.2
1990 – 1996	1.7	1.1	2.0

a) Includes five countries: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. No information on Belize and Panama.

b) Costa Rica and Honduras (countries without armed conflict).

c) Guatemala, El Salvador and Nicaragua (countries with armed conflict)

Source: State of the Region Report, UNDP 1999.

TABLE 3
GDP growth rate (%)

Country	1997	1998	1999
Costa Rica	3.7	5.5	4.5
El Salvador	4.0	3.5	3.5
Guatemala	4.3	4.7	3.9
Honduras	4.7	3.0	-1.8
Nicaragua	5.1	4.0	6.1
TOTAL	4.4	4.1	3.3

Source: State of the Region Report. UNDP 1999.

channelling of public spending into social expenditure, which rose from 10.1 percent of GDP in 1990–1991 to 12.4 percent in 1996–1997. This was a historical high for the region. In Central America and Panama, however, the effort would appear to remain insufficient. The data on per habitant social cost trends in the long-term clearly show that the significant rises in the 1990s allowed only Belize, Costa Rica and Panama to achieve spending levels for 1996–1997 comparable to those of 1980–1981. The figures for El Salvador, Guatemala and Nicaragua were lower than those for the early 1980s. The implication was that social expenditure in these three countries in 1996–1997 had dropped by 30 percent since 1980. The data suggest that redistributive policies in Belize, Costa Rica and Panama have been maintained at levels begun in the mid twentieth century. This indicates that these countries continue to give priority to investment in human capital as a national development strategy (Tables 4, 5 and 6).

In the specific case of the education sector (Table 7), the aggregate investment figures for education as a percentage of GDP clearly show that both Costa Rica and Panama invested three

TABLE 4
Central America and Panama: selected social indicators

Country	Per capita GDP in 2001	US\$	Life expectancy at birth (years)	Mortality rate (per thousand live births)	
				Infants	Under five years
Costa Rica	3 652		77	14	16
Panama	3 264		75	18	20
El Salvador	1 737		71	30	34
Honduras	691		71	33	44
Nicaragua	471		70	39	48
Guatemala	1 548		66	41	52

Source: Secretariat for Economic Planning of Guatemala (SEGEPLAN), based on Human Development Report 2000 (UNDP) Gender Statistics: ECLAC 2001.

TABLE 5
Human Development Index 2001 for Central America and Panama

Country	Human Development Index
Costa Rica	0.801
Belize	0.732
El Salvador	0.674
Honduras	0.641
Guatemala	0.624
Nicaragua	0.616

Source: Human Development Index 2001. UNDP

TABLE 6
Social indicators for Central America and Panama

Country	Indicator		
	Poverty: % of people living on < US\$ 1.00/day	Real per capita social cost 1997 US\$ 1996–1997	Social cost/GDP 1990–1991 a 1996–1997 b
Belize	33 (1995)	237	9.3 a 10.2 b
Costa Rica	9.6 (1996)	550	18.2 a 20.8 b
El Salvador	25.3 (1996)	147	5.4 a 7.7 b
Guatemala	39.8 (1989–1998)	71	3.3 a 4.2 b
Honduras	40.5 (1996)	58	7.8 a 7.2 b
Nicaragua	n.d.	49	10.3 a 10.7 b
Panama	1.03 (1997)	683	18.6 a 21.9 b
LAC	n.d.	457	10.1 a 12.4 b

* n.d. = No data available

Source: INCAP. Food and Nutrition Security in Central America in the XXI Century XXI. Guatemala, January 2001. Publication INCAP ME/101.

times as much as Guatemala, twice as much as El Salvador and 25 percent more than Nicaragua in 1996–1997. The data also bring out the fact that per capita public spending in Costa Rica and Panama is nearly four times that of El Salvador, seven times that of Guatemala and Nicaragua, and five times that of Honduras. Belize, while still below the levels spent in Costa Rica and Panama, spends

TABLE 7
Educational indicators for Central America and Panama

Country	Indicator		
	Per capita public investment in education (1997 US\$) 1990–1991 a 1996–1997 b	Public investment in education (% of GDP) 1980	Public investment in education (% of GDP) 1990–1991 a 1996–1997 b
Belize	89 a 130 b	n.d.*	5.5 a 6.4 b
Costa Rica	113 a 153 b	7.8	4.7 a 5.8 b
El Salvador	33 a 50 b	3.9	2.1 a 2.6 b
Guatemala	25 a 28 b	1.8	1.6 a 1.7 b
Honduras	27 a n.d*, b	3.2	n.d*, a n.d*, b
Nicaragua	23 a 20 b	3.4	4.9 a 4.2 b
Panamá	124 a 172 b	4.9	4.7 a 5.5 b

* n.d. = No data available

Source: INCAP. Food and Nutrition Security in Central America in the XXI Century. Guatemala, January 2001. Publication INCAP ME/101.

more than the remaining four Central American countries.

Here, though, it should be pointed out that major efforts were made in 1996–1997. The following four countries did raise the per capita outlay for education: Belize by 46 percent, Costa Rica by 50 percent, El Salvador by 39 percent and Panama by 35 percent, compared to the 1990–1991 biennium.

As for the political dimension, first and foremost the signing of peace treaties and democracy-building deserve mention, as does decentralization, with power moving from the central authorities down to the regional and municipal levels. The region is attempting to overcome the political and military conflicts which had such a critical effect on its inhabitants, forcing many thousands of

Central American families out of their homes and countries, and depriving of the most basic human rights.

Part of the process of establishing and maintaining peace in countries involved in armed conflict comprises the still incipient efforts by people and governments to achieve and strengthen the democratic process, and to promote the rebirth of regional integration in conjunction with the other Central American countries. National government policies adopted to consolidate the processes of decentralization are moreover vital for the state reform initiatives promoted since the late 1990s.

The point needs to be made, however, that civil society and central governments in each country of the region are not finding it easy to hammer out a shared vision with long-term development strategies in various fields. The attempt is causing problems concerning the lack of a joint definition of national priorities, the failure to assign clear and appropriate clear roles to the public and private sectors, and weak interinstitutional coordination. The challenge of the Central American countries is that the state needs to address the major issue of managing the democratic process and the economy even as it undergoes a relative loss of sovereignty. It also needs to carry forward the process of internal reform required to build the new society.

SOCIOECONOMIC AND POLITICAL CONTEXT OF THE AGROFOOD SECTOR

The agricultural sector has been greatly influential in the economic and social life of the countries of Central America and the Caribbean. Agricultural modernization acted as a major stimulus to production and productivity and the evolution of the productive structure.

Guatemala's Ministry of Agriculture, Livestock and Food sets out the following text in its Agrarian and Sectoral Policy (MAGA, 1998). "The policy of incentives for productive investment and support to marketing are designed to encourage investment in activities representing comparative advantages with the potential to become competitive through technological innovation in the productive process, agroindustrial processing and the structure of related marketing channels".

Some of the support instruments for this incentive policy are:

"The Central American Agricultural Trade Policy. This is one of the sectoral and subsectoral policies. It is part of the country's commercial policy framework designed and approved by

the public and private sectors concerning the principle of competitiveness to guarantee access to international markets and participation in the domestic market, and is helping to guarantee food security for the people of Guatemala."

"The agricultural foreign trade unit under the strategic information and policy unit of MAGA, which is actively participating in the definition of national trade policies, supporting the development of the national competitiveness programme, and contributing to national capacity – building through participation in and administration of multilateral, regional and bilateral trade treaties".

Share of agriculture and agroindustry in the GDP of the region and its countries, and in exports

Tables 8 and 9 illustrate the share of agriculture and the manufacturing industry in the generation of the gross domestic product of the countries of the Central America and Panama region. Agricultural participation in GDP is major in countries such as Guatemala, Honduras and Nicaragua, and somewhat less so in Panama. Moreover, the contribution of the sector to GDP has been falling in individual countries as in the region in the years under review.

Basic ECLAC data on the agricultural sector show that the sector has been declining in economic importance in Costa Rica, contributing only 8.6 percent of GDP in 2000, and surpassed by the manufacturing industry and trade. Agricultural GDP has registered a contraction compared to 1999, growing by an annual average of only 0.2 percent. This is mainly due to the impact of the drop in production value of export crops (coffee and banana) and in basic grains, due to falling international prices. The drop was unable to offset

TABLE 8
Participation of agriculture, silviculture, hunting and fishing in GDP in Central America and Panama (% of GDP)

Country	At constant 1995 prices		
	1997	1998	1999
Costa Rica	12.5	12.3	11.9
El Salvador	12.8	12.2	12.6
Guatemala	21.0	20.7	20.4
Honduras	20.7	19.4	18.1
Nicaragua	34.9	34.7	34.0
Panama	7.2	7.3	7.0
Belize	23.4	22.5	23.9
TOTAL	18.93	18.44	18.27

Source: ECLAC Statistical Series for Latin America and the Caribbean 2001.

TABLE 9
Participation of the manufacturing industry in GDP in Central America and Panama (% of GDP)

Country	At constant 1995 prices		
	1997	1998	1999
Costa Rica	20.4	21.0	24.5
El Salvador	22.1	22.8	23.0
Guatemala	11.4	11.2	11.1
Honduras	17.8	17.8	18.6
Nicaragua	14.6	15.3	14.8
Panama	8.6	8.5	7.8
Belize	13.4	12.7	12.5
TOTAL	15.60	15.60	15.50

Source: ECLAC Statistical Series for Latin America and the Caribbean 2001.

the increase from certain non-traditional crops for the livestock subsector.

The agricultural subsector in Costa Rica decreased by 0.25 percent. Crop production for domestic consumption has been shrinking for some years now. Rice yields were lower. Beans exhibited a negative trend due to the disincentive caused by trade problem and the existence of surpluses on world markets. For maize, neither the area cropped (down by 21.3 percent), nor production (down by 16.1 percent), showed positive trends. This was due to the shrinking participation of private enterprise in trade: production is in the hands of small farmers who produce mainly for home consumption.

In El Salvador, the figures for the agriculture and livestock sector dropped by 0.8 percent in 2000, contributing 12.6 percent of the GDP. The agricultural subsector dropped by 3.3 percent that same year. For basic grains, with the exception of bean at 4.2 percent and sorghum at 6.9 percent, the trend was negative, with maize down 11.2 percent and rice lower by 16.1 percent. Among the export crops, the falling coffee yields drove production down by 18.8 percent. As international prices fell, plantation owners lost interest, as yields were no longer able to sustain production costs.

In Guatemala, GDP in the agricultural and livestock grew moderately in 2000 by 2.4 percent, with a stagnation in the agricultural subsector of 1.1 percent in association with export and non-traditional crops. This behaviour is partly attributable to low international prices and problems of access to credit. Basic grains (wheat at 10 percent, maize at 2.8 percent and bean at 4 percent) showed positive growth figures. Rice, however, was down by 9.3 percent and sorghum by 0.3 percent. In these two cases the areas planted and yields were both negative. Among the traditional

crops, only banana at 18.9 percent and cardamom at 6.3 percent showed positive growth.

In the year 2000, after two consecutive negative years, the agriculture and livestock contribution to GDP in Honduras rose by 7.6 percent – outpaced only by the trade and some service sectors. The activity of the agricultural subsector grew by 7.7 percent. This was due to a rise in technology transfer, the use of improved seeds and a strong credit stimulus thanks to the laws on reactivation and financial recovery of the agricultural sector. The area under basic grains increased by only 0.7 percent. Despite this, maize yields increased by 15.8 percent, bean by 55.6 percent, and sorghum by 38.8 percent. These were the highest figures for recent years, leading to bumper harvests. Rice production, however, fell dramatically by 23.7 percent and yields by 24.4 percent.

The area under the traditional export crops grew by 2.2 percent, and this boosted production. Banana now approaches the levels achieved prior to the passage of Hurricane Mitch in October 1998. Production nearly doubled as a result of the plantation rehabilitation programme. In the year 2002, non-traditional crop exports skyrocketed. The preferred crops were melon and watermelon, which became more competitive in the international marketplace, even as production rose. For 2003, the Ministry of Agriculture and Livestock anticipates exports of 1 500 containers.

In Nicaragua the agriculture and livestock sector contributed 29.5 percent of GDP, 55.8 percent of aggregate exports, and 60 percent of job creation, all in the year 2000. The number of persons employed exceeded the national total due to the intensive use of the labour force, especially in coffee, maize and bean production. The aggregate value of the agricultural subsector grew by 7.9 percent. The area harvested grew by four percent to a total figure of 820 181 ha in the year 2000. Despite this, the production value of basic grains dropped by 1.2 percent due to falling prices for rice and beans, though bean production volumes grew by 5.3 percent. The maize harvest also grew by 24.1 percent, as did sorghum by 6 percent. Rice, on the other hand, dropped by 8.6 percent due to the effects of drought on the first harvest.

In the year 2000, the agriculture and livestock sector in Panama grew only slightly by 1.6 percent due to a drop of 3.5 percent in the agricultural subsector due to adverse climatic factors such as drought, plus the rising price of petrol and low international prices for some export crops. Basic

grain production rose by 5.3 percent for bean, 10.5 percent for maize and 2 percent for rice, contrasting heavily with a 58.4 fall in sorghum production.

Agroindustrial Participation

Concerning the contribution of the manufacturing industry to GDP, El Salvador, together with Costa Rica, followed by Honduras registered the highest figures. Guatemala, Nicaragua and Panama have the smallest share of agroindustrial participation in GDP. It needs to be pointed out that the manufacturing industry's contribution to GDP has grown significantly in recent years in the region as a whole and in individual countries, excepting Guatemala and Panama (Table 9).

Tables 10 and 11 illustrate the behaviour of imports over a three-year period for agriculture and manufactured goods for the region. Table 10 shows that Costa Rica and Guatemala have the highest figures for this type of export products. It is important to point out the significant drop in exports of agricultural, forestry, fisheries and game export products from the region as a whole and of

TABLE 10
Exports of goods by sector of economic activity: agriculture, hunting, silviculture and fishing, in selected countries of Central America and Panama (millions of US\$)

Country	1997	1998	1999
Costa Rica	1 726.2	1 869.6	1 491.3
El Salvador	586.1	394.8	303.2
Guatemala	1 037.2	1 072.1	1 055.1
Honduras	589.2	279.9	391.1
Nicaragua	293.7	328.6	300.1
TOTAL	4 232.4	3 945.0	3 540.8

Source: ECLAC Statistical Series for Latin America and the Caribbean 2001.

TABLE 11
Total FOB exports by groups of products: manufactured products. Selected countries of Central America and Panama (millions of US\$)

Country	At Constant 1995 prices		
	1997	1998	1999
Costa Rica	1 667.7	2 719.5	4 269.1
El Salvador	526.6	584.3	582.4
Guatemala	708.0	846.3	837.8
Honduras	292.0	165.9	242.4
Nicaragua	161.5	42.4	40.9
Panamá	112.4	119.9	116.9
TOTAL	3 355.9	4 358.4	5 972.6

Source: ECLAC Statistical Series for Latin America and the Caribbean 2001.

each of the Central American countries during this period.

The major exporter of manufactured products in the region is Costa Rica, which accounts for more than 70 percent of all exports in this subsector. Nicaragua exhibits a significantly negative trend for manufactured exports.

The Central American region has its own common market, the CACM, a trade bloc established in 1960. CACM member countries set a fixed common external tariff that currently fluctuated between a minimum of one percent and a maximum of 20 percent *ad valorem*, for all tariff positions. There are major exceptions for agricultural and livestock products. The region is likewise involved in the ALCA talks. These negotiations are scheduled to end in 2005, at which point the entire American continent will have become a free trade area.

In the year 1993, the presidents of the Central American countries signed the General Treaty on Central American Economic Integration. The treaty stipulated that all products of Central American origin excepting those listed under Annex "A" of the Central American Customs and Tariffs Regime would remain exempt from the payment of tariffs, surtaxes, fiscal stamps and other measures of equivalent effect, and free of all tariff barriers – in a word, establishing a free trade zone within the region.

Goods requiring some sort of formality to enter Guatemalan markets are those of plant and animal origin, agrochemicals, medicines, veterinary medicines, soap and other cleaning articles, and food preparations. In the case of agricultural and livestock products such as seeds, parts of plants, plant and animal products and by-products for sale abroad, the export firm must present a phytosanitary certificate issued by the Standards and Regulations Unit of the Ministry of Agriculture, Livestock and Food. Zoosanitary certificates are compulsory for the export of animal feeds and fishery products.

SOCIOECONOMIC CHARACTERISTICS OF THE RURAL AGRICULTURAL SECTOR

Agricultural and livestock production is a major economic activity in every country in the region, generating around 25 percent of the gross domestic product, and able to absorb up to half or more of the economically active population. It can also generate up to 60 percent or more of foreign exchange earnings for exports.

According to estimations, upwards of 60 percent of the population of Central America is living in rural areas, most engaging in agricultural activities – sectors where the highest indicators of poverty (75 percent) and extreme poverty (60 percent) also prevail. This is paralleled by high rates of illiteracy, undernutrition and poor access to public services such as medical care, drainage and safe drinking water. The basic diet consists of basic grains, mainly beans and maize. The per capita supplies of maize and bean have shrunk in recent decades due to an interacting range of factors. These include poverty due to lack of opportunity, environmentally harmful production processes, the failure to incorporate environmental conservation criteria in productive investments, and the widespread lack of awareness of environmental issues. Other factors such as deforestation also contribute to this serious decline. An estimated total of over 99 000 ha disappear every year, with soil erosion rates as high as 1 100 t/ha/yr recorded in some areas of the isthmus. The loss of biodiversity, and contamination due to the indiscriminate use of agrochemical products and the presence of industrial residues and household wastes, compound the issue.

One aspect of the rural sector in Guatemala is the lack of smallholder access to good agricultural land. There are no legal certainties and guarantees governing the use, tenure and ownership of land. This discourages investments in the sector. In other parts of the country, productive infrastructure is in short supply or non-existent. The prevalence of inappropriate technologies and unsustainable production systems makes it hard to achieve acceptable levels of competitiveness.

PRODUCTION VOLUMES AND CHARACTERISTICS OF SMALL AND MEDIUM RURAL PRODUCERS

The following facts emerged from the observation visits and interviews with small and medium food producers and/or traders in rural Guatemala. Most of those interviewed were producing food mainly for and with the help of the family, on parcels yielding from 25 to 150 quintal of food products such as fruits and vegetables, pulses such as beans, and cereals – especially maize. Most producers agreed that their products were first class, and that the amounts obtained from the second harvest were often sold as second quality products at such low prices as to make harvesting barely worthwhile.

POVERTY

Estimates from the 1990s, based on the poverty line method, reflect the persistence of widespread poverty in the region. Three out of every five Central Americans are living in poverty. Worse still, two out of five are living in extreme poverty or indigence (Table 12). Rural areas are those hardest hit by the phenomenon. A total of 71 percent of rural dwellers are poor compared to 56 percent of urban residents. The situation is even worse in the case of extreme poverty, which applies to half of all rural residents. The situation is particularly serious in Guatemala and Honduras, followed by El Salvador and Nicaragua.

EMPLOYMENT

There is a lack of regular, comparable and timely statistics on the labour situation of the population of Central America. The national population censuses are an important source of information, but there are problems with their age and accessibility. They are generally unavailable, at least not in a form that can be processed so as to make the data comparable from one country to the next. Household surveys are not carried out on a regular basis in all countries. In addition, some household surveys have only limited coverage, such as metropolitan or urban areas. Mindful of these limitations, what follows is a brief review of the labour situation in Central America. It refers fundamentally to urban employment (Table 13).

Up to the year 1990, the economically active urban population (urban EAP) in the area included some 3.1 million people, with a rate of participation of 53.4 percent (Table 13). Individual country rates for participation parallel the regional average. In 1996 the urban EAP had grown by around one million people, due in part to an increase in the rates of participation, but also to the growth of the urban population. ECLAC figures indicated urban rates of participation of 78 percent of men and 41 percent of women in Costa Rica (1995). The rates were 84 percent of men and 43 percent of women in Guatemala (1989), 80 percent of men and 43 percent of women in Honduras (1994), and 80 percent of men and 47 percent of women in Panama. Unemployment was highest among women and young people.

Open unemployment affected 11 out of every hundred in the urban EAP in 1990. By 1996, the figure had dropped to 9.7 percent. Female unemployment is clearly much more prevalent

TABLE 12
Central America and Panama: incidence of poverty by the poverty line method during the 1990s (percentages of poverty)

Country	Year	Total poverty			Indigence		
		Country Total	Urban Area	Rural Area	Country Total	Urban Area	Rural Area
Total		60	56	71	40	26	52
Belize	1996	33	n.d.*	n.d.	13	n.d.	n.d.
Costa Rica	1994	21	18	23	8	6	10
El Salvador	1996	52	43	65	22	15	31
Guatemala	1989	75	65	86	60	55	71
Honduras	1994	73	70	76	49	41	55
Nicaragua	1993	68	53	89	51	37	69
Panama	1994	30	25	41	12	9	20

* n.d.= no data available

Source: State of the Region Report, UNDP 1999.

TABLE 13
Urban Central America and Panama: economically active rural population, employed, unemployed, rate of participation and rate of open unemployment 1990 and 1996 (thousands and percentages)

Country	Urban EAP				Rate of open unemployment		
	Total	Employed	Unemployed	Rate of participation	Total	Youth	Women
Region							
1990	3 102.7	2 755.8	346.9	53.4	11.2	-	-
1996	4 076.1	3 682.0	394.1	54.4	9.7	-	-
Belize							
1990	n.d.*	n.d.	n.d.	n.d.	n.d.	-	-
1996	n.d.	n.d.	n.d.	n.d.	n.d.	-	-
Costa Rica							
1990	482.3	456.5	25.8	53.1	5.3	10.3	6.2
1996	561.3	524.5	36.8	52.3	6.6	13.9	7.6
El Salvador							
1990	982.8	884.9	97.9	55.0	10.0	18.6	9.8
1995	1 261.3	1 172.9	88.4	54.1	7.0	14.3	5.0
Guatemala							
1989	574.1	555.2	18.9		3.3		5.6
1996							
Honduras							
1990	691.6	644.4	47.4	50.1	6.9	10.4	5.8
1996	980.2	915.1	65.1	54.7	6.6	9.7	5.1
Nicaragua							
1990	482.3	369.7	112.6	51.2	23.3	34.2	20.8
1995	619.7	526.8	95.9	48.7	15.0		14.0
Panama							
1991	463.7	400.5	-	57.3	13.6	33.0	15.2
1996	653.6	542.7	-	61.7	17.0	34.8	20.5

* n.d.= no data available

Source: State of the Region Report, UNDP 1999.

in Nicaragua and Panama. The rate of open unemployment is much lower in El Salvador, Guatemala and Honduras.

Underemployment, and not open unemployment, is the main problem in the region, as data from the Central American Monetary Council clearly show. According to their figures, open unemployment rates equal those for equivalent unemployment. The equivalent unemployment

figure for Guatemala is more than six times higher, whereas in Nicaragua the figure is only slightly lower.

RURAL EMPLOYMENT

In all countries for which information is available (Guatemala, Honduras, Costa Rica and Panama), labour insertion figures show that half of those occupied in the rural sector are people working

TABLE 14
Labour insertion of employed rural population in Costa Rica, Guatemala, Honduras and Panama (percentages)

Country	Costa Rica (1995)	Guatemala (1989)	Honduras (1994)	Panama (1995)
TOTAL	100.0	100.0	100.0	100.0
Owners	5.7	0.5	1.6	4.3
Employees	68.5	38.3	37.2	44.5
Public sector	9.6	2.9	4.8	11.9
Private sector	58.9	35.4	32.4	32.6
Independent and unremunerated family workers	25.8	61.2	61.2	51.3
Agricultural activities	12.2	47.9	43.4	33.5

Source: State of the Region Report, UNDP 1999.

TABLE 15
Economically active population, by sector of economic activity and sex, 1990 (thousands of persons)

Country	Both sexes			Men			Women		
	Agriculture	Industry	Service	Agriculture	Industry	Service	Agriculture	Industry	Service
Guatemala	1 293	47.8	684	1 210	40.9	371	8.3	6.9	31.3
El Salvador	599	33.6	687	56.8	23.2	361	3.1	10.8	32.7
Honduras	611	22.1	415	57.6	17.0	244	3.5	5.1	17.2
Nicaragua	491	15.9	486	46.3	12.5	239	2.8	3.4	24.7
Panama	214	11.0	396	204	8.5	228	10	2.5	16.9
TOTAL	3 208	130.4	2 668	3 021	102.1	1,443	27.7	28.7	272.9

Source: ECLAC Statistical Series for Latin America and the Caribbean 2001.

for themselves or unremunerated family workers, mostly involved in agricultural activities. The exception is Costa Rica; there the percentage is lower because there is a large group of paid rural workers (Table 14).

Table 15 outlines the ECLAC data on occupation in the region for the EAP for the year 1990.

Notably, the greater part of the economically active population in the region is engaged in the agriculture, hunting, forestry and fisheries sectors. This is followed by wholesale and retail trade activities, restaurants and hotels in the service sector, and with a substantial portion of the EAP working in industry.

TRANSPORT NEEDS

Most producers lack a vehicle of their own to carry their products to market. Field observations showed that more than half these producers were forced to hire a vehicle. Most of these trucks cannot carry more than 20 quintals. The roads are so narrow that only a vehicle smaller than a five-ton truck can get in, and so the load cannot all be carried in one trip. None of these producers (whether fruit, vegetable, pulse or cereal growers) use refrigeration to transport their food to market. The exception consists of one or two very special cases where exporters of fruits and some vegetables pack pre-selected goods and hold them in cold

storage at the plant for subsequent export abroad. The vast majority of producers find transport costs high, a few very high, and a few more find them adequate. Transport is in short supply in some regions and it is hard to find someone to move goods from field to market.

ROAD INFRASTRUCTURE

A good road infrastructure is essential to facilitate internal and external integration. It is also a fundamental condition for achieving greater access to markets and the benefits of free trade for all. It is also a prerequisite for reducing the production costs for goods and services, and inherent in the search for better business and national competitiveness.

Most food producers and traders in the region are forced to use unpaved roads. On our observation tours we learned that drivers face 0 to 50 km of unpaved roads before reaching a paved or tarred road. These unpaved roads are inaccessible in the rainy season to conventional vehicles of five tonnes or more. Only pick-up trucks carrying no more than one tonne can get in. This makes the transport of food from field to market a very slow process, generating scarcity because the goods cannot arrive on time. Paved roads are also poorly maintained in the rainy season, and they soon deteriorate, as can also be seen in the highlands of Guatemala.

TRANSPORT INFRASTRUCTURE IN EL SALVADOR

Overland transport

El Salvador has a road network of some 12 540 km, 16 percent of which is paved. There are two main highways: the Pan-American linking the east to the west and the Coast Highway, paralleling the Pan-American Highway and running south.

Maritime transport

El Salvador has a number of ports, primarily Acajutla, Puerto Catuco, La Libertad, La Unión, and El Triunfo. The port of Acajutla on the Pacific is the main access port. It is 85 km by highway and 103 km by rail from the capital, San Salvador. This port has a major complex for services for handling, storing and transferring container cargo and liquid, solid and fluid bulk products. From Buenaventura to Acajutla there is only one opportunity for transport, every two weeks, via Puerto Quetzal in Guatemala. The greatest drawback for this route is the long transport time of 15 to 19 days, so that exporters need to plan carefully ahead to meet the needs of their Salvadoren clients. There are more than ten shipping companies serving the Atlantic ports of other Central American Countries, all with previous maritime connections and combinations in Panama, Kingston, Jamaica or Miami in the USA, or overland connections to Central American ports such as Puerto Limón, Santo Tomás de Castilla and Quetzal. Transit times can range from eight to twenty days.

Rail network

The rail network of 380 km is used solely for the transport of merchandise.

TRANSPORTATION ADMINISTRATION AND LOGISTIC ASPECTS

Product temperature, moisture content and rate of respiration are all factors affecting the quality and protection of fresh food products. Very few small or medium producers in the region have access to controlled temperature transport systems. The mark of a truly professional carrier is the use of high-quality, cold storage equipment; or adherence to a strict programme of good farming and/or manufacturing processes with respect to the transport of agrofood products. Many of the producers and/or traders interviewed were completely unaware of the need for similar logistics for the food they produce or transport.

Transport is in short supply in some areas and inadequate in others due to a shortage of pick-up trucks to move products from harvest areas to local or regional markets. For longer distance conventional trucks of five tonnes or more are used. Most of the vehicles in use are poorly equipped for food transport. Trucks used to move construction materials are also used to transport food. This creates hygiene problems: the trucks are simply swept but not cleaned or sanitized. Many of the trucks used to transport food crops are also utilised to ship animals such as chickens, pigs and cattle. The owner of the vehicle simply hoses it out without drying it, and the truck is ready to transport food products. Producers are prepared to accept these conditions as there is often little demand and they frequently lack their own transport to get their products from field to market for sale.

MARKETING CHANNELS (CUSTOMS/OIRSA EXPORT REQUIREMENTS)

The destination of almost all food carriers, comprising pick-up and regular trucks, are wholesale markets. In El Salvador, the infrastructure for the transport and sale of food products has undergone constant change. Access to local, regional and capital city markets has improved substantially: they are much easier to reach than in earlier years. This has led to an excellent market price/quality ratio, and much better packing and packaging techniques on the part of those transporting food products.

The people producing food in the countryside sell their products to a buyer at the harvest site. This facilitates transport as this intermediary has the means, transport vehicle and capital as well as a spot on the local, regional or national market (CENMA). The buyer usually sells the product wholesale or retail. Exporters comply with the regulations established by the international treaties in force.

Importation is mainly in the hands of the major distributors (who then sell to retailers), or the big department stores. Sales profits are higher for USA products, ranging from 10 to 20 percent. In El Salvador, it is important to make a careful review before choosing an agent, representative or distributor. This person will need to know how to handle the domestic regulations and formalities for the different products. Sales strategies are not very highly developed. The usual way of introducing a

new product is to give a reception in a big hotel, combined with an advertising campaign, for the product presentation. Direct marketing is an upcoming method now that telecommunications and door to door marketing (which began with the sale of cosmetics and household articles), have been privatized. It is advisable to have a good consumer support service comprising replacements and technical assistance, especially for sales to the government, for those products requiring such service.

Agricultural and livestock inputs, pesticides and veterinary products

Exports of agricultural inputs, pesticides, fertilizers and veterinary products for animals for human consumption require prior registration of the firm exporting the product, or a local distributor who will take responsibility for compliance with the formal registration of the product. It is important to remember that while the requirements for introducing these products on Salvadorean markets are not very complicated, there are severe post-sale controls that need to be considered by those wishing to trade in these products.

GENERAL DESCRIPTION OF RURAL FOOD TRANSPORT: SWOT ANALYSIS

Strengths

- The farmer produces first-quality food products.
- Pick-up trucks are used for hauling in areas mostly inaccessible to larger trucks or trailers, facilitating transport.
- The state of transport is good.
- The supply of transport is good.
- Vehicles are loaded quickly and properly.
- A collection centre for apple growers is being built and another is now in operation providing cold storage of Chinese peas for export.
- The collection centres make it possible to export first-quality products and boost the income of the farm families producing them.
- Vegetable and fruit growers in some highland departments have organized, and this facilitates training designed to improve product quality and encourage exports.
- There is a federation of tomato, onion and chilli growers in the eastern part of the country that allows for training to improve product quality and encourage exports.

Weaknesses

- Producers are dependent on others to haul their agrofood products.
- The costs of transport are high.
- They are unaware of the unit cost of the product transported.
- They receive no subsidies from governments or other bodies for the production and/or transport of their products.
- Little employment is generated during transport. Instead what is generated is under-employment in the loading and unloading of products for market.
- Food products are transported without taking GAP into consideration.
- Markets fail to apply either GAP or GMP.
- They are unaware of the term “quality” concerning the transport of their products. What matters is getting the goods to market; how this may affect the quality of their products is not considered important.
- Producers follow various schedules for transporting their products. Their own convenience and not that of the consumer determine these schedules. This has the effect of lowering sales prices.
- They pack their products in the field the same day they are harvested, lacking appropriate packing areas for this operation.
- Quality selection is by the producer’s personal criteria. For a producer, the first harvest is of higher quality. Size, colour, flavour or other characteristics are not considered important.
- Producers in some highland departments are not organized. Everyone produces and sells to the highest bidder, and they get their products to market as best they can.
- Down on the southern coast producers tend to sell their products in the field, and generally do not take them to market.

Opportunities

- The international market for small and medium fruit and vegetable growers is open. Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), and possibly Hazard Analysis and Critical Control Points (HACCP) must be complied with.
- Guatemala’s capital city has a national wholesale market, the “Central de Mayoreo”. It has good installations and facilitates the sale and purchase of agrofood products.

- Producers are very willing to establish processing industries near production areas or collection centres.
- Some producers would supply land for growing and others would provide space on their property for the construction of said centre or industry.
- There is an opportunity to build collection centres or regional markets like CENMA, which would allow producers to sell to the final consumer and thus boost their earnings.
- Organized producers can be trained to learn how to handle their products and use GAP and GMP, and initiated in the use of HACCP, now that the Free Trade Treaty has opened international markets.
- Producers who have formed organizations may be eligible for transport subsidies once collection centres are available.

Threats

- Intermediaries buy most of the output and often impose the price paid.
- Most roads they cover are unpaved, with distances up to 50 km or more to reach a paved road
- No producer utilizes refrigerated transport for food products, excepting those destined for export.
- Adverse environmental conditions such as excessive rainfall affect transport. Packing the product and loading the vehicle is done in the open, an improper procedure.
- Producers do not take their products to market and there is nowhere they can safely shelter, pack and load their products into the vehicle.
- Unpaved roads are in poor condition and paved roads are not much better, deteriorating rapidly during the rainy season.
- The sun is too hot for people to work between ten in the morning and two in the afternoon in the southern coastal and eastern areas of Guatemala, where temperatures can reach 42°C.

AGROFOOD TRANSPORT DEVELOPMENT NEEDS

The agrofood transport sector is characteristically complex and heterogeneous. A major and general characteristic of the sector is its extensive fragmentation and the large number of firms with just one or two vehicles and very few employees (95–97 percent of the total). These firms are usually

autonomous and highly independent. For these reasons their interests are very different from those of other stakeholders in the sector. The interests of the packaging firms, for example, are not the same as those of firms supplying a supermarket chain. Food transport is totally different from the transport of dangerous or toxic products, or garbage collection.

Another important factor is new trends in marketing, such as shopping malls, hypermarkets, supermarket chains and other agents and modalities of distribution and sales.

Another major factor is the cost of transport due to heavy competition. Prices tend to go down whereas fuel, labour and other costs continue to rise. Any review of training needs in the agrofood transport sector needs to consider the following points:

- organization of urban logistics and integration in the intermodal network, which is the point of departure;
- knowledge of the logistical infrastructure (e.g. merchandising centres, urban terminals...);
- data transmission technologies and applications;
- today's logistics imply a hefty contribution from the information and data transmission sectors;
- alternative transport and transfer technologies;
- other commercial aspects that may have a bearing on better management such as maximising the use of available resources;
- environmental factors, including contamination and visual and noise pollution.

New information technologies such as the Internet are having an astonishing impact on the regular transport of merchandise. The application of computerization to the transport industry reduces delivery times, improves customer service and makes it possible to pinpoint the exact location of any given shipment. It also increases competition and creates the risk that small companies may be swallowed up by big ones.

This is a sector which has traditionally been left to cope on its own, and is subject to swift-paced technological change. If the sector is to be competitive, there is an absolute need for the development of a project to analyse current training needs to boost the qualifications of people working in this sector. The greatest potential of transport firms is the people who work for them.

A review of the latest data shows certain connections between non-agricultural rural

employment and the aggregate employment figures for specific Central American countries. One very important item is the proportion of non-agricultural employment in the countries of the region.

The main problems facing the drivers of commercial vehicles transporting merchandise from rural areas to urban areas are as follows:

- lack of space; commercial vehicles have to compete with other means of transport for parking space;
- extensive reserved parking areas for taxis;
- irregularly parked private cars impede the movement of commercial vehicles; even the loading and unloading zones are often blocked by illegally parked private cars;
- bus traffic congestion on some of the main access roads into the centre ;
- commercial vehicles often have to double-park to make deliveries, blocking narrow streets;
- there is a very small window for legal access into the city for commercial vehicles. Trucks and pick-up trucks can only enter the centre from 07:00 to 11:00, leaving before 12:00, and from 15:00 to 17:00, leaving by 18:00. These regulations apply to all transport vehicles, even though they operate in very different ways. The schedule does not correspond to store opening hours, as most do not open before 10:00. Private merchandise vans are not held to this same timetable;
- other stakeholders are not involved in solving the problem of distribution;
- those receiving the merchandise see this as the carriers' problem, and so solving it and providing the service as scheduled is up to the carrier;
- the authorities attach greater priority to attracting consumers into downtown areas. They thus pay more attention to the problems of salespeople, private cars and public transport;
- commercial vehicles are thought of as aesthetic blemishes in downtown areas;
- carriers view individualism as a positive trait, and are not predisposed to cooperative behaviour. As a result a great many commercial vehicles enter the city every day, usually carrying only small loads;
- the battery of problems faced by carriers just to do their job creates a situation that often puts them in violation of traffic regulations;

- there is insufficient logistical infrastructure to maximise loading and unloading operations and deliveries;
- pedestrian areas limit access for deliveries;
- last of all, insecurity is too great and too prevalent for drivers to leave their vehicle unattended while they make deliveries.

Given the importance of training, the following considerations deserve attention:

- the scant impact of advertising campaigns in training;
- possible lack of interest in training on the part of firms working in the sector. Some two-thirds of those asked about training answered that they had all the information they needed to run their business;
- high potential for improvement among workers.

The commercial transport sector at present can be accurately described as follows:

- good supply;
 - individualistic;
 - prices and services highly competitive; technological obsolescence;
 - low level of professional qualifications.
- Transport firms can be described as follows:
- very weak;
 - lack of internal structure;
 - lack of employee preparation;
 - high average age;
 - poor interrelatedness among firms.
- The market is under growing pressure from:
- technological evolution;
 - need for modernization;
 - liberalization of transport;
 - competitiveness;
 - appearance of big companies offering better-quality services.

EMPLOYMENT GENERATION

Transporting agrofood products generates both employment and underemployment. Independently of explanations for non-agricultural employment generation and the problems of pinpointing or measuring data, various countries do possess information offering the possibility to relate theoretical considerations concerning this to actual behaviour.

From 1950 to 1980, non-agricultural employment in the rural labour force in Central America and Panama rose from 11.3 percent to 24.3 percent. During the same period, the share of non-agricultural employment in overall employment

rose from 15.8 percent to 20.3 percent. Figures from the International Labour Organization suggest that non-agricultural employment for the current labour force in Latin America as a whole fluctuates between 26 and 28 percent. Non-agricultural employment as a proportion of rural employment ranges from 32 percent to 44 percent. The size and potential of the phenomenon are repeated in some of the Asian countries, which are reporting annual non-agricultural employment increases of one to 1.5 percent. The links between agriculture and the market for goods and services mean that this growth entails an increase in non-agricultural activities of 0.80 US dollars for each US dollar of additional agricultural income.

A review of the most current information reveals the ratio of agricultural to non-agricultural rural employment (NARE) to aggregate employment for selected Central America countries. One very important point is the proportion of non-agricultural employment in the countries of the region. This is becoming rather remarkable, despite the differences between agricultural production and productivity indexes and the exportable volumes from these countries. There are also World Bank estimates that identify 36 percent of El Salvador's rural EAP as working in non-agricultural activities, duplicating the proportion of NARE in the 1970s. Other structural characteristics such as population patterns from one country to the next, and varying degrees of urbanization, seem to have a bearing on the differing proportions of agricultural employment, and on the ratio of NARE to total and rural employment. Countries where the proportion of rural employment has less impact on the national economy, such as Costa Rica and Panama, have higher proportions of NARE. This indicates a relationship between the extent of urbanization and the proportion of off-farm employment opportunities. Other indicators such as per capita income, the proportion of rural poverty or the occupational structure of the EAP, which differentiate Costa Rica and Panama from Guatemala and Honduras, appear to follow the same relationship. This would indicate that as economic indexes go up and sources of income and employment arise outside the sector, the opportunities for the consumption of non-agricultural goods also go up, paving the way for a relatively larger off-farm rural employment subsector.

Our observation of the situation in Colombia, which has a much bigger economy than the Central American countries do, indicates that the

characteristics of the employment situation are similar. Household surveys from the early 1990s show that off-farm rural employment totalled 38.7 percent of the labour force. Commercial and service activities led with some 12 percent in the service sector and 7 percent involved in manufacturing, with a great deal of variation from one region to another. Structural trends of NARE in Colombia differ from those reported for El Salvador, where some 30 percent were working in the manufacturing sector, 20 percent in construction, 22 percent in unskilled service sector jobs, and 5 percent in jobs requiring higher qualifications. The analysis emphasises that rural employment in Colombia has undergone structural modification to a point where there is now a high proportion of family-based non-agricultural employment. An estimated 51 percent of rural households have some sort of agricultural or livestock enterprise, 21.1 percent a non-agricultural enterprise, and 11 percent have both. Off-farm businesses operate out of the home in 74 percent of these cases. The Atlantic and Oriental regions are those with the highest concentration of home businesses and are also relatively less developed regions. Only eight percent of these hire workers outside the family, and the business occupies fewer than five people in 99 percent of the cases. The same regions report higher proportions of women in off-farm rural employment – 16.3 percent in Atlantic province and 22 percent in Oriental province.

RURAL TRANSPORT COSTS

When agricultural products are produced far from consumer, export or industrial centres, the transport of these products assumes great importance. The big producers have incorporated trucks into their business. This may be because they hoped to earn more, or because they wish to maintain their independence and do not want to have to depend on third parties to ship their products.

Producers, asked about the costs of the transport system they use, mostly answer that they do not know. They usually just know how much they are charged per unit shipped. This ranges from 0.35 US dollars to 1.10 US dollars for a crate or for bulk volume. Or they may only know the cost of a truckload (from 65 to 120 US dollars per truckload for trucks carrying more than 100 quintals¹). They do not keep records of actual transport costs, and are thus unaware of the unit cost of transport.

¹ 1 quintal = 100 pounds = 45,36 kg.



Plate 1
Arriving from the countryside into the city. Guatemala

Transport is an important item in determining costs and time as necessary stages in getting the product to market. A product coming off the farm, ranch or plot and destined for the local, regional, national or international market place needs to be transported. The means of transport used by farmers or traders to get agricultural products to market are many and varied: beasts of burden, roads, foot travel, pick-up trucks, lorries, urban and extra-urban buses, and more (Plate 1). The mean of transport is important, considering the costs and losses incurred from poorly managed transport and delayed deliveries. Small farmers lack their own means of transport to take their goods to market. Those who live very far from consumption centres alternate shipping the product with carrying it on their own backs or on the back of an animal, or else hiring some other means of transport.



Plate 2
Transfer of agricultural products from farmer to buyer. Guatemala

A farmer transporting his products on his own is also responsible for material losses during transport. Otherwise, the intermediary meets this cost, which he recovers out of his own earnings. This is why most farmers sell their products to intermediaries (Plate 2), thus avoiding the problem of transport losses. Intermediaries pay cash directly upon taking delivery of the product. Even farmers with commitments to farmers' organizations may decide to sell to intermediaries for a lower price so as to have the money in hand sooner. This is a regular occurrence when product prices are high, and generates scarcity for specific products.

Identification and description of added costs due to transport

Fuel costs (mostly diesel), daily wages for the driver, and sometimes his expenses, are the usual items in working out the costs of transport. Expenses are figured in when the producer is the owner of the vehicle in which the food products are transported. When the producer hires a vehicle, the only item considered is the unit charge for moving the goods from farm to market. This is also true of producers who transport their products on extraurban buses from the countryside to the national markets.

Food transport subsidies

These countries do not normally provide incentives for producing food products or for transporting them to consumption centres. An article published in the Guatemalan news daily *La Prensa* stated that "We have become an importer of soybean, maize and almost all grains consumed in this country, because it is cheaper to import them, due to the subsidies producer countries such as the United States of America pay their farmers, and which allow them to cut their sale prices". In Guatemala and the other Central American countries there are no subsidies for producing agrofood products or getting them to market.

FOOD LOSSES AND FOOD SAFETY DURING TRANSPORT

Perhaps the most serious losses to agrofood products during transport are small bruises. These account for no more than 10 percent of losses, and some carriers opined that bruising occurs on unpaved roads, where the cargo is shaken even at low speeds, causing minor damage despite packing and packaging. Once the trucks reach asphalt the truck bounces less and the load stops shifting. The distances and time to market are below 200 km, and



Plate 3

Concentration of trucks in the Mercado Municipal. Guatemala.

carriers get there quickly enough to ensure the load arrives in good shape (Plate 3). Damaged products are thrown away, or, if relatively undamaged, are sold as seconds.

GOVERNMENT POLICIES TO IMPROVE FOOD TRANSPORT

Road infrastructure is one investment component of Guatemala's National Peace Fund (FONAPAZ). "Road, highway and bridge projects are executed to provide easy access to communities. Works of this kind make it easier for populations to market their products, facilitate access to urban markets and thus help generate the conditions for economic development".

Strategies for improving rural agrofood transport

DESIRABLE CHARACTERISTICS OF FOOD TRANSPORT SYSTEMS

The possibility of food contamination during handling and transport is indisputable: efforts must be made to maintain the safety and integrity of harvested agrofood products during transport. They must be protected to avoid contamination or damage.

Food transport vehicles must be thoroughly cleaned, dried, and preferably disinfected before loading. Loading and unloading should preferably be done during daylight hours, away from food processing areas, and protected from inclement weather and sources of contamination. The load should travel firmly stowed in its compartment to avoid shifting during travel, which can have an adverse effect on product quality.

It is fundamental to establish a proper loading pattern. This means leaving enough space between products to ensure uniform air circulation throughout the cargo so that temperature can be brought down rapidly and maintained throughout the trip. Proper loading also increases stability, ensuring the product remains intact during the move. Lastly, consideration needs to be given to the inherent resistance of a given product to packing.

Transport vehicles should be parked away from food handling areas to avoid contamination from petrol or diesel fumes. For bulk transport it is advisable to provide dry-air ventilation of the load to eliminate moisture arising from respiration, and subsequent condensation as the vehicle moves from a warm region to a cooler one, or from a dry to a wet region, or when night falls.

It is best to establish the loading and unloading zones beforehand. The packed products should be moved gently to avoid breakage and/or damage to the product. Agrofood products need to be packed in such a way as to meet a strict set of conditions. They must be able to withstand environmental changes such as alterations in temperature, vapour pressure, relative humidity, atmospheric composition and light. The inherent dangers of

loading and unloading, and the risks of damage and bruising during transport, need to be reduced. Vibrations and movement of the vehicle during transit can cause damage. Mixed loads need to be judged for their compatibility or incompatibility during transit (odours, contamination, colour changes). There should be no toxic substances, and different temperature or humidity requirements for products also need to be factored into the equation.

Research on the impact of indiscriminate packing and loading of products show that not all agricultural products can be transported in the same load and under the same conditions. They must be compatible in terms of the recommendations for temperature, relative humidity, ethylene production, ethylene sensitivity, and the production and absorption of odours.

The condition of the various parts of the vehicle needs to be checked to ensure nothing is broken, the locks are working, no water can leak into the load, or any other defects. The truck should not be parked in the sun during rest stops. Stopping in the proximity of other fume-emitting transport vehicles or machinery should be avoided.

Another major factor in agrofood transport is the condition of roads and transport fleets. Much of the problem – and the reason why many regions are still subsistence economies – has to do with the poor condition of road networks. If we are to improve the rural transport of food products, therefore, both good road networks and proper, well-maintained transport vehicles will be needed. The upshot will be accessible transport costs for the producer. Another important aspect of better transport and better-quality food products is farmer organization.

ANALYSIS OF JOINT INTERVENTIONS TO ADDRESS FOOD TRANSPORT PROBLEMS

Some regions have solved the problem of distance from production site to market or meeting the demands of the international market-place by building collection centres that go some way towards enhancing agrofood product quality.

This can cut losses during transport, or else allow selection of higher quality products, at higher prices. This is particularly true of organized farmers, such as the request by farmers in the Guatemalan highlands for collection centres with cold chambers for their fruit and vegetable products.

There are also private initiatives by organized farmers' groups who have built their own collection centres. Organizing farmers and building collection centres are two appropriate strategies for enhancing the quality of food products within the transport system.

OPPORTUNITIES FOR HOLISTIC SOLUTIONS, IMPROVEMENT OF FOOD TRANSPORT SYSTEMS AND SOCIOECONOMIC DEVELOPMENT

The formation and development of industrial conglomerates (or clusters) offers a glimpse of how Latin America's small farmers could become competitive in the face of the new and challenging world market situation. This section explains the main advantages for enterprises to join forces, especially small agricultural enterprises. It outlines a practical methodology for implementing development processes and strengthening competitive conglomerates. Also discussed are critical factors for successfully undertaking ventures of this kind. It all goes back to the year 1995, when the Central American Institute of Business Administration (INCAE) helped to promote discussions among the presidents of five Central American countries, culminating in the signed commitment of these heads of state to back the "Central American Agenda for the 21st Century". This paper sets out, for the first time, a vision of Central America's position in the world economy. The Agenda incorporates two central concepts: *Conglomerates* and the *Business Climate*. The conglomerate concept, in particular, introduces a new way of looking at national and regional economies.

First approach

The reality faced by a business or enterprise can be viewed in any of four contexts: global, national, industrial-sectoral and business. Managers have different degrees of control in each, ranging from virtually no control in the global context to a very high degree of control over the business practices of their own enterprises. All of these contexts are important, but unfortunately a business can only make a difference in specific cases. Acting as a

conglomerate is one feasible way for businesses to become more competitive

Global context

Agroindustries mainly operate within a complex context of global competition, in particular in the market for generic products. These markets are now showing signs of maturity with respect to demand. Their growth tends to parallel that of population growth, but the supply picture is both growing and volatile. This has created highly irregular but basically downward price trends. .

In Central America, banana, coffee and sugar alone represent 18 percent of all exports and over 60 percent of agricultural, agroindustrial and forestry exports for the region as a whole. In other words, exports are concentrated precisely in the three generic markets that are frequently plunged into price and other types of crisis. Generic markets are very fluid and easy to access, the problem here is not selling the product but the price at which the product is sold.

The minimum scale of production, distribution and promotion necessary to be competitive on world markets lessens the potential for individual small farmers to do well in these markets, especially as they mostly hail from poor countries with very little influence in the international market-place. Open competition with Colombian coffee, for example, which has for decades invested vast sums on product promotion and positioning, in addition to being the second world producer and exporter, is a thankless task.

Moreover, even with the new trends for open trade on world markets, the persistence of heavily distorted world markets for agricultural goods is anticipated. This mainly involves tariffs and subsidies, especially for the so-called "sensitive" products: cereals, oilseed and sugar, among others. In accordance with the WTO agreements, the rules for the world trade of agricultural products are being agreed upon and redefined, but there are still major gaps. In very poor countries, overexploitation and unsustainable management of human and natural resources can still produce astonishingly low production costs. In the rich countries, direct subsidies to farmers and barriers to international trade distort costs and prices, and this is the environment in which the competence is developing.

In Latin America there are vast and virtually unexplored opportunities. There are environmental niche markets, for example, for which the demand

is relatively small but in which growth is very rapid, and where prices are both higher and less volatile. The problem is that it is very expensive to penetrate these niche markets. This is a medium- and long-term task, which can become a near insurmountable barrier for small individual businesses.

National context

There is increasingly less room for manoeuvre in the national context. The influence of the global context on national economic policies, especially trade policies, and the shrinking fiscal resources earmarked for these activities, are all factors constraining the opportunities for traditional support to the agricultural sector. While traditional local support to the farm sectors now restricted by WTO agreements, such as subsidies, are being eliminated, other unrestricted aids such as public spending for research are only timidly being applied. The United States of America and the European Union, for example, invest one percent of their Gross Domestic Product of the Agricultural Sector in research and development, whereas the comparable figure for Central America is very much smaller, at 0.2 to 0.5 percent. Thus the Latin American farmer finds himself increasingly confronted with a heavily distorted international market with growing rivalry for local markets, less support, and more regulations.

The industry situation: acting as conglomerates

There is not much room for manoeuvre in the global and national context. At the industrial level, however, improvements are possible where businesses and other stakeholders join forces to achieve common objectives and share profits. Forming into conglomerates can make progress possible, but agreements must be reached beforehand. Reaching and complying with agreements implies a clear set of rules and efforts to raise the business platform for all (or at least most of) the conglomerate's activities.

Operation of the enterprise

The approach is the efficient and effective operation of conglomerate. The assumption is that the enterprises involved are reasonably well managed. A poorly managed enterprise cannot survive in the long run, not even one backed by conglomerates, governments or the socio-economic context.

Conglomerates and competitive advantages

Porter (1991) defines a conglomerate (or cluster) as "geographically close groups of interconnected companies and associated institutions in a given field, linked by common and complementary elements". They may be companies providing finished products or services, inputs, components, machinery and special services, or financial institutions. They may be "downstream" related businesses such as distribution channels and customers, or providers of complementary products, specialized infrastructure, public and private training, education or information institutions, or perhaps technical support and research institutions, supervisory and regulatory agencies, or labour associations.

This new way of looking at the economy places competitive advantage largely outside the enterprise --even outside its traditional industrial sectors. It suggests that competitive advantage is inherent in the quality of the member relationship--one wherein businesses, governments and other institutions all play a permanent and active role in boosting competitiveness. The greatest competitive advantage from operating in this fashion comes from economies of scale for entrepreneurial activities. This includes materials purchases, research and development investment, information systems, distribution and storage infrastructure, promotional costs and sales. By operating as a conglomerate, an enterprise gains in efficiency and product quality through specialization. The labour and institutional response of the sector also increases significantly.

The global context is a given condition, especially for small farmers from poor countries. Global realities and resource scarcity both influence the national context, and therefore domestic room for manoeuvre is very limited at the country level. As for the industrial situation, a business working as a conglomerate can be much more competitive. The most important requirement, however, is that key protagonists reach agreement.

Conglomerates are a good competitive option for small farmers, enabling them to take advantage of economies of scale in some entrepreneurial activities such as purchases and distribution. Moreover, joint action or investment in promotion, brand consolidation and product lines facilitate the differentiation of small agricultural enterprises in small (but more profitable) market niches.

A new concept of competitiveness

The following four fundamental changes were achieved by a key group of the region's businessmen, based on the Central American Agenda for the 21st Century and discussions on a course of action deriving from a competitiveness analysis of its conglomerates. These were:

- heightened awareness by entrepreneurs and public sector officials of the key sectors in each country that can drive competitiveness, with a obvious emphasis on the opportunities afforded the agribusiness sector;
- a better understanding of the best practices for becoming competitive in key sectors, and the introduction of improved practices for certain conglomerates such as the fishing sector in El Salvador. These may not represent huge transformations, but they do clearly indicate the potential of participant efforts in this conglomerate;
- drawing up specific agendas to improve sectoral performance validates the need for an action plan to follow up on the agreement among key conglomerate participants;
- a start – in some cases a vigorous one while only timid in others – towards implementation of the proposed improvements to the respective agendas.

The first three elements constitute the prerequisites for implementing measures designed to make a given conglomerate more competitive, and they also comprise the constituent elements of confidence in this model, as mentioned above in describing the critical factors for success.

Training in competitiveness analysis

Specialists had to be trained to identify potentially highly competitive conglomerates in each country. They had to be immediately available for the intensive job of preparing the studies and hammering out a set of useful proposals and recommendation to improve competitiveness in each conglomerate. At the time of writing of this document, some 200 people, including officials, entrepreneurs and members of labour organizations had participated in the training workshops on competitiveness analysis. National communities now have an invaluable resource for deepening, disseminating and extending the data on competitiveness to other sectors of their economies.

The fundamental challenge in this field is to use this built-in capacity for study and analysis to

explore other sectors, in addition to those already reviewed. A second component of the learning process concerns participation and observation of the research process, and its implications for subsequent cooperation efforts and the implementation of new management practices at the individual conglomerate level.

Requirements for enhanced competitiveness

The analysis of conglomerates and benchmark studies alone is no panacea for achieving competitiveness in a conglomerate. The process of study and implementation proved to be just as important as the content and findings of these studies. These requirements are mentioned in the section on critical factors for success as follows:

- confidence in the model;
- “democratization” of benefits;
- institutional development of critical actors;
- presence of a local stakeholder as leader;
- perseverance;
- resource availability;
- the existence of a crisis or threat to the sector;
- acknowledgement of the vulnerability of isolated efforts.

National competitiveness committees

Greater use should be made of the existing scaffolding of national competitiveness committees in each of the Central American countries as a key resource for efforts to strengthen local conglomerates. The basic function of these committees is to act as a forum for meetings, exchanges, discussion and follow-up on commitments arising out of the Central American Agenda for the Twenty-first Century. These committees can reaffirm and ensure the implementation of the specific agendas of individual conglomerates – a potential that should not be overlooked.

The challenge of equity

Strictly speaking, the analysis and development of conglomerates focuses on and favours, by definition, just a few sectors of the national economy: those with the greatest potential for global competitiveness. One fundamental challenge for all countries in the region will be to make use of the competitiveness model, instruments and practices in sectors that have been sidelined up to now, and which will irremediably widen the poverty gap if they continue to be ignored. We need to recognize the fact that an exclusive focus on competitiveness, especially

competitiveness in the agribusiness sector, is part but not all of the reality in the sector. There are major considerations concerning the broader concept of rural development. The challenge is to achieve a more competitive farm sector and at the same time address the current pressing social needs of the rural areas now home to nearly half the population of Central America.

COLD CHAINS: ONE ALTERNATIVE FOR THE RURAL SECTOR

Components of economic feasibility and viability

Post-harvest cooling of agricultural products is a necessity. Temperatures need to be brought down quickly and the product prepared for packing, storage or processing and final consumption. The point of post-harvest cooling of agricultural and livestock products is to successfully:

- suppress enzyme degradation and slow respiratory activity;
- lower or inhibit moisture losses;
- inhibit the proliferation of micro-organisms;
- reduce the production of ethylene.

Post-harvest cooling does not just protect product quality; it makes for a more flexible market situation by lengthening the time a product can be stored without losing its sensory properties. Cooling and storage will avoid the need to market these products almost immediately, which is an effective way of at once regulating both markets and prices.

In the cool highlands of Central America and especially in Guatemala, where ambient temperatures range from 10° to 15° C., some fruits and vegetables have a longer shelf life. This, however, is not enough: temperatures of 1° to 4° C are needed to conserve and transport export products, which require greater care. In the hot lowland areas of Guatemala, where temperatures above 30° C are frequent, poor product management was observed. Ignorance of or lack of interest in the introduction of new post-harvest management techniques led to a lowering of the quality of agricultural products carried to local, regional and national markets.

A number of aspects need to be considered before selecting a pre-cooling or cooling method.

- The nature of the product. Each product has its own cooling requirements. Strawberries and broccoli need to be maintained at near-freezing temperatures, whereas tomatoes can be damaged at these temperatures. Other products cannot be moistened, and so they cannot be pre-cooled with ice or water.

- A product has specific packing requirements. The selection of a cooling technique depends on whether a product is packed or not, and, if so, if it is bagged or crated. Packing design has an impact on the cooling behaviour and velocity of the technique selected.
- Flow capacity of the product. Some cooling methods are faster than others. The volume of product to be cooled per harvest, per day or per hour will affect how quickly a product needs to be cooled to cover the production of these volumes. Highly perishable products with a higher rate of respiration such as asparagus, broccoli, spinach and sweet maize need to be cooled quicker. They therefore also need to be kept at cooler temperatures and the quickest pre-cooling technique is also required.
- Economic restrictions. Construction and operating costs vary in accordance with cooling techniques. Initial outlay is usually high, especially when only small amounts of produce are to be cooled. Cooling costs need to be offset by high sale prices and other economic benefits. Factors affecting the choice and use of a given system will be influenced by the consequent market flexibility, market expansion, greater distances to be covered for transporting the product, and the farmer's capacity to invest now for later gains.

Suggestions for the transport of refrigerated agrofood products

Where products are subjected to high temperatures and great distances are to be covered, trucks need temperature regulation equipment. Various suggestions for transporting refrigerated food products are listed below:

- cool the vehicle before loading to the temperature at which the product has to be stored or shipped;
- ensure the loading area is closed and cooled; individual crates and bags need to be stacked so as to ensure the circulation of cold air throughout the load;
- test the refrigerating system to ensure it meets the cooling requirements for the specific product;
- include thermographs in the load to ensure it has remained at the proper temperature during the transfer process;
- check the condition of the vehicle walls, floor, roof and doors to ensure there are no cracks

or damage that might let in heat, dirt or insects, or cause losses of cold and moisture; also check to see that all doors and vents are in good working order;

- check to see that the vehicle is clean, and that there are no residual odours, toxic or other residues from the previous load, insects or their nests, or blocked air vents in the floor, all of which can damage cargo;
- park transport vehicles well away from areas where products are handled to avoid contamination from combustion fumes.

PROBLEM PRIORITIZATION

Multimodal transport in Central America

- All Central American countries have door to door services using two or more means of transport, but there is no appropriate legal framework to regulate these services.
- Formalities, procedures and documentation used in the food import/export sector are unduly complex.
- Customs services are making efforts to modernize and technify. However, there are still problems concerning the lack of technical and operational capacity to address the growing demand for more efficient services to handle foreign trade in the region.
- Some Central American agreements to facilitate international commerce are only partially (or not at all) complied with. The different modes and interfaces of transport services are often inefficient.
- Lack of coordination between the various public and private sectors involved in multimodal transport within and between countries. Transport standards are not harmonized and transport policies are mostly non-existent.
- Lack of electronic exchange of data, a key element in food transport.
- Lack of regulations governing freight transport.

Maritime transport services and ports

Various problems need to be addressed in the short-term, namely:

- technical problems of access channel depth and the availability of loading and unloading equipment;
- operational limitations and low productivity;
- institutional limitations, failure to take the long view and scant intra-regional technical cooperation;

- lack of infrastructure to meet the needs of maritime transport.

Customs

- lengthy, cumbersome, border customs procedures;
- financial and operational limitations;
- high user costs/operation/ton;
- qualitatively unsatisfactory loading services.

Airports and air transport

- sidewalk areas are not long enough to mobilize passengers efficiently;
- parking area problems;
- insufficient, saturated freight terminals;
- problems with increasing the number of take-off and landing strips;
- problems with increasing the number of terminal access doors.

Rail transport

- rail infrastructure designed to meet early twentieth century requirements;
- necessary investments to establish a new, high-performance rail network only feasible in corridors with sufficient traffic density to make participation competitive.

STRATEGIC PLANNING TO ADDRESS AGROFOOD TRANSPORT NEEDS

Key factors for guaranteeing food availability

Central America proposes to become an economically integrated area in which goods can be shipped via intermodal transport systems from one ocean to the other with no intra-regional limitations. The various regional ports can thus offer optimum service at lowest cost. Goods can be unloaded in one port in the country, re-processed in another and leave from a third port, using the transport services of any member country.

If Central America is to make this viable, the process of integration must be strengthened. Factors such as the harmonization of macroeconomic policies and regulatory frameworks need to be freer and more flexible to promote competitiveness and development in the region.

Below some of the problems facing the transport sector in Central America are listed.

- Limited capacity, deteriorating and poorly maintained road and rail networks, ports and airports.

- Barriers to genuine access to official financing offered by international financing bodies.
- Legal and regulatory frameworks not designed to attract private capital to the sector.
- Organizational and institutional gaps at the country level.
- Insufficient regional coordination with COMITRAN and its secretariat.
- These gaps reflect, in some sense, the high operational costs of product handling, and are making the Central American economies less competitive.

The regional transport policies now being promoted in the transport sector in support of regional integration are listed below.

- Modernization of the transport infrastructure and services.
- Competence and complementarity among means of transport.
- Strengthening the state planning and regulatory role in each country and in regional coordination.
- Reorganization of public investment under the criterion of subsidiarity.
- Promotion of private management and financing of public infrastructure.
- Incorporation of environmental impact aspects.
- Helping to facilitate transport through inter-sectoral coordination.

POLITICAL AND SOCIAL ASPECTS: EFFECTIVENESS OF PROPOSED SOLUTIONS

Market structures have changed significantly in recent years. The state role in marketing and financing basic commodities has shifted from direct intervention to a new openness to private sector participation. Nonetheless, the inherent risks of the already cited instability do have a direct impact on producers and/or other local stakeholders. In this context, then, it is important to explore the various mechanisms that can be applied to find the right solutions for each country and each market. In a context of liberalization, local agents are encountering a number of stumbling blocks to accessing financing. New financing structures based on the use of raw materials as a form of collateral guarantee can substantially improve access to financing under terms that will allow the agrofood industry to develop. This section looks at several examples of price risk management and specific financing structures.

Need for external service providers (quality control, insurance, and more)

- The economic integration process has been ongoing for many years now, but the Central American market is still very far from constituting a true free trade zone. Missing is the standardization of existing regulation as well as free trade among participating countries. Some characteristics mentioned by the Costa Rican Chamber of the Food Industry (CACIA) concerning the intra-regional food trade are listed below.
- Poor economic integration of the regional market. The legislation has not been standardized, there are still no mechanisms for conflict resolution, and decisions on trade matters are arbitrary, especially for technical quality standards and sanitary records.
- There are no specified periods for prior approval and plant inspection by the Ministries of Agriculture, a constraint to regional market opportunities.
- Regional competitiveness should be bolstered using a productive chains approach.
- Problems with local market shortages lead to requests for safeguards for the importation of raw materials or inputs, and these temporarily reduced the tariff for the firm to the detriment of other regional suppliers.
- It is hard to track trade flows in the region because the statistics are so complex to process, given the unrecorded trade that goes on in the region.
- There is no strategy for regional capacity-building for food safety and standards, especially the standardization of food labelling norms, inspection and licensing.
- Information on food production is lacking in all countries.

CONVERGENCE OF ECONOMIC POLICIES IN CENTRAL AMERICA

Principal convergences of regional economies

The countries of the region have made major efforts to achieve macroeconomic stability and the convergence of economic policy based on the Peace Accords. Stability and convergence have been mentioned above as key to enhancing the business climate and attracting investment. Unsurprisingly, then, new steps are being taken in the region towards greater openness, deregulation, the transfer of government functions to the private

sector, and the transformation of investment policy frameworks. These and other efforts aim to make the region more efficient and more competitive. But the changes have not gone forward at the same pace and to the same extent in every country. The region faces substantial challenges that must be met if the objective is to achieve high rates of sustained growth and address the implied task of economic and social development.

The demands of the economic, social, environmental and institutional plan therefore represent a genuine challenge for the economies of the region. The infrastructure and *per capita* income gaps, the high incidence of poverty, and the lagging development of regional institutions are among the major constraints to tackling the problems of growth and human development, achieving stability, and consolidating a favourable climate for investment. A consolidated environment guaranteeing both the safety of its citizens and the legal security of investments is fundamental to heightened trade flows in the region.

Progress in the economic integration of Central America has been slow-paced. This is particularly true of issues such as harmonizing economic policies, and the customs union. The need to negotiate rules of internal origin clearly shows how far we still are from the framework of the Central American Common Market (CACM). Duly negotiated concrete projects, such as the Central American Logistical Corridor, for example, are not being implemented. Progress is lacking in areas such as the free movement of goods and persons, the monetary union, the unification of economic legislation, enhanced free trade areas and business facilitation, harmonization of regulatory frameworks and the improvement of regional infrastructure. One of the most worrying regional trade issues, however, especially for agricultural and livestock products, is the question of non-tariff barriers.

It is worth recalling that the issue of tariff barriers is fairly well resolved in Central America. The area could be described as a working free trade zone with some room for improvement. The multilateral commitments of countries in the region, under the FTAA and the WTO, require a revised export strategy for Central American countries based on the eventual elimination of some of the benefits of duty-free areas. This trend has been of particular importance for the region in its trade relations with the world, much more so than the eventual elimination of some of the intra-regional benefits of duty-free areas.

It needs to be pointed out that intraregional trade never stopped, even at the height of hostilities, but pacification has substantially increased trade within the region. So it comes as no surprise that businesses are working hard to regionalize. In the commercial sphere this involves supermarket chains; in industry, food, beverages and construction materials; in the service industry, airlines, hotels and restaurants; and in the financial sector, banks and financial investments. Regional institutions promoting the establishment of a unified and interconnected market for electric power, integrated fossil fuel markets and the construction and maintenance of transport infrastructure and services, among others, pave the way for progress in these sectors.

To sum up, the **business climate** has increasingly improved since the 1990s in the region. Despite the persistence of certain major risk factors, there is every indication that the countries of the region are well on their way to completing the reform process and consolidating stability, though not necessarily at the same pace. One proof of this process is the major growth in direct foreign investment and intraregional investment alike, in response to the new opportunities opening up for trade and for increased private sector participation in the economic sector. The challenges are still enormous, however, in terms of the major investments that will be needed for infrastructure and in connection with the human development aspects in the region.

Macroeconomic convergence

Overall economic performance is one of the region's greatest challenges. Output growth rates have been less than satisfactory. In 1999 the regional average was 3.7 percent, lower than in the early 1990s. The average per capita income in the region was US\$1 518, with a major gap between Costa Rica's yearly average of nearly US\$2 900, El Salvador and Guatemala somewhere between US\$1 600 and 2 000, and Nicaragua and Honduras under US\$900. This represents a major challenge for the future in terms of opportunities for economic growth and social stability. Looked at from the standpoint of economic convergence, real output growth rates in the 1990s showed no clear growth trend. On the contrary, erratic economic behaviour fluctuating between one and two percent characterizes the period. **Inflation rates** had dropped somewhat by 1999 compared to the previous year, and were the lowest in the decade at 6.1 percent for the region as a whole. This is evidence of a general

downward inflationary trend, greater efforts to control domestic price trends and better monetary discipline and credit control in each country. It is important to point out that no negative interest rates in real terms (such as had occurred earlier in Guatemala and Honduras) were recorded in 1999, reflecting some progress in deepening of financial markets in Central America.

Convergence was also observed in exchange management. Guatemala and Honduras both adopted a free exchange regime, achieving stability through the active intervention of the central banks. The type of exchange operating in Costa Rica and Nicaragua is administered by the Central Bank under the so-called crawling peg system of minidevaluations. In El Salvador, sustained affluence from family remittances from abroad has long made it possible to maintain a type of fixed exchange and accumulate foreign exchange. More recently, in January 2001, the US dollar was allowed to circulate freely together with the local currency. The trend toward greater convergence and lesser annual variation in the type of exchange is also related to economic adjustment. Economic adjustment generally tends to reduce inflation and promote the use of more transparent exchange systems, less influenced by currency market interventions, and hence more realistic currency prices.

Concerning **fiscal matters**, the countries of the region have improved their tax collection policy through the imposition of new taxes. Major macroeconomic fiscal imbalances still persist in the region, however. Costa Rica, Honduras and Nicaragua are finding it hard to reduce their fiscal deficits: the result of past policies of increased public expenditure financed by internal or external debt. This laid a heavy burden of debt servicing and interest payments, which in the long run made it impossible to reduce public spending. So far, El Salvador and Guatemala are not looking at major debt problems, but they do need to continue their efforts to improve tax collection, make revenue earmarking more efficient, and increase the tax burden to put them in compliance with the commitments of the Peace Accords.

The fiscal deficit is clearly on a downward trend in the region, with a certain amount of convergence in terms of the direction of the deficit from one country to the next. There were years like 1994, for example, when every country except Honduras had low fiscal imbalances, unlike what happened in 1996. This can be attributed to their tax structures,

which are heavily dependent on foreign trade. Regional efforts for tariff harmonization and exemption are reducing tariff levels and tariff rate dispersion. Despite this, some products, especially agricultural products, still have high protective tariffs. This testifies to the difficulties Central American countries still face in adapting to a free trade area under a common external tariff.

The Tariff Exemption Programmes apply only to goods originating in each country participating in the trade agreement. This is particularly important where treaties involve the participation of several countries. The rule of origin is fundamental in avoiding triangulation where the levels and timetables for exemption differ from one country to the next.

VIABLE SOLUTIONS FOR THE TRANSPORT OF FOOD PRODUCTS

Among the existing solutions for solving food transport problems, the following deserve mention.

- Establish an infrastructure that can link the most remote hamlet in the interior anywhere in the region with the big regional markets and the rest of the world. This would serve to reduce operating expenses, make these remote areas more competitive, and broaden access to the benefits of free trade. The goal is to turn the region into a highly attractive investment and trade centre, given its geographical location, providing an optimum infrastructure, accountable and efficient institutions, qualified human capital and good business sense.
- Lease the services of El Salvador's International Airport, rail network and the Port of Acajutla, approving the necessary legislation, to provide a more competitive framework.
- Build and/or rebuild those roads identified as crucial for national development in line with the needs identified by the government, the National Plan and the Plan Puebla Panama. This would include the north-running highway, the interoceanic highway from the ports to the Atlantic, the highway to Santa Ana, the highway to Quezaltepeque, the Pan-American highway to Oriente, the coast highway from San Miguel to La Unión, the Santa Ana-Metapán-Anguiatú road and the San Salvador ring road.
- Continue the second phase of the project "Sustainable Rural Roads", to develop regions

with few connections to the remainder of the country, such as the access road from the northern trunk road to the town of Las Pilas, Chalatenango and the road between Ilopango and Santiago Texacuangos that links the Pan-American highway to the freeway leading to El Salvador's International Airport, among others.

- Revise, formulate and modernize the legal framework for overland freight and passenger transport, creating the underpinning for sector competitiveness.
- Approve the Special Law on Mandatory Insurance for Motor Vehicles.
- Establish and maintain a systematic study of regional and international legislation on overland freight transport so as to harmonize local legislation.
- Establish overland freight transport reciprocity mechanisms with other Central American countries and ensure compliance.
- Develop the original project to reform collective transport for passengers.
- Take the necessary steps to ensure competitive market prices for air and sea transport of freight and passengers.
- Monitor the internal operations of the freight transport service to avoid unfair competition by carriers from other countries.

FORMULATION OF STRATEGIES AND POLICIES TO IMPROVE THE TRANSPORT OF AGROFOOD PRODUCTS

The presidents of the Central American countries, spurred by the growing globalization of the world economy and by progress in democratization and pacification in the region, agreed to formally relaunch the Central American integration process. The new basis for integration would make the national processes of external openness compatible with a renewed process of regional integration in a context of open regionalism.

The proposal of the Central American transport sector "Global Frameworks for Regional Transport Infrastructure and Components of a Regulatory Legal Framework" suggests:

- accelerating change in legal frameworks and institutional modifications; components of loans or technical cooperation to finance this type of efforts are already operating in the countries of the isthmus;
- integrating individual country efforts, identifying successful reform experiences

in the region or in other Latin American countries, and promoting short-term workshops and visits;

- creating road maintenance funds;
- promoting leasing legislation to allow private sector investment for the rehabilitation and operation of existing infrastructure;
- applying re-engineering in ministries and autonomous bodies working in the sector, stressing long-term planning, streamlining and upgrading, and the awarding and execution of work contracts;
- harmonize and step up a regionally-oriented process of legal, regulatory and institutional reform in the various countries.

Financing the regional master plan will enable precise definition of new regional projects and their funding needs, in light of interaction with specific ongoing national projects. As the integration process evolves, the necessary regional mechanisms for implementing the works can be clearly defined:

- proposals of the regional master plan;
- provision of services to the six urban areas generating industrial production for intraregional trade, as well as the electronic assembly plants and the garment industry;
- attention to the major agroexport production zones;
- general services for the main centres of tourist, archaeological, historic, folklore and recreational interest;
- provision of services to certain lightly populated areas on the Atlantic side.

Measures to improve the transport services:

- institution-building studies;
- legal and leasing studies;
- design and regulation manuals;
- transport infrastructure studies;
- project monitoring profiles;
- transport facilitation studies.

REDUCTION OF POST-HARVEST LOSSES Sociological, economic and institutional consequences of post-harvest food losses

Material losses occur at various phases from crop maturity to the point of final consumption. These losses can be reduced at any stage of the post-harvest process by improving harvesting, drying, storage, processing, and/or handling techniques. These processes and operations are inter-related, however, and all are affected by the prevailing environmental conditions, be these climate-related,

sociological, economic, agronomic, cultural or ecological considerations.

Any steps taken to reduce post-harvest losses must be both economically justifiable and practical with reference to the predominant post-harvest system. A clear and detailed analysis of how the system operates under specific concrete circumstances is an essential pre-condition to reducing (or even evaluating) post-harvest losses. Only then can constraints, problems, and possible solutions or improvements be identified.

In some countries rice is precooked, which improves its nutritional content. This is why consumers are willing to pay a little more for it. Precooking also makes it easier to process rice. And where processing equipment is quite minimal, there are fewer broken grains and fewer losses. However, in some countries people consider precooked rice an inferior product, and prefer to pay more for highly processed white rice with a lower percentage of broken grains. The introduction of the precooking process might not receive widespread acceptance, therefore. Factors such as cost-efficiency, the institutional framework, labour availability and consumer preferences need to be reckoned into the equation.

Post-harvest loss prevention will only be undertaken if it represents a benefit for the producer. In a subsistence economy, prevention might entail the storage of cereal grains or tubers, with the benefit consisting of the fact that the product remains edible longer. There is usually just one harvest and so any part of the harvest that is not consumed immediately accumulates, and has to be stored somewhere if it is not to be lost.

In a mixed subsistence/market economy, or in one where products are grown only for sale, producers will introduce into the post-harvest process only those changes they believe will contribute to and boost their income. These changes will only be adopted, however, if the operation is cost beneficial, and markets can absorb larger amounts at cost-effective prices for the producer.

Many factors affect the cost of post-harvest loss prevention. Usually post-harvest loss prevention projects include such activities as the introduction of techniques to reduce material losses and boost the income of small-scale farmers. Such projects tend to improve the handling, storage and pre-processing of cereal grains, pulses, roots and tubers, and to introduce techniques to preserve the quality of fruits and vegetables. Storage structures

at the farm and village level have also been supplied to support these activities. Storage sheds and small-scale dryers have been provided, and processing equipment improved (from rice threshing to fruit and vegetable grading and packing). Rodent and insect pest control measures have been enhanced and training undertaken on all aspects of all phases of post-harvest loss reduction. It is important that the initial cost-benefit analysis is seen to be positive. According to some reports, a cost-benefit ratio of 1:1.5 is not good enough to persuade farmers to accept the risk of introducing a change in post-harvest loss prevention activities. On the other hand, a 1:2 ratio will probably provide sufficient incentive. This approach can be a meaningful guideline for post-harvest loss reduction planners, project managers and those responsible for training activities in this field.

Storing cereal grains in metal drums on the farm or village will probably reduce grain losses, but the initial cost of the drums can be too high with respect to the amounts saved in the short term to appeal to farmers. On the other hand, when the cost is quite low, the innovation will be replicated, as in the case of a storage container made of clay and straw combined with insecticide use. In this case the only outlay is for the insecticide, whereas the straw and clay can be found *in situ* and the container built with family labour. Some farmers store rice in wooden bins, and many houses have such bins. They measure about 2 x 1.5 m, and are built out of readily available hardwood. They are rodent-proof and often comprise an integral part of the home. The initial outlay is negligible, and the bins last for many years.

Another factor to bear in mind in making a cost/benefit evaluation is whether the product is intended for home consumption or for sale. If the improvement affects a product for home consumption, and concerns product quality, producers are reluctant to shell out money for the innovation. The introduction of simple crop dryers aroused interest even for crops for home consumption even though they produce discoloration and a bad taste. The situation changes for crops intended for sale, especially where sale prices fluctuate markedly in accordance with the moisture content or the content of additional elements. A producer will usually want to take steps to reduce imperfections and get a higher price, although the price differential is not always sufficient to impel the producer to invest in the improvement.

Those responsible for cereal purchase price-setting should consider that offering a price incentive to farmers for well-dried grain, and promoting efficient on-farm drying, means that the authorities will not have to bear this cost. Drying will be faster, and a viable activity of post-harvest loss prevention for the producer developed, cutting material losses and at the same time greatly reducing official operating costs.

An important factor in the cost-benefit ratio is to anticipate the substitution of capital goods. The storage tools, machinery or installations provided in connection with post-harvest loss prevention will need to be repaired, maintained, and replaced. These are factors to consider in the initial cost estimates of post-harvest loss prevention.

An important aspect of cost-benefit analysis is to proceed as precisely as possible. It is easier to determine costs than to quantify benefits. Unforeseen costs may arise, so costs need to be overestimated. Benefits are usually based on the estimated future sale price, unless the product is to be sold to an agency, such as a market board, where the purchase price for the upcoming season has been declared in advance.

The labour force

All development projects with a strong component of technological change have an impact on employment. Post-harvest loss prevention projects are no exception to this rule. A study done in Asia, a traditional rice-growing area, observed that the introduction of the pedal thresher and rice processor caused significant labour displacement, even when food losses were not successfully reduced. The innovations were, in fact, introduced as labour-saving devices.

It is important to maintain the demand for labour because it is fundamental to demonstrate that the proposed innovations will neither increase or diminish the demand for labour even when labour shortages or surpluses are anticipated for a given crop or processing technique in other areas. The histogram describing the labour needs of an average farm family for one year is a widely used method for analyzing the distribution of labour.

TRAINING PROGRAMME

The objective of a training programme is to ensure that all staff at every stage of the process are fully aware of good hygiene and farming practices, and of their own role and responsibility in maintaining the safety, quality and hygiene of the agrofood

products intended for human consumption in which they are directly involved.

Training is fundamental for any food hygiene system. Insufficient training in hygiene-related matters for staff directly involved in food handling implies a high degree of risk for food safety and its fitness for consumption.

Supervisors are needed for constant supervision and monitoring of the handling of inputs, procedures and harvest products. Employees need to be sufficiently well-informed about their own job, whatever that may be, at every stage of the fresh produce chain, and take due responsibility for safeguarding this produce against contamination and damage.

Training and refresher training

The most important training components to consider include:

- training staff for supervisory duties, and to detect and correct errors;
- implementing periodic training and refresher training in compliance with job development;
- designing training to foster a better understanding of the importance of specific product handling practices, particularly sanitation or personal hygiene, as well as sanitizing the means of transport in use;
- joint training for staff working at the various stages of the production process;
- training programmes need to be periodically revised and updated as required for each specific process;
- once staff have received training they should be subjected to periodic controls. Supervisors will need to have a good grounding in the principles and practices of food hygiene. They need to know enough to evaluate potential risks and adopt the necessary measures to remedy any gaps.

Records and control

Records and controls, though often disregarded by small businesses, should instead give consideration to the basic importance of documenting and recording the relative data on the goods they ship: quantities, general condition of the product, ripeness index, and other considerations.

Tracking products in the market

Packers should ensure they have some efficient way of tracking products so that they can be quickly located and withdrawn in case of

possible threat to consumer safety. The products should be accompanied by the necessary detailed information for tracking and investigation. The packers' data should match the data supplied by farmers, so that the products can be back traced from the distributor to the field, allowing produce suspected of contamination to be retrieved. Every product recipient should be permanently marked so that container and lot can be identified. Products representing a possible threat need to be kept under supervision until they can be eliminated as required.

TRANSPORT COST/BENEFIT RATIOS

The estimated cost of developing the road infrastructure programme in Central America amounts to US\$ 4 650 000 000 (four billion six hundred fifty million US dollars). This would promote development in the area, make transport more mobile, and facilitate freight transport throughout the isthmus. The figure comes from the Sectoral Board of the Commission of Ministers of Transport (COMITRAN).

The benefits deriving from the application of this programme would be many. Regular transport of agrofood products from farmgate to market and industrial centres would reduce the value losses of products marketed by many of the region's producers.

The positive results anticipated from upgraded channels of communication in the region include:

- stepped-up production for traditional activities;
- lower production costs from adjusted transport costs (fleets);
- the construction of highway infrastructure will benefit many families in the region, in light of the existing labour pool available for work on these projects.

Conclusions and recommendations

CONCLUSIONS

- Modernize the legal, organizational and regulatory framework of the transport sector in each country, for a more efficient performance from the public sector and enhanced private sector participation.
- Strengthen the machinery of regional coordination to ensure that institutional reform and planning in each country answer to a coherent and long-term regional vision and strategy.
- Modernize long-term regional planning, incorporating aspects of environmental sustainability.

RECOMMENDATIONS

- Bring regional transit operation up to a minimum standard of comfort, safety and efficiency.

- Improve the load-carrying capacity of road surfacing (pavement).
- Improve the load-carrying capacity of bridges.
- Improve geometric design.
- Develop self-financing road maintenance programmes.
- Develop marketing infrastructure for agricultural and livestock products at different sites in each country, such as CENMA in Guatemala and La Tiendona in El Salvador.
- Privatize most aspects of the design, inspection, construction, operation and maintenance of road networks.
- Strengthen the planning and regulatory functions of the Ministries of Public Works and Transport.

