

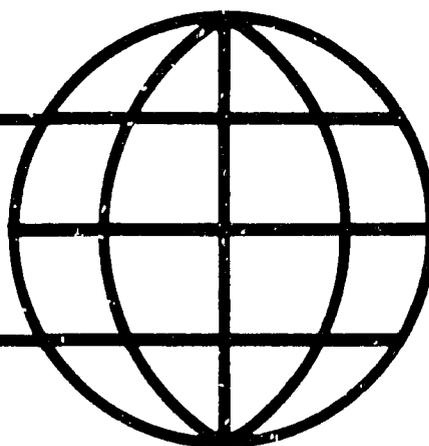
**COOPERATIVE AGREEMENT ON HUMAN SETTLEMENTS  
AND NATURAL RESOURCE SYSTEMS ANALYSIS**

CENTRAL PLACE SYSTEMS IN GUATEMALA: THE FINDINGS OF THE  
INSTITUTO DE FOMENTO MUNICIPAL (A PRECIS AND TRANSLATION)

RICHARD W. WILKIE  
ARMIN K. LUDWIG

University of Massachusetts-Amherst

Rural Marketing Centers Working Group  
Clark University/Institute for Development Anthropology  
Cooperative Agreement (USAID)



**Clark University**  
International Development Program  
950 Main Street  
Worcester, MA 01610

**Institute for Development Anthropology**  
Suite 302, P.O. Box 818  
99 Collier Street  
Binghamton, NY 13902

PMAT-44

CENTRAL PLACE SYSTEMS IN GUATEMALA: THE FINDINGS OF THE  
INSTITUTO DE FOMENTO MUNICIPAL (A PRECIS AND TRANSLATION)

RICHARD W. WILKIE  
ARMIN K. LUDWIG

University of Massachusetts-Amherst

Rural Marketing Centers Working Group  
Clark University/Institute for Development Anthropology  
Cooperative Agreement (USAID)

August 1983

THE ORGANIZATION OF SPACE IN THE CENTRAL BELT OF GUATEMALA  
(ORGANIZACION DEL ESPACIO EN LA FRANJA CENTRAL  
DE LA REPUBLICA DE GUATEMALA)

Juan Francisco Leal R., Coordinator of the Study

Secretaria General del Consejo Nacional de  
Planificacion Economica (SGCNPE)

and

Agencia Para el Desarrollo Internacional (AID)

Instituto de Fomento Municipal (INFOM)

Programa: Estudios Integrados de las Areas Rurales (EIAR)

Guatemala, Octubre 1981

## Introduction

In 1981 the Guatemalan Institute for Municipal Development (Instituto de Fomento Municipal-INFOM) under its program of Integrated Studies of Rural Areas (Estúdios Integrados de las Áreas Rurales-EIAR) completed the work entitled Organizacion del Espácio en la Franja Central de la República de Guatemala (The Organization of Space in the Central Belt of Guatemala). This work had its origins in an agreement between the government of Guatemala, represented by the General Secretariat of the National Council for Economic Planning, and the government of the United States through its Agency for International Development. As a part of this agreement the Institute for Municipal Development undertook the ordering of towns and hamlets on the basis of their infrastructure, facilities and existing goods and services, and took account of the places where these goods and services should be developed so that the rural populations can avail themselves of them. The Institute also defined the spatial relationships between these places and their tributary rural areas.

## The Instituté's Approach to the Problem

The Instituté's approach to the problem was two-fold: theoretical and practical. The first three parts (14 pages) of the 100 page text are given over to theoretical and methodological treatments of central place and tributary area concepts embodied in works by Christaller, Lösch, Galpin, Lalanne, Castello and Coraggio. A four point program proposed by the Institute constitutes a practical use of the results of its central place analysis. The first of these points... would focus on deconcentration of development investment in major cities and the shifting of this investment to less developed areas with a concentration on rural production and on the infrastructure that supports that production. The second point would also

involve the decentralizing of investments but in this case by orienting them to population centers in the middle of the urban hierarchical structure thus providing some counterbalance to the extreme weights of Guatemala City, the national capital, and the second city, Quezaltenango. The third point in the program envisions a more equitable distribution of investments in order to strengthen economic and social ties between small cities and their areas of influence in the urban hierarchy. A fourth program would improve existing transport ties between the rural locations and the urban centers by heavy investment in the road network.

Chapter five of the work presents 14 pages of historical antecedents to the spatial occupation of the Franja Central of Guatemala. Information leading to an understanding of the present day central place structure is generally descriptive and limited to such phrases as, "The capital city and Quezaltenango constituted the most important centers for financial and banking operations." The second part of the chapter presents population data from the 1950, 1964 and 1973 censuses. Of most concern to the Institute is the acceleration in the rate of urban population growth, a condition readily demonstrated, particularly for large urban centers, by the Lorenz curve which has steepened toward the right considerably from 1964 to 1973.

#### The Study Area

The study area covered 16 contiguous departments and 209 municipios in the Franja Central. These are listed on Table 1. Eleven of these departments were covered in full; five were only partially covered. Only central places with 500 or more inhabitants were included in the study. The total came to 1,987 central places of which 15 were department capitals, 194 were municipio seats and 1,778 were hamlets and aldeas.

#### Centrality and the Index of Centrality of Guatemalan Central Places

The report notes that the centrality of a place can be considered in two ways. In a strict sense the centrality concept includes only those central functions which are in excess and thus serve the inhabitants of the hinterland (area of influence), but in the sense used in this study all private commercial and service functions that serve the population both in the community and the hinterland are considered central functions. The purpose of this study is to obtain a weighted index for each of the 1,987 places covered in the study which indicates its position in a systematic hierarchy on the basis of the private goods and services offered.

Table 1

Municipios by Departments in the Study Area

Huehuetenango

- |                                 |                                 |
|---------------------------------|---------------------------------|
| 1. San Antonio Huista           | 17. Santa Bárbara               |
| 2. Nentón                       | 18. Todos Santos Cuchumatán     |
| 3. Jacaltenango                 | 19. Aguacatán                   |
| 4. Concepción                   | 20. La Democracia               |
| 5. Santa Ana Huista             | 21. Cuilco                      |
| 6. Barillas                     | 22. Istahuacán                  |
| 7. Santa Eulalia                | 23. La Libertad                 |
| 8. San Mateo Ixtatán            | 24. San Gaspar Ixchil           |
| 9. San Sebastian Coatán         | 25. Tectitán                    |
| 10. Soloma                      | 26. San Pedro Necta             |
| 11. San Miguel Acatán           | 27. San Juan Atitán             |
| 12. San Rafael La Independencia | 28. San Sebastián Huehuetenango |
| 13. San Juan Ixcoy              | 29. San Rafael Petzal           |
| 14. Huehuetenango               | 30. Colotenango                 |
| 15. Chiantla                    | 31. Santiago Chimaltenango      |
| 16. Malacatancito               |                                 |

Totonicapán

1. Totonicapán
2. San Cristóbal Totonicapán
3. San Andrés Xecul
4. San Francisco El Alto
5. Momostenango
6. Santa María Chiquimula
7. San Bartolo
8. Santa Lucía La Reforma

Chimaltenango

1. Chimaltenango
2. San José Poaquil
3. San Martín Jilotepeque
4. Comalapa
5. Santa Apolonia
6. Tecpán Guatemala

Quezaltenango

- |                              |                             |
|------------------------------|-----------------------------|
| 1. Quezaltenango             | 11. San Martín Sacatepéquez |
| 2. Salcajá                   | 12. La Esperanza            |
| 3. Almolonga                 | 13. Palestina de Los Altos  |
| 4. Cantel                    | 14. Ojitepeque              |
| 5. Zunil                     | 15. San Carlos Sija         |
| 6. Cajolá                    | 16. Sibilia                 |
| 7. San Miguel Siguilá        | 17. Huitán                  |
| 8. San Juan Ostuncalco       | 18. Cabricán                |
| 9. San Mateo                 | 19. San Francisco La Unión  |
| 10. Concepción Chiquirichapa |                             |

Table 1 (continued)

San Marcos

- |                                |                       |
|--------------------------------|-----------------------|
| 1. San Marcos                  | 11. Comitancillo      |
| 2. San Pedro Sacatepéquez      | 12. San Lorenzo       |
| 3. San Antonio Sacatepéquez    | 13. Tacaná            |
| 4. Esquipulas Palo Gordo       | 14. San José Ojetenam |
| 5. Río Blanco                  | 15. Sibinal           |
| 6. San Rafael Pie de la Cuesta | 16. Ixchiguán         |
| 7. Concepción Tutuapa          | 17. Tajumulco         |
| 8. San Miguel Ixtahuacán       | 18. Malacatán         |
| 9. Sipacapa                    | 19. Catarina          |
| 10. Tejutla                    |                       |

Quiché

- |                              |                            |
|------------------------------|----------------------------|
| 1. Chajul                    | 10. San Pedro Jocopilas    |
| 2. San Juan                  | 11. Chiché                 |
| 3. Nebaj                     | 12. Chinique               |
| 4. Uspantán                  | 13. Zacualpa               |
| 5. Cunén                     | 14. Joyabaj                |
| 6. Sacapulas                 | 15. Santa Cruz de Quiché   |
| 7. San Andrés Sajcabajá      | 16. Chichicastenango       |
| 8. Canillá                   | 17. Patzité                |
| 9. San Bartolomé Jocotenango | 18. San Antonio Ilotenango |

Baja Verapaz

1. Rabinal
2. El Chol
3. Cubulco
4. Granados
5. Salamá
6. San Miguel Chicaj
7. San Jerónimo
8. Purulhá

El Progreso

1. El Progreso
2. Morazán
3. San Agustín Acasaguastlán
4. San Cristóbal Acasaguastlán
5. El Jícato
6. Sansare
7. Sanarate
8. San Antonio La Paz

Sololá

- |                          |                               |
|--------------------------|-------------------------------|
| 1. Panajachel            | 10. Santiago Atitlán          |
| 2. San Andrés Semetabaj  | 11. San Antonio Palopó        |
| 3. Santa Catarina Palopó | 12. Sololá                    |
| 4. San Lucas Tolimán     | 13. San José Chacayá          |
| 5. Santa Cruz La Laguna  | 14. Santa María Visitación    |
| 6. San Pablo La Laguna   | 15. Santa Lucía Utatlán       |
| 7. San Marcos La Laguna  | 16. Nahualá                   |
| 8. San Juan La Laguna    | 17. Santa Catarina Ixtahuacán |
| 9. San Pedro La Laguna   | 18. Santa Clara La Laguna     |
|                          | 19. Concepción                |

Table 1 (continued)

Guatemala

- |                          |                           |
|--------------------------|---------------------------|
| 1. Santa Catarina Pinula | 6. Mixco                  |
| 2. San José del Golfo    | 7. San Pedro Sacatepéquez |
| 3. Palencia              | 8. San Juan Sacatepéquez  |
| 4. San Pedro Ayampuc     | 9. San Raimundo           |
| 5. Chinautla             | 10. Chuarrancho           |

Alta Verapaz

- |                      |                                 |
|----------------------|---------------------------------|
| 1. Cobán             | 8. Panzós                       |
| 2. San Pedro Carchá  | 9. Senahú                       |
| 3. Chisec            | 10. Tukurú                      |
| 4. Chahal            | 11. Tamahú                      |
| 5. Cahabón           | 12. San Cristóbal Verapaz       |
| 6. Lanquín           | 13. Santa Cruz Verapaz          |
| 7. San Juan Chamelco | 14. Tactic                      |
|                      | 15. Fray Bartolomé de Las Casas |

Zacapa

- |              |               |
|--------------|---------------|
| 1. Río Hondo | 6. Huité      |
| 2. Teculután | 7. Zacapa     |
| 3. Usumatlán | 8. Estanzuela |
| 4. Cabañas   | 9. Gualán     |
| 5. San Diego | 10. La Unión  |

Chiquimula

- |                       |                         |
|-----------------------|-------------------------|
| 1. Chiquimula         | 6. Olopa                |
| 2. San José La Arada  | 7. Esquipulas           |
| 3. San Juan La Ermita | 8. Concepción Las Minas |
| 4. Jocotán            | 9. Quezaltenpeque       |
| 5. Camotán            | 10. Ipala               |
|                       | 11. San Jacinto         |

Jutiapa

- |                  |                         |
|------------------|-------------------------|
| 1. Asunción Mita | 9. Conguaco             |
| 2. Yupiltepeque  | 10. Jutiapa             |
| 3. Atescatempa   | 11. El Progreso         |
| 4. Jerez         | 12. Santa Catarina Mita |
| 5. El Adelanto   | 13. Agua Blanca         |
| 6. Zapotitlán    | 14. San José Acatempa   |
| 7. Comapa        | 15. Quezada             |
| 8. Jalpatagua    |                         |

Jalapa

1. Jalapa
2. San Pedro Pinula
3. San Luis Jilotepeque
4. Monjas
5. San Carlos Alzatate
6. Mataquescuintla
7. San Manuel Chaparrón

Izabal

1. El Estor
2. Puerto Barrios
3. Livingston
4. Morales
5. Los Amates

### Coefficient of Location of a Central Function

The report establishes the coefficient of localization for 80 central functions in the Franja Central of Guatemala. These coefficients do not enter into the calculation of the hierarchical position of any given community, but they do serve to compare certain central functions in Guatemala with similar functions elsewhere. The coefficient is given by:

$$C_i = \frac{1}{N_i} \times 1000 \quad \text{in which}$$

$C_i$  = coefficient of location of central function  $i$

$N_i$  = total number of installations of central function  $i$  in the study area, the Franja of Guatemala

This coefficient is inversely proportional to the number of central functions in the study area. The central function coefficients are shown on Table 2.

### The Index of Centrality

This index is the basis for the hierarchy of central places developed in this study. It is a composite of the indices of centrality for each central place function located in a central place. It is given for each central place function by:

$$C_{ix} = \frac{1000}{N_i} \times N_{ix} \quad \text{in which}$$

$C_{ix}$  = index of centrality of central function  $i$  in central place  $x$

$N_i$  = total number of installations of central place function  $i$  that occur in the study area, the Franja Central of Guatemala

$N_{ix}$  = number of installations of central place function  $i$  that are located in central place  $x$

After this index is computed for every central place function in a given central place these indices are summed to yield what the study refers to as the global index of centrality. It is given by:

$$I_x = \sum_{i=1}^n \quad \text{in which}$$

$I_x$  = global index of centrality of place  $x$

$C_{ix}$  = index of centrality of central function  $i$  in central place  $x$

$i$  = number of central functions in central place  $x$

The highest global index values will pertain to those central places that offer the most specialized, least frequently sought goods and services.

Table 2

## Coefficients of Localization of Privately Owned Central Place Functions in the Franja Central of Guatemala

Function	Coefficient	Function	Coefficient
1. Street Vendors	0.068	41. Basic Schools	8.696
2. General Stores	0.103	42. Chicken and Egg Vendors	9.174
3. Stores	0.112	43. Cinemas	9.259
4. Grain Mills amal	0.346	44. Alcoholic Beverages	9.434
5. Bars	0.358	45. Pool Halls	9.524
6. Meats	0.481	46. Seed Vendors	9.615
7. Food Vendors	0.548	47. Radios and T. V.'s	9.804
8. Clothing	0.562	48. Watch Sales and Services	10.000
9. Tailors	0.566	49. Non-Alcoholic Beverages	10.204
10. Marranerias	0.763	50. Hotels	10.417
11. Bakeries	0.763	51. Native Stores	10.417
12. Miscellaneous	0.862	52. Funeral Homes	10.526
13. Carpentry Shops	1.245	53. Autobuses	11.111
14. Pharmacies	1.931	54. Dairy Products	11.765
15. Barbers	1.965	55. Electricians	12.821
16. Shoes/Leather Goods	2.336	56. Wood Vendors	13.158
17. Shoes	2.370	57. Sword Belt Shops (Talabarterias)	13.333
18. Lawyers/Notaries	2.577	58. Agro-Chemicals	15.385
19. Medical Clinics	2.941	59. New and Used Automobiles	16.949
20. Mechanics Shops	3.040	60. L.P. Gas	16.949
21. Microbuses	3.333	61. Radio Stations	18.182
22. Dry Goods	3.509	62. Fireworks Shops	18.868
23. Blacksmiths	3.774	63. Printing and Publishing	18.868
24. Cafes	3.846	64. Medical Laboratories	18.868
25. Pensions	3.846	65. Diversified Schools	21.277
26. Bars and Restaurants	4.098	66. Photocopies	22.222
27. Private Police	4.831	67. Paint Vendors	23.810
28. Electrical Equipment	4.926	68. Hat Shops	26.316
29. Ice Cream Vendors	4.975	69. Banks and Branches	26.316
30. Primary Schools	5.495	70. Private Hospitals	26.316
31. Construction Materials	5.618	71. Veterinarians	27.027
32. Musical Groups	5.814	72. Pre-Primary Schools	27.027
33. Grocery Stores	5.848	73. Optical Shops	34.483
34. Candle Vendors	5.988	74. Night Clubs	43.478
35. Dental Clinics	6.329	75. Locksmiths	55.555
36. Fertilizers	7.042	76. Supermarkets	142.857
37. Stationery	7.519	77. Florists	166.666
38. Photographers	7.752	78. Record Shops	166.666
39. Hardware	8.130	79. Universities	166.666
40. Furniture	8.772	80. Agricultural Machinery	333.333

## Establishing the Hierarchy

By means of what the report refers to as "mathematical-statistical procedures" and "criteria of an empirical character" the array of 1,987 global centrality indices was divided into six classes (level 2 through level 7), each then becoming one level in the central place hierarchy ( Table 3). The capital, Guatemala City, is not among the 1,987 places but because of its size and national importance it stood alone in level 1. The only mathematical-statistical procedure specified, Guttman scaling, is noted parenthetically. The "empirical approaches" were used to adjust the hierarchical position of those central places whose centrality indices placed them, after the application of statistical procedures, in a hierarchical level that raised questions in the minds of the institute's staff. Chiquimula is pointed out as a prime example of a central place which suffered an initial low hierarchical scaling because the initial field check omitted several central function categories. These were deduced by the staff and Chiquimula duly moved up the hierarchy.

Escuipulas offers an example of a distorted centrality index, on the high side in this case, because of its excessive number of candle merchants. The staff moved it down to hierarchy level 5. In another kind of adjustment San Pedro Sacatepéquez was included in level 3 because the staff viewed it as functionally part of an urban agglomeration with San Marcos. The last eight central places in the fifth level of the hierarchy beginning with El Estor were all moved up to this level according to the staff's subjective (empirical) judgements.

## Some Characteristics of Places in the Different Levels

The first two levels in the Franja's urban hierarchy contain one center each: Guatemala City in the first and ancient center of Quezaltenango in the second. Eight of the nine centers in the third level are department capitals. San Pedro Sacatepéquez is not, but its access to San Marcos via National Route 1 has accelerated its growth and produced a conurbation between the two centers. The fourth level contains six centers, four of which are department capitals and two of which, Malacatán and Morales, are municipio seats. No places were added or removed for subjective reasons from level 4 and the interval ranged from 1,043 to 1,506. Among the 31 places

Table 3

## Hierarchical Groupings and Global Indices of Centrality for Central Places in the Franja Central of Guatemala

Hierarchical Group	Number of Central Places	Central Places	Global Index of Centrality	1979 Projected Population
2	1	Quezaltenango	11998.2	77,554
3	9	Huehuetenango	3661.3	18,481
		Cobán	3572.7	17,147
		Puerto Barrios	3448.4	43,168
		Zacapa	2300.2	21,397
		Jutiapa	1799.7	13,802
		San Marcos	1671.0	7,532
		Jalapa	1648.8	19,730
		San Pedro Sacatepéquez	1481.8	15,265
		Chiquimula	810.6	22,136
4	6	Totonicapán	1506.0	13,027
		Santa Cruz Quiché	1409.8	12,897
		Chimaltenango	1409.8	18,104
		Morales	1263.9	10,166
		Salamá	1167.8	7,282
		Malacatán	1043.4	4,584
5	31	Esquipulas	1072.8	10,336
		San Pedro Carcha	923.9	6,530
		Panajachel	920.6	2,647
		Asunción Mita	732.6	12,895
		Gualán	724.0	8,788
		San Juan Sacatepéquez	689.8	6,325
		Jocotán	640.5	3,448
		Sololá	633.7	5,578
		Santa C. Barillas	613.1	3,935
		Tecpán Guatemala	610.1	7,362
		Mataquescuintla	544.3	4,238
		Mixco	500.4	38,278
		San Cristóbal Totonicapán	490.7	6,343
		El Progreso	482.8	5,693
		Rabinal	459.4	5,328
		Jalpatagua	449.1	3,022
		Tejutla	444.0	1,727

Table 3 (continued)

Hierarchical Groupings and Global Indices of Centrality for Central Places in the Franja Central of Guatemala (continued)

Hierarchical Group	Number of Central Places	Central Places	Global Index of Centrality	1979 Projected Population
5	31	Santiago Atitlán	440.6	26,382
		San Cristóbal Verapaz	437.7	5,991
		Monjas	415.4	6,882
		Los Amates	400.2	2,772
		San Martín Jilotepeque	399.6	5,095
		Chiantla	392.3	3,049
		El Estor	349.5	5,380
		Teculután	341.9	4,222
		El Progreso	326.7	8,144
		Chichicastenango	301.1	4,586
		Sanarate	282.8	7,325
		San Juan Comalapa	217.5	14,412
		San Francisco El Alto	167.6	2,827
		Nebaj	121.1	6,199
6	71	--	--	--
7	1,869	--	--	--
2 - 7	1,987	--	--	--

(10)

in level 5 Escuipulas was dealt with earlier as a place reduced to a lower level by subjective factors. San Pedro Carcha and Panajachel are at the top of the statistical interval for level 5 which ranged from 392 to 924. A majority of the 71 places in the sixth level are municipio seats, the remainder, villages and hamlets. Only a few places in the seventh level are municipio seats. The 1,869 places in this level made up 94 percent of the total number of places in the study area.

#### Spatial Distribution of Central Places by Size Levels

Centers of level 7 are distributed in all areas of the country although the political unrest in Alta Verapaz and northern Quiché has limited data collection at this level in these departments. The centers in level 6 show a very irregular pattern of distribution with a strong concentration in the department of Huehuetenango. Level 5 centers are concentrated in the western part of the study area. Although level 4 centers are widely dispersed there is a tendency for them to cluster in the west central region. Level 3 centers, on the other hand, predominate in the eastern part of the country. In level 3 the report notes the gateway positions of Puerto Barrios the country's Atlantic coast port, and eastern terminus of Highway CA-9, of Jutiapa relative to El Salvador along Highway CA-2 and of Huchuetenango linked to Mexico by CA-1. The latter is also a center for tourism and the center of a major wool producing region. Zacapa benefits from its position along Highway CA-9 halfway between Puerto Barrios and Guatemala City. In the eastern region of the country Chiquimula and Jalapa have strong development potential. Cobán is sustained by tourism and its proximity to the mineral and petroleum deposits of Alta Verapaz.

#### Areas of Influence of Centers in Different Levels of the Hierarchy

The study developed the areas of influence of central places in levels 2, 3, 4 and 5. They are listed in detail on Table 4. The entire municipio was the basic unit used to build up the area of influence of a central place. The study explains that economic variables were used to establish the areas. Thus, a person or persons coming from municipio B to central place A for the purpose of obtaining a good or service would perforce put municipio B in the area of influence of central place A. The scarcer the good or service (the higher its coefficient of localization shown on Table 2) the further a person is likely to travel to obtain the good or service and because of this central

Table 4

## Central Places in the Hierarchy and Their Areas of Influence

<u>Urban Center &amp; Department</u>	<u>Areas of Influence</u>	<u>1980 Population</u>	<u>Area SqKm</u>
<u>Hierarchy Level 2</u>			
Quezaltenango Quezaltenango	All the municipios of the department of Quezaltenango that are included in the study area.	284,171	948
	In the department of San Marcos the municipios of San Marcos, San Pedro Sacatepéquez, Comitancillo, San Lorenzo, San Rafael Pie de la Cuesta, San Antonio Sacatepéquez, Esquipulas Palo Gordo and Río Blanco.	129,901	693
	In the department of Totonicapán, Santa María Chiquimula, San Bartolo, Momostenango, San Francisco El Alto, San Cristóbal Totonicapán and San Andrés Xecul.	221,593	1,061
	In the department of Sololá, San José Chacayá Santa María Visitación, Santa Clara La Laguna, Santa Lucía Utatlán, and some of the communities in Nahualá and Santa Lucía Utatlán, principally those found along Highway CA-1.	46,577	206
<u>Hierarchy Level 3</u>			
Huehuetenango Huehuetenango	All the municipios of the department of Huehuetenango except Tectitán.	482,113	7,335
Cobán Cobán	Includes all the municipios in the department of Alta Verapaz plus the municipios of Purulhá in the department of Baja Verapaz and El Estor in the department of Izabal.	427,595	11,828
Puerto Barrios Izabal	All the municipios of the department of Izabal except El Estor	233,309	6,142
San Marcos/ San Pedro Sacatepéquez San Marcos	Includes the municipio Tectitán of the department of Huehuetenango and all the municipios of the department of San Marcos that are in the study area.	371,931	2,693
Zacapa Zacapa	All the municipios of the department of Zacapa, and in the department of El Progreso the municipios of San Cristóbal Acasaguastlán, San Agustín Acasaguastlán and El Jicaro.	181,387	3,508
Jutiapa Jutiapa	All the municipios of the department that are in the study area.	278,368	2,531
Jalapa Jalapa	All the municipios of the department, plus Sansare in the department of El Progreso	165,332	2,181
Chiquimula Chiquimula	All the municipios of the department.	212,182	2,376

Table 4 (continued)

## Central Places in the Hierarchy and Their Areas of Influence (continued)

<u>Urban Center &amp; Department</u>	<u>Areas of Influence</u>	<u>1980 Population</u>	<u>Area SqKm</u>
<u>Hierarchy Level 4</u>			
Totonicapán Totonicapán	Municipios of Totonicapán, San Bartolo, Momostenango, Santa María Chiquimula, San Francisco El Alto, San Cristóbal Totonicapán and San Andrés Xecul of the department of Totonicapán.	219,098	1,061
Santa Cruz del Quiché Quiché	All the municipios of the department of Quiché plus Santa Lucía La Reforma of the department of Totonicapán.	418,619	8,514
Chimaltenango Chimaltenango	The following municipios in the department of Chimaltenango: Chimaltenango, Tecpán Guatemala, Santa Apolonia, San José Poaquil, San Martín Jilotepeque, Comalapa.	146,984	936
Morales Izabal	Every municipio in the department of Morales.	72,637	1,295
Salamá Baja Verapaz	In the department of Baja Verapaz the municipios of Salamá, Cubulco, Rabinal, San Miguel Chicaj, El Chol and San Jerónimo and Morazán in the Department of El Progreso.	125,357	2,957
Malacatán San Marcos	Municipios of Malacatán and Catarina in the department of San Marcos.	53,788	280
<u>Hierarchy Level 5</u>			
Sololá Sololá	Municipios in the department of Sololá: Sololá Concepción, San José Chacayá, San Marcos La Laguna, Santa Lucía Utatlán, San Juan La Laguna, Santa Clara La Laguna, Santa María Visitación, Santa Catarina Ixtahuacán and Nahualá.	102,398	661
Barillas Huehuetenango	Municipios in the department of Huehuetenango: Barillas, San Mateo Ixtatán, Santa Eulalia, San Miguel Acatán, San Rafael La Independencia, San Pedro Soloma.	129,239	2,320
Panajachel Sololá	Municipios in the department of Sololá: Panajachel, Santa Cruz La Laguna, San Andrés Semetabaj, Santa Catarina Palopó and San Antonio Palopó.	19,781	124
El Progreso El Progreso	Municipios in the Department of El Progreso: El Progreso, Morazán, San Agustín Acasaguastlán, El Júcaro and San Cristóbal Acasaguastlán.	60,667	1,322
San Pedro Carcha Alta Verapaz	Municipios in the department of Alta Verapaz: San Pedro Carcha, Lanquín, Fray Bartolomé de Las Casas and Cahabon.	134,540	2,512

Table 4 (continued)

## Central Places in the Hierarchy and Their Areas of Influence (continued)

<u>Urban Center &amp; Department</u>	<u>Areas of Influence</u>	<u>1980 Population</u>	<u>Area SqKm</u>
<u>Hierarchy Level 5 (continued)</u>			
Asunción Mita Jutiapa	Municipios in the department of Jutiapa: Asunción Mita, Santa Catarina Mita, Agua Blanca and Atescatempa.	92,090	1,016
Santiago Atitlan Sololá	Municipios in the department of Sololá: Santiago Atitlán, San Pedro La Laguna and San Lucas Tolimán.	45,685	276
Tecpán Guatemala Chimaltenango	Municipios in the department of Chimaltenango: Tecpán, Santa Apolonia and San José Poaquil.	50,336	397
Nebaj Quiché	Municipios in the department of Quiché: Nebaj and San Juan Cotzal.	53,707	790
Rabinal Baja Verapaz	Municipios in the department of Baja Verapaz: Rabinal and El Chol.	35,546	644
San Cristóbal Verapaz Baja Verapaz	Municipios in the department of Baja Verapaz: San Cristóbal Verapaz and Santa Cruz Verapaz.	32,393	240
Jocotán Chiquimula	Municipios in the department of Chiquimula: Jocotán and Camotán.	52,741	380
Esquipulas Chiquimula	Municipios in the department of Chiquimula: Esquipulas and Olopa.	37,361	688
Gualán Zacapa	Municipios in the department of Zacapa: Gualán and La Unión.	44,461	907
Teculután Zacapa	Municipios in the department of Zacapa: Teculután and Usumatlán.	14,349	530
Mataquescuintla Jalapa	Municipio in the department of Jalapa: Mataquescuintla.	2,188	287
Monjas Jalapa	Municipio in the department of Jalapa: Monjas.	15,355	256
El Progreso Jutiapa	Municipio in the department of El Progreso: El Progreso.	17,672	68
Jalpatagua Jutiapa	Municipio in the department of Jutiapa: Jalpatagua.	17,471	204
El Estor Izabal	Municipio in the department of Izabal: El Estor.	32,553	2,896
Los Amates Izabal	Municipio in the department of Izabal: Los Amates.	63,140	1,615
San Juan Comalapa Chimaltenango	Municipio in the department of Chimaltenango: San Juan Comalapa.	24,406	76

Table 4 (continued)

## Central Places in the Hierarchy and Their Areas of Influence (continued)

<u>Urban Center &amp; Department</u>	<u>Areas of Influence</u>	<u>1980 Population</u>	<u>Area SqKm</u>
<u>Hierarchy Level 5 (continued)</u>			
San Martín Jilotepeque Chimaltenango	Municipio in the department of Chimaltenango: San Martín Jilotepeque.	43,791	251
Chichicastenango Quiché	Municipio in the department of Quiché: Chichicastenango.	64,239	400
Sanarate El Progreso	Municipio in the department of El Progreso: Sanarate.	20,473	273
San Francisco El Alto Totonicapán	Municipio in the department of Totonicapán: San Francisco El Alto.	25,639	132
San Cristóbal Totonicapán Totonicapán	Municipio in the department of Totonicapán: San Cristóbal Totonicapán.	22,021	36
Tejutla San Marcos	Municipio in the department of San Marcos: Tejutla.	20,837	142
Chiantla Huehuetenango	Municipio in the department of Huehuetenango: Chiantla.	41,909	536

place "reach" the number of municipios from which persons come is likely to be greater. An so, according to this model the higher the good or service the larger the area of influence of the central place offering that good or service. The Institute did not use empirical data in the study such as that which can be gathered in the field by asking who actually came from where to buy what. Instead, it estimated the "reach" of a series of goods and services offered from each central place to determine which municipios were in which center's area of influence.

### Conclusions

The study reports the following ten conclusions:

1. The quantitative and qualitative differences among groups of centers, especially among those that belong to the same level in the hierarchy, are not capable of being explained in sufficient detail owing to limited information, although the conclusion can be drawn that these differences are not very serious
2. Privately owned central functions in centers in different levels occur in direct proportion to public central functions
3. Among the lowest level centers, the differences between the values of the indices are greater than the differences between their numbers of central functions
4. The hierarchy of large centers, as measured by indices of centrality, appears to be confirmed by the systems of linkages and the areas of influence
5. The majority of centers in a lesser level in the hierarchy are always intermediate points between two or more points of a higher level in the hierarchy that are connected by an important highway
6. The principal routes of communication intensify the relationships between places at a higher level in the hierarchy creating possibilities for greater production, interchange and consumption in these centers
7. Quezaltenango is confirmed as an important center and strong influence in the Franja Central

8. Large areas empty of centers are found in the high western zone. Although densely populated this region has a difficult terrain and a precarious network of communication which has impeded the expansion or strengthening of a decided number of centers
9. The centers in levels 2 and 3 of the hierarchy are correctly distributed and their development is in accord with the historical conditions of the country
10. A very strong dispersion of central places exists in the Franja Central and although some regions have centers supplying services it is clear that most lack a sufficient quantity of centers to cover the demand for goods and services over the whole country.

#### Recommendations

The study made the following four recommendations:

1. The analysis of the limitations of the centers at the lowest levels ought to be a point of departure for the planning of investment since the function of strengthening these centers and satisfying social demands should be considered part of national development
2. An analysis should be made of the empty areas where there are no routes of communications in order to find those centers that can become marketing points and, by dint of their locations, centers of supply and objects of investment
3. Selected middle level centers in the study area should be targeted for road improvement projects radiating out to adjacent centers for the purpose of elevating consumption of goods and services and the distribution of production
4. Given the fact that some centers are weak in the numbers of services they offer, packages of infra-structural, equipment, service, agricultural and industrial investment should be directed to raising the hierarchical level of the 14 centers shown on Table 5.

Table 5

## Proposed Changes in the Hierarchical Level of 14 Selected Centers

<u>Department</u>	<u>Center</u>	<u>Present Level</u>	<u>Proposed Level</u>
Sololá	Sololá	5	4
San Marcos	Tacaná	6	5
Huehuetenango	La Democracia	6	5
	Nentón	6	5
	Cuilco	6	5
	Aguacatán	6	5
Quiché	Santa Cruz de Quiché	4	3
	Uspantán	6	5
	Joyabaj	6	5
	Chajul	7	5
Baja Verapaz	Cubulco	6	5
Alta Verapaz	Fray Bartolomé de Las Casas	6	5
	Cahabón	7	5
	Senahú	7	5