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**NICARAGUA POVERTY DATA FOR  
REGIONS I AND IV**

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**GOVERNMENT OF NICARAGUA**

**NICARAGUA POVERTY DATA  
FOR REGIONS I AND IV**

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Janina León,  
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and Javier Poggi**

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**Pobreza en Nicaragua ¿Donde estamos?**

por

Farid Matuk y Rodolfo Cermeño

con colaboracion de

Janina Leon, Miguel Ostos, y Javier Poggi

## I. Las fuentes de información<sup>1</sup>

Para Nicaragua, tenemos en la actualidad cuatro fuentes de información (en orden temporal) identificadas, aunque existen universidades y organismos no gubernamentales que también han efectuado sus propias encuestas

1) Las encuestas de PRODERE (Programa de Desarrollo para Desplazados, Refugiados, y Repatriados) a las poblaciones afectadas por la guerra civil de los '80, estas fueron realizadas entre 1991 y 1992, siendo el propósito de la encuesta identificar socio-económicamente a dichas poblaciones a fin de priorizar las necesidades de las mismas. Existen dos tipos de formularios con pequeñas diferencias, que se pueden compatibilizar, teniendo ambos una extensión de ocho páginas. En la actualidad existen siete reportes independientes (correspondientes al mismo número de municipalidades encuestadas) que contienen numerosa información descriptiva

2) La Encuesta de Medición de Niveles de Vida, ejecutada por el INEC, bajo las instrucciones del Banco Mundial (BM), a comienzos del '93, es de alcance nacional. Esta encuesta, la más completa realizada en el país desde la ESDENIC de 1984-85 (ahora perdida), cubre todas las áreas necesarias para identificar calidad de vida, con una longitud de 64 páginas. En la medida que el Banco Mundial necesita compatibilización entre las encuestas que patrocina en distintos países, han habido obvios sacrificios a la especificidad

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<sup>1</sup> Las encuestas de PRODERE fueron proporcionadas por la Lic. Silvia Negreros del MAS (Ministerio de Acción Social), la Encuesta de Medición del Nivel de Vida fue proporcionada por el Lic. Carlos Gabuardi del INEC (Instituto Nacional de Estadísticas y Censos) la Encuesta de Empleo Urbano fue proporcionada por el Lic. Transito Gomez del MITRAB (Ministerio del Trabajo), y el Sistema de Información sobre Recursos Socio-Económicos fue proporcionada por la Lic. Nora Arguello, Vice-Ministra del Ministerio de Acción Social

nicaraguense Existen diversos informes en base a este material, y se continua trabajando en el mismo, aunque al dia de hoy no existe un reporte que establezca analisis estadistico inferencial Tambien se sabe que el Banco Mundial esta interesado en efectuar una segunda encuesta similar, si esto fuese asi se podria hacer un analisis dinamico de la calidad de vida

3) La Encuesta de Empleo Urbano del Ministerio de Trabajo (MITRAB) se ha concentrado en las ocho ciudades más grandes del pais, y ha efectuado tres encuestas Marzo '93, Octubre '93, y Octubre '94, debido a razones presupuestarias no se efectuo una planeada en Marzo '94 y otra planeada para Marzo '95 Las tres encuestas actuales presentan la unica oportunidad para efectuar un analisis dinamico del empleo en el tramo mas urbano de Nicaragua, si bien carece de informacion precisa (tiene una pagina para la vivienda y otra pagina para cada individuo en la vivienda mayor de diez años) es suficientemente rica como para efectuar un seguimiento del impacto (por ejemplo del deslizamiento) en la poblacion urbana de Nicaragua

4) El Sistema de Informacion sobre Recursos Socio-Economicos del Ministerio de Accion Social (MAS) es un inventario de los servicios sociales basicos que tiene acceso la poblacion a nivel de municipio, y que se viene actualizando mes a mes Este inventario tiene la peculiaridad de construirse en base a informacion provista por los generadores de esta oferta de servicios publicos, y no a partir de encuestas a hogares En la medida que se asuma que la unidad observacional es el municipio, este inventario tiene las propiedades estadisticas necesarias para efectuar analisis inferencial Una tarea que resta por hacer, es efectuar un ejercicio de consistencia, donde se muestree al azar hogares en municipios, y verificar que los

resultados son equivalentes a nivel de municipio Si se halla equivalencia, tenemos que esta herramienta del Ministerio de Accion Social es mucho mas barata que efectuar encuestas a nivel municipal

## II Los Resultados

Uno de los temores fundamentales al consolidar los cuatro reportes que se desprenden de las fuentes de informacion arriba indicadas, es que la diversidad de razones que condujeron a diversos organismos a ejecutar y/o financiar dichas bases de datos son tan disimiles, que seria practicamente imposible hallar elementos comunes

Sorprendemente, en base a los enfoques utilizados por cada uno de los analistas, es posible hallar una cierta estructura de analisis donde existe un grado de complementariedad entre las bases de datos De alcance nacional tenemos a INEC/BM y MAS, focalizado —exclusivamente— en lo rural de las regiones I y IV tenemos PRODERE, y focalizado en lo urbano —no exclusivamente— de las regiones I y IV tenemos MITRAB, tal como se observa en la Tabla 1

**TABLA 1**

	COBERTURA NACIONAL	FOCALIZADO EN REG I Y IV	NIVEL DE PRECISION
<b>PRODERE</b>	NO	SI (solo rural)	MUNICIPIO
<b>INEC - BM</b>	SI	NO	REGION (urbana o rural)
<b>MITRAB</b>	SI (solo urbano)	SI (solo urbano)	CABECERA REGIONAL
<b>MAS</b>	SI	NO	MUNICIPIO

De esta manera, tenemos que la consolidación de los cuatro reportes nos dará una visión adecuada de la pobreza en Nicaragua a distintos —y complementarios— niveles de precisión. *Una primera extensión natural de este trabajo es ampliar el análisis a nivel regional centroamericano*, la Encuesta Nacional Sociodemográfica de Guatemala y las Encuestas de Propósitos Múltiples de Costa Rica, son alternativas inmediatas para evaluar la pobreza en Nicaragua relativa a la región centroamericana

#### **II-1. PRODERE / Encuesta de población desplazada, desmovilizada, y repatriada**

Esta encuesta fue efectuada en siete municipalidades rurales de las Regiones I y VI, toda la región tiene una población<sup>2</sup> de 971,688 habitantes, si excluimos las cabeceras regionales Esteli y Matagalpa, tenemos que la población rural sería de 788,177, y las siete municipalidades representan 132,606, es decir un 17% de la población rural. Si bien es cierto que estas municipalidades no fueron extraídas al azar de entre las 45 municipalidades rurales de la región, el tamaño de la muestra garantiza resultados estadísticos confiables.

Los resultados más importantes, basados en la metodología de las necesidades básicas insatisfechas (NBI) son

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<sup>2</sup> De acuerdo a JERARQUIZACION DE MUNICIPIOS DE ACUERDO A INDICADORES DE ACCESO DE LA POBLACION A SERVICIOS SOCIALES BASICOS 1993, Proyecto NIC/92/P01 OIM/FNUAP Managua, Junio de 1994

a) Aproximadamente 90% de los hogares en las siete municipalidades de San Juan Rio Coco, Quilali, Santa Maria de Pantasma, El Jicaró, Murra, Wilili, y Jalapa son consideradas pobres de acuerdo a la metodología de Necesidades Básicas Insatisfechas<sup>3</sup>

b) Agua potable, Acceso a servicios de salud, y Hacinamiento son los problemas mas severos por aquellos extremadamente pobres<sup>4</sup>

c) San Juan Rio Coco (Madriz-I), Murra (Nueva Segovia-I), y Santa Maria de Pantasma (Jinotega-VI) —en ese orden— son las municipalidades donde la pobreza es mas severa

d) No se encuentra una diferencia estadística significativa en el nivel de pobreza de los hogares segregando por el género del jefe del hogar

e) Titulación de la vivienda es un elemento que separa a los extremadamente pobres de los pobres, mas no la titulación de las tierras de trabajo

f) Malnutrición —una vez mas— es una variable que aparece fuertemente relacionada con pobreza tanto en análisis estadístico univariado y multivariado

g) Analfabetismo —una vez mas— es una variable que aparece relacionada con pobreza, pero además se encuentra una diferencia estadística significativa por género

En el estudio mencionado en el pie de página 2, se tiene que usando la Encuesta de Medición de Niveles de Vida, con la metodología de Necesidades Básicas Insatisfechas, a nivel nacional se halla

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<sup>3</sup> Se ha tomado como Necesidades Básicas, aquellas ya establecidas en el documento ESTUDIO DE LA POBREZA EN NICARAGUA (Informe Preliminar), Proyecto NIC/93/016 MAS/PNUD/UNICEF Managua, Junio 30 - 1994

<sup>4</sup> Se considera pobres a aquellos con sólo una carencia y extremadamente pobre a aquellos con dos carencias o mas

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un 25% de la población no pobre, y el promedio simple para las regiones I (9 4%) y VI (7 9%) es 8 5%. Mientras que en las siete municipalidades estudiadas, se tiene que es 7%, siendo esta última cifra bastante cercana al promedio de las regiones.

Cuando analizamos el reporte del Banco Mundial sobre la pobreza en Nicaragua, tenemos que a nivel nacional existe un 50% de no pobres, y en el promedio simple de las regiones I (25%) y VI (29%) tenemos 27%. Ciertamente las diferencias metodológicas conducen a resultados distintos.

A fin de evaluar si tenemos tan solo un problema de escala, vemos que si cambiamos la definición de no pobres —en las siete municipalidades en cuestión— para aquellos que tienen una o ninguna necesidad básica insatisfecha, nuestro resultado pasa de 7 0% a 26 5%, es decir la línea de pobreza del Banco Mundial sería equivalente a esta nueva definición de pobreza.

**TABLA 2**

<b>% DE NO POBRES</b>	<b>BANCO MUNDIAL</b> (Línea de Pobreza)	<b>PRODERE</b> (cero o una necesidad insatisfecha)	<b>PRODERE</b> (ninguna necesidad insatisfecha)	<b>MAS</b> (ninguna necesidad insatisfecha)
<b>REG I Y VI</b>	<b>27 00%</b>	<b>26.50%</b>	<b>7 00%</b>	<b>9 00%</b>
<b>NACIONAL</b>	<b>50 00%</b>	<b>—</b>	<b>—</b>	<b>25 00%</b>

En el caso que un análisis posterior pruebe esta equivalencia con más precisión, tenemos que el costo de construir un indicador de necesidades básicas insatisfechas es sensiblemente menor al costo de construir una línea de pobreza, y en esa medida *se recomendaría una encuesta que tan sólo mida necesidades básicas insatisfechas*.

Un trabajo importante a ejecutar sería *comparar el nivel de pobreza de estas siete municipalidades, con el sistema de información sobre recursos socio-economicos del MAS*, como una medida inicial de evaluación de las bondades de dicho sistema de información, siendo este aun mas barato que la alternativa de medir necesidades basicas insatisfechas

## II-2 INEC-BM / Encuesta de Medición de Niveles de Vida

Esta encuesta fue efectuada a nivel nacional en el año de 1993, un elemento a tomar en cuenta es que el universo muestral no provino de un censo —como sería lo esperable— sino de las mesas electorales del año de 1990, ya que el ultimo censo había sido efectuado en 1970 y se destruyó con el terremoto de 1972

El informe del Banco Mundial<sup>5</sup> sobre esta encuesta esta concentrado en la construcción de una línea de pobreza a partir de la información de gasto recogida. Los resultados mas relevantes —para las regiones I y VI— ya fueron presentados en la Tabla 2

Un resultado pendiente de análisis es la decisión de tomar una única línea de pobreza nacional, en la medida que los precios —a nivel nacional— no sean heterogeneos no tiene sentido hallar distintas líneas de pobreza. Una comunicación oral de una consultora del Banco Mundial<sup>6</sup> me indico que ella no había encontrado diferencias notables de precios entre las regiones de análisis de la encuesta, y en esa medida era valido trabajar con una línea de pobreza única

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<sup>5</sup> NICARAGUA POVERTY PROFILE (Preliminary Findings of the 1993 Living Standards Measurement Survey) The World Bank. Human Resources Operations Division, Country Department II, Latin America and the Caribbean

<sup>6</sup> Katherine MacKinnon Scott, (202) 473-8124

Pero un punto a *evaluar es la existencia de mercados segmentados al interior de las regiones*, que atraviesan las mismas, y se concentran en consumidores altamente discriminadores entre productos —aparentemente— idénticos, como puede ser el caso del arroz. Se puede asumir teóricamente que el arroz del Supermercado La Colonia (dos de tres variedades son arroz americano) es un producto transable indexado al dólar, mientras el arroz del Mercado Oriental (el más concurrido por estratos bajos de ingreso) es un producto no transable que su precio se origina por el nivel de demanda.

El trabajo efectuado con la Encuesta de Medición de Niveles de Vida, se concentró en el lado de los ingresos, ya que el trabajo del Banco Mundial antes mencionado ha —prácticamente— agotado el análisis descriptivo del gasto. Los ingresos se definieron como ingresos por trabajo y por transferencias.

Los ingresos por trabajo tienen un componente monetario y otro en especie, así como también existen distintos tipos de ingresos por el nivel de intensidad: ingreso principal, ingreso secundario, e ingreso terciario. Las transferencias pueden ser del interior o del exterior. No se han tomado otros ingresos tales como regalos —que están como componente del gasto— o ingresos por renta imputada de la vivienda que ocupa cada familia. El énfasis ha sido en los ingresos por trabajo y transferencias.

Como puede verse en la Tabla 3, no hay mayores diferencias entre pobres y no pobres a nivel nacional con ambas metodologías. Lo que sí es diferente es la descomposición al interior de la pobreza, entre pobres extremos y no pobres extremos, y por área urbana y área rural.

El hallazgo más importante es que a nivel de pobres extremos, cuando al interior del sector urbano aislamos al estrato más bajo tenemos una diferencia de dos a uno entre ambas metodologías.

Si adjudicamos esta diferencia al autoconsumo —y la consiguiente autoproduccion— tenemos que los pobres extremos rurales, que son mas numerosos y tienen un ingreso/gasto inferior a los pobres extremos urbanos, estan mejor equipados frente a una reduccion de salarios reales

Este resultado no es nuevo, ya que Morley<sup>7</sup> lo generaliza a lo que el llama "economias pequeñas agricolas" donde el sector que mejor responde al ajuste estructural —en su componente de elevacion del tipo de cambio real— es el agricola (rural) y no el industrial (urbano)

TABLA 3<sup>8</sup>

% DE FAMILIAS	POR GASTO			POR INGRESO		
	RURAL	URBANO	TOTAL	RURAL	URBANO	TOTAL
POBRE EXTREMO	15 10%	4 30%	19 40%	17 50%	9 60%	27 10%
POBRE	31 70%	18 60%	50 30%	27 30%	25 10%	52 40%
NO POBRE	18 40%	31 30%	49 70%	8 30%	39 30%	47 60%

Tal como en el caso anterior, analizaremos la profundidad de la pobreza con ambas metodologias, a traves de los resultados de la Tabla 4 Como se podia prever tenemos que tomando solo ingresos por trabajo y transferencias la profundidad de la pobreza se acentua a nivel de todas las regiones En particular se reducen las diferencias entre la brecha urbana y la brecha rural, pero se

<sup>7</sup> Samuel A Morley POVERTY AND INEQUALITY IN LATIN AMERICA Past Evidence, Future Prospects Washington Overseas Development Council, 1994

<sup>8</sup> Por gasto es tomado del Banco Mundial y Por ingreso es elaboracion propia.

conserva el hecho que el area rural es sistematicamente mas pobre que la urbana, y que tambien las regiones I y VI muestran los mayores niveles de profundidad de pobreza

En base a las Tablas 3 y 4, se puede concluir que si bien la magnitud de los indices de medicion de pobreza cambian, la ordinalidad se conserva, y de esta manera las prioridades establecidas en base al gasto, permanecen invariantes

**TABLA 4**

BRECHA DE POBREZA	POR GASTO			POR INGRESO		
	RURAL	URBANO	TOTAL	RURAL	URBANO	TOTAL
SEGOVIAS	0 48	0 25	0 40	0 66	0 52	0 60
OCCIDENTE	0 35	0 11	0 21	0 58	0 46	0 52
MANAGUA	0 18	0 08	0 10	0 48	0 42	0 44
SUR	0 30	0 08	0 17	0 54	0 44	0 49
CENTRAL	0 37	0 19	0 30	0 58	0 44	0 53
NORTE	0 48	0 13	0 37	0 65	0 44	0 59
ATLANTICA	0 36	0 12	0 25	0 60	0 44	0 53

Finalmente, se evaluo la hipotesis de que las regiones I y VI fuesen estadisticamente diferente de las demas. Dado que la brecha de pobreza es una media de aquellas unidades economicas debajo de la linea de pobreza, y asumiendo que dichas unidades economicas son extraidas de un funcion de densidad normal, se puede aplicar un analisis de varianza (Anova One Way) para la hipotesis nula de que las brechas de pobreza de todas las regiones son iguales entre si.

*Los resultados de esta prueba muestran claramente (al 5% de significancia) que existen tres grupos de regiones.* En orden de severidad de pobreza, el primer grupo esta conformado por las

regiones Segovias (I) y Norte (VI), el segundo grupo por las regiones Occidente, Sur, Central, y Atlantica, y el tercer grupo es solo la region Managua

Esta verificacion estadistica tambien debiera hacerse con los datos de gasto, y para ambos casos, ingreso y gasto, habria que efectuar pruebas estadisticas con indices de severidad de la pobreza

### **II-3 MITRAB / Encuesta de Empleo Urbano**

Las Encuestas de Empleo Urbano fueron inicialmente disenadas con una periodicidad semestral, y en ese sentido el año 93 se ejecutaron dos encuestas, por razones presupuestarias el año pasado se ejecuto una, y para este año se planea ejecutar tan solo una encuesta. El análisis de estas encuestas, se concentrara en la ultima disponible, es decir la de Octubre del '93

Un primer paso fue agrupar las ocho ciudades en tres grupos, que —afortunadamente— coinciden con los grupos de pobreza que se desprenden de la Encuesta de Medicion de Niveles de Vida. Un primer grupo esta conformado por Esteli y Matagalpa (Regiones I y VI) que lo denominaremos Area Pobre, un segundo grupo es Chinandega, Leon, Masaya, Granada, y Juigalpa (Regiones II, IV, y V) sera Otras Areas, y el ultimo grupo es formada por la ciudad de Managua (Region III)

Hay que tener presente que para la construccion de pobres extremos, pobres, y no pobres se han tomado los ingresos monetarios de las familias, mas no los ingresos en especie y las transferencias, ya que no se pregunto en la encuesta por estas variables. Asimismo se supuso que la muestra era autoponderada al momento de construir los grupos

Los resultados mas importantes del procesamiento de esta encuesta son

a) La guerra civil ha reducido el numero de varones a nivel nacional, y de manera mas aguda en la Areas Pobres y en Managua

b) Las personas con ninguna educacion estan concentradas en las Areas Pobres y Otras Areas, mientras las personas con educacion universitaria estan concentradas en Managua

c) El tamaño de familia es homogéneo en las tres areas, y no se encuentra relacion con el nivel de pobreza

d) La poblacion inactiva —potenciales desempleados ocultos— es equivalente en Managua y Otras Areas, y mas baja en las Areas Pobres

e) El desempleo abierto es sensiblemente mayor en las Areas Pobres (27%), que en Otras Areas (19%) y Managua (22%) Hay que notar que el desempleo urbano de acuerdo al Banco Mundial es 18%, pero su definicion de urbano son ciudades por encima de 1,000 habitantes, mientras que en esta muestra estamos hablando de ciudades por encima de 100,000 habitantes

f) El subempleo por horas es alto en Managua y en Otras Areas, cerca al 15%, mientras en Areas Pobres es 3 5%, y no muestra un patron distinto por genero

g) El ingreso medio por genero de jefe del hogar es siempre mayor para varones que para mujeres, siendo cerca a un 60% en las Areas Pobres y Otras Areas, y 76% en Managua

h) Los ingresos medianos por estrato de ingreso, así como sus totales se presentan a continuacion. En ellos se encuentra, una mayor proximidad entre Areas Pobres y Otras Areas

TABLA 5

	AREAS POBRES		OTRAS AREAS		MANAGUA	
	Mediana	% Familias	Mediana	% Familias	Mediana	% Familias
<b>POBRES</b>	457	54 9%	500	60 0%	600	42 5%
<b>NO POBRES</b>	1450	45 1%	1500	40 0%	1600	57 5%
<b>TOTAL</b>	800	100%	800	100%	1000	100%

1) El desempleo tiene una fuerte relacion con desempleo en las familias pobres de las tres areas, y no la tiene con familias no pobres de Areas Pobres y Otras Areas

En terminos generales, *tenemos que a nivel urbano no existe una diferencia sustancial entre Areas Pobres y Otras Areas*, siendo Managua claramente distinta a las otras siete ciudades

Los resultados de desempleo abierto son altos, relativo a la media nacional o urbana de la Encuesta de Medicion de Niveles de Vida, pudiendose concluir que *el desempleo abierto es un fenómeno eminente urbano, y el desempleo oculto es —aún— una incógnita*

#### II-4. MAS / Sistema de Información sobre Recursos Socio-Economicos.

Esta base de datos parte de un esfuerzo del MAS, para efectuar un inventario de los servicios publicos a nivel de municipio. Este esfuerzo ha generado una base de datos de cobertura nacional, a nivel de los municipios menos urbanos, que permite interrogarse sobre semejanzas y diferencias a nivel municipal.

El procedimiento estadístico ejecutado con esta base de datos es el análisis de grupos ("clusters") y en el análisis factorial ("factor analysis") Con ambos procedimientos es posible formar grupos semejantes a partir de características definidas exogenamente

Para el análisis de grupos, tenemos que las variables definidas exogenamente son

- a) Salud,
- b) Educación e Infancia,
- c) Agua Potable y Salubridad,
- d) Electricidad y Comunicaciones,
- e) Otras características

Los resultados por cada variable exogena, mostrara el numero de grupos que se forman, y que porcentaje de las municipalidades representan Estos resultados estan en la Tabla 6

**TABLA 6**

	<b>SALUD</b>	<b>EDUCACIÓN E INFANCIA</b>	<b>AGUA POTABLE Y SALUBRIDAD</b>	<b>ELECTRICIDAD Y COMUNICACIONES</b>	<b>OTRAS CARACTERÍSTICAS</b>
<b># DE GRUPOS</b>	3	5	5	4	4
<b>% MUNICIPIOS</b>	92 5%	86 3%	84 3%	92 3%	93 5%

Como puede observarse un reducido numero de características, de tres la mas baja y cinco la mas alta, sirven para capturar las carencias de cada municipio Pero existe una novedad en este analisis, los grupos no se forman siempre con los mismos municipios, sino que estos se agrupan de manera distinta para cada variable exogena

En otras palabras, *la pobreza no está concentrada en lo que pudiésemos llamar una mancha india*, como puede ser el caso del Norte de Guatemala y el Sur de México, o el Norte de Bolivia y el Sur del Perú

Las carencias a nivel de municipio, muestran diferentes grados de profundidad, y una alternativa sería construir un Índice de Necesidades Básicas Insatisfechas, con las cinco variables exógenas que se tienen, y evaluar si con este índice se repite el resultado de una pobreza multifacética en el espacio

Los resultados del análisis factorial nos indican que de trece variables analizadas, estas se pueden colapsar a cuatro factores que explican el 58.6% de la varianza. Estos cuatro factores son

- 1) Variables vinculadas a la demanda efectiva y al tamaño de los mercados
- 2) Inversiones gubernamentales para servicios básicos de emergencia
- 3) Inversiones gubernamentales para otros servicios básicos
- 4) Variables vinculadas a ubicación

En general, el estudio de las características municipales a partir de los servicios públicos que poseen, nos da una nueva dimensión de análisis. Habitualmente la información provenía de encuestas a hogares, pero este esfuerzo del MAS, nos permite hacer un estudio desde el lado de la oferta de servicios públicos

### **III. Conclusiones**

A nivel de genero tenemos que en algunos casos si aparece una diferenciacion, pero en otros casos no se halla diferenciacion. Un trabajo especifico a realizarse es un estudio en profundidad de identificacion de la discriminacion por genero, que variables muestran discriminacion y cuales no.

Se encuentra que la pobreza esta claramente concentrada en las areas rurales, pero como se dijo previamente, las areas rurales son al mismo tiempo las mas impermeables al ciclo economico, tanto a la alza como a la baja.

La pobreza en Nicaragua es multiespacial, zonas que aparecen como las mas pobres con un indicador, no lo son con otro indicador, en ese sentido tendríamos que no existe en Nicaragua un area que concentre toda la pobreza desde cualquier angulo.

En base al ingreso de las familias, y construyendose una brecha de pobreza se ha establecido que existen tres areas de pobreza en el pais, una constituida por las regiones Segovias y Norte, otra por la Region Managua, y una restante por todas las demas.

Cuando el analisis se concentra en las ciudades de mas de 100,000 habitantes, tenemos que existen dos areas de ingreso, Managua y el resto de ciudades, es decir las otras siete cabeceras regionales son indistinguibles entre si.

### **IV Apéndice sobre Guatemala**

Una de las afirmaciones mas comunes sobre Nicaragua es que la pobreza es generalizada, esta afirmacion esta sustentada en el PIB per capita nicaraguense. Ciertamente, una comparacion del PIB per capita al interior de la region centroamericana, nos muestra a Nicaragua como el pais mas de la

region Pero en el analisis de la pobreza, tenemos que no solo interesa la media del ingreso —PIB per capita— sino tambien la desigualdad de la distribucion de dicho ingreso

Cuando se examinan los resultados de indices de pobreza para las areas rurales de Nicaragua y Guatemala, observamos que ciertamente Nicaragua no es desde ningun punto de vista mas desigual que Guatemala, en ese sentido se puede concluir diciendo que la pobreza es mas superficial en Nicaragua que en Guatemala

Una posible explicacion para este hecho es el proceso de entrega de tierras efectuado por el gobierno sandinista a traves de la Reforma Agraria, y las entregas de tierras a los desmovilizados efectuada por este gobierno Ambos procesos han producido un nivel de igualdad en la tenencia de la tierra, que seguramente no tiene paralelo en Latinoamerica

La pregunta que subsiste es como incorporar esta igualdad en la tenencia de la tierra para el proceso de crecimiento que Nicaragua es incapaz de hallar hasta el dia de hoy

Tabla 7

		% EN POBREZA	BRECHA DE POBREZA	INDICE FGTP <sub>2</sub>
NICARAGUA	CAPITAL	26.4	7.9	3.4
	RURAL	76.1	37.1	21.9
GUATEMALA	CAPITAL	41.7	18.9	9.9
	RURAL	85.7	53.5	38.9

**Poverty In Nicaragua Inter Regional Comparisons Using The 1993 LSMS Information On  
Income**

by

Rodolfo Cermeño  
March 1995

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## EXECUTIVE SUMMARY

### 1 Objectives

The objectives of this study are First, estimate poverty indices by regions and areas using information on income Specifically the proportion of poor and extreme poor families by regions and areas is quantified Also the poverty gap and extreme poverty gap indices are computed The definition of these indices is given below Second, this study intends to evaluate statistically the differences in the estimated poverty gap and extreme poverty gap by regions and areas The question here is how different or homogenous are the regions and the areas of the regions regarding poverty gap indices

### 2 Methodology

This study uses the 1993 LSMS information Income is defined as the sum of labor income plus transfers received by each household and is computed per equivalent-adult This value is then compared to the poverty line (C\$ 214 47) and extreme poverty line (C\$ 101 32) in order to categorize each household as “non poor”, “poor”, and “extreme poor” The distribution of households according to its poverty status as well as the poverty and extreme poverty gaps are estimated by areas and regions

To estimate the poverty gap the difference between the poverty line (C\$ 214 47) and the total income per adult divided by the poverty line is computed for each household whose income is below the poverty line This defines the poverty gap for each household The poverty gap for a region or area is then estimated as the average of the individual poverty gaps The extreme poverty gap is

defined as the average of the income deficit of the extreme poor households with respect to the extreme poverty line. This index is computed in the same way as the poverty gap but using the extreme poverty line value of C\$ 101.32 and taking into account households whose income falls below the extreme poverty line. For some reason this index is usually not reported in the studies of poverty.

Since the poverty gap indices used here are computed as the *mean* of the poverty gaps of the individual households, the t-test is used to test whether the poverty gaps (means) of two regions or areas are equal or not. It is important to point out that the assumption here is that the underlying distribution is normal.

### 3 Results

According to this study about 52.4 percent of households in the sample fall below the poverty line and 27.1 fall below the extreme poverty line. The highest proportion of poor families out of the total sample is mainly concentrated in the urban area of Managua (7.0), followed by the rural areas of Norte (5.8), Central (5.0), and Segovias (4.9). The results on extreme poverty show that the highest percentages of households (out of the total households surveyed) who are extremely poor are located in the rural areas of Norte (4.2), Segovias (3.7), and Central (3.1).

For the total sample the poverty gap (PG) is 0.53 meaning that on average the deficit of income with respect to the poverty line for all poor families is 53 percent. For the urban area as a whole the PG is 0.45 and for the rural area it is 0.60. The extreme poverty gap for the urban areas is 0.42 and for rural areas is 0.5. Both indices are shown to be statistically different between areas.

On this basis it can be concluded that the urban and rural areas of Nicaragua present significant differences regarding poverty and extreme poverty gaps. In other words taken as a whole the rural area of Nicaragua is unambiguously poorer than the urban area.

The regions with the highest poverty gap indices are Segovias (0.60) and Norte (0.59). These are followed by the regions of Atlantica (0.53), Central (0.53) and Occidente (0.52).

The poverty gaps in the rural areas of each region are systematically greater than those in the urban areas. The highest poverty gaps are in the rural areas of Segovias (0.66), Norte (0.65) and Atlantica (0.60). The regions with the highest extreme poverty gap are Norte (0.5) and Segovias (0.49). By areas, the highest extreme poverty gap indices are found in the rural areas of Occidente (0.53) and Norte (0.52), followed by Segovias and Atlantica (0.50 each).

Regarding the differences across regions the following results are obtained. The poverty gap of Managua region is significantly different from (less than) the PG of all other regions. On the other extreme the regions Norte and Segovias differ significantly from all other regions. The regions Sur, Occidente, Atlantica and Central do not have significant differences among themselves, i.e. their poverty gaps are statistically similar.

With respect to the extreme poverty gap, only Managua region differs significantly from the regions of Occidente, Segovias and Norte. More importantly, *all the regions of Nicaragua except Managua do not differ significantly to each other regarding the extreme poverty gap.*

Finally, each region is split according to its urban and rural area. The results regarding the poverty gap are as follows. The urban areas of all regions except Segovias and the rural area of Managua do not present significant differences in their poverty gap indices, but they do differ from

the rural areas of all other regions and from the urban region of Segovias. The first group have the lower PG indices than the second group. According to the extreme poverty gap, the rural areas of Segovias, Norte and Occidental do not present significant differences from other rural areas, with exception of the rural area of Managua.

#### **4. Policy Implications**

Some implications for policy can be obtained from the results of this study. In terms of policy directed to alleviate poverty, one possible target could be defined as the rural areas of all regions excluding Managua. It has been found in this study that regarding extreme poverty gaps the rural areas of all regions except Managua do not present significant differences in their extreme poverty gaps.

On the other hand this study shows that although Segovias and Norte contain an important number of poor and extremely poor families, there are also other regions such as Central and probably Occidental that are not so different of the former and could also be considered as targets for policy.

#### **5 Future Work**

During the implementation of this study several inconsistencies were found in the 1993 LSMS data set. It would be desirable to check the consistency of the data and presenting it in a uniform format. The information on expenditures can be exploited to construct a expenditure system for Nicaragua. An important task related to this is the estimation of implicit prices. The expenditure

system will provide price and income elasticities for different categories of goods, which will be useful for predictions of the impact on poverty of changes in income



**Poverty In Nicaragua Inter Regional Comparisons Using The 1993 LSMS Information On  
Income**

## I. Introduction

Several studies by the World Bank present an extensive and well documented description of the poverty phenomenon in Nicaragua. The "Nicaragua Poverty Profile" (June, 1994) is the most complete characterization of poverty using the 1993 LSMS information. The most important results in that study are (1) about half of the population falls below the poverty line and about one fifth of the population falls below the extreme poverty line (2) poverty and extreme poverty in Nicaragua are primarily rural (3) the greatest proportion of the country's poor and extremely poor population is concentrated in the Northern and Segovias region. These estimates were built up with information on total expenditures.

The purpose of this study is twofold. First, it is to estimate poverty indices by regions and areas using information on income. The focus here is to quantify the proportion of poor and extremely poor families by regions and areas. Also the poverty gap and extreme poverty gap indices are computed. The definition of these indices can be found in the next section. Second, it is to evaluate statistically the differences in the estimated poverty gap and extreme poverty gap by regions and areas. The question here is how different or homogenous are the regions and the areas of the regions regarding poverty gap indices.

This study uses information from the 1993 LSMS. The variable constructed out of that information is income. It should be noticed at this point that several inconsistencies were found, and where possible corrected, in the LSMS information. More details on this will be provided in the next section.

In what follows, section II briefly presents the methodology used to construct income and poverty indicators. The methodology used to evaluate the differences across regions is also presented in this section. Section III presents the distribution of poor and non poor households in the sample by region and by region and area. The estimated poverty gap and extreme poverty gap indices are presented in Section IV. Section V presents an analysis of the differences in poverty gap and extreme poverty gap across regions and across regions by areas. Finally, in section VI the main results are summarized.

## **II. Methodological Issues**

This study uses the 1993 LSMS information which has two parts: (1) household information (509 variables and 4455 households) and (2) individual information (244 variables and 25165 individuals). The information had several inconsistencies of which the treatment of missing values was the most frequent. For example, variables were found defined as having 9999 as representing a missing value but in fact the missing value was 99999. There were also variables with several missing value codes such as 9999, 8888, 7777, 99999 which were not recorded properly into a single missing value code. Several typographical errors were also found, i.e. a family having ten members is reported as having only one and so on. Given the huge amount of information the checking and treatment of those inconsistencies absorbed a substantial amount of the time and impose a serious limitation to the present study. Whenever possible those inconsistencies were corrected, but a more specific and systematic work needs to be done.

The total income has two parts labor income and transfers The labor income is computed as the total amount of cordobas received by all the members of the household as payment during a month, in primary, secondary and other supplementary jobs The transfers are those received by the household and come from either inside or outside the country Other sources of income are not included since they presented some inconsistencies and were recorded only for a few number of households The number of adult-equivalent in a household is also computed on the basis of the age of each member and an equivalence coefficient Ages below ten years define “children”, “young adults” are between ten and seventeen years old, and “adults” are eighteen years or older The equivalence coefficients were 0.61 for children, 0.91 for young adult and 1 for adults Income is then computed per equivalent-adult, and this value is compared to the poverty line (C\$ 214.47) and extreme poverty line (C\$ 101.32) in order to categorize each household as “non poor”, “poor”, and “extreme poor”

The proportion of poor and non poor by areas and regions is computed by cross tabulation There are several forms of reading the results but the main focus of this study is on the percentages of poor and extreme poor households out of the total population in each area or region The importance of this indicator for policy purposes is that it permits to identify which regions and/or areas concentrate the highest number of poor or extreme poor families

The construction of the poverty gap proceeds as follows The difference between the poverty line (C\$ 214.47) and the total income per adult divided by the poverty line was computed for each household This defines the poverty gap for each household The poverty gap is then estimated as the

average of the individual poverty gaps. The estimation of the extreme poverty gap proceeds in the same way but using the extreme poverty line value of C\$ 101.32.

The evaluation of the differences across regions and areas is made for the poverty gap and extreme poverty gap indices. Notice that since the poverty gap indices used here are computed as the *mean* of the poverty gaps of the individual households, the t-test can be used to test whether the poverty gaps (means) of two regions are equal or not. Whenever pairs of means are compared, i.e. extreme poverty gap in the urban area against the rural area, the t-test is used. The procedure means in SPSS program is applied in this case. To compare the means of more than two groups at the same time, i.e. differences in poverty gaps among the seven regions of Nicaragua, the procedure one-way in SPSS is used. This is a multiple comparison of means adjusting the t-test by the number of groups being evaluated. The result is a matrix indicating in its lower triangular whether a group mean, i.e. poverty gap of a region, is significantly different to any other group mean or not.

### **III. Distribution of the Poor by Regions and Areas**

In this section the geographic distribution of the poor and non poor households in the sample is presented. A household is considered “extreme poor” if its level of total income per adult is below the extreme poverty line (C\$ 101.32). A “poor” household is defined as having an income per adult below the poverty line (C\$ 214.47). The results are reported in table 1.

**TABLE 1 POVERTY TOTAL AND BY AREAS**

POVERTY CONDITION	RURAL	URBAN	TOTAL
EXTREME POOR	17.5	9.6	27.1
POOR	27.3	25.1	52.4
NON POOR	8.3	39.3	47.6

Table 1 shows that about 52.4 percent of households in the sample fall below the poverty line and are almost equally distributed between the urban and rural areas. The remaining 47.6 percent of households constitute the non poor which are mainly concentrated in the urban areas. The results concerning extreme poverty are presented in the first row of Table 1. The percentage of families that falls below the extreme poverty line is 27.1. Most of the extreme poor households are concentrated in the rural areas of Nicaragua and most of the non poor are living in the urban areas.

To have a more precise picture of the geographic distribution of the households according to its poverty condition, the sample was split by regions and considering whether a region is urban or rural. Table 2 shows that out of the total population, the highest proportion of poor families is concentrated in the urban area of Managua (7.0), followed by the rural areas of Norte (5.8), Central (5.0), and Segovias (4.9).

**TABLE 2 POVERTY BY REGIONS AND AREAS (INCOME)**

REGION	EXT POOR	POOR	NON POOR	TOTAL
SEGOVIAS URBAN	1 6	3 4	2 7	6 1
SEGOVIAS RURAL	3 7	4 9	0 6	5 5
OCCIDENTE URBAN	1 6	3 8	5 1	8 9
OCCIDENTE RURAL	1 9	3 2	1 1	4 3
MANAGUA URBAN	2 5	7 0	17 7	24 8
MANAGUA RURAL	0 8	1 9	1 6	3 5
SUR URBAN	1 0	3 0	4 7	7 7
SUR RURAL	1 5	2 8	1 5	4 2
CENTRAL URBAN	0 9	2 5	3 0	5 5
CENTRAL RURAL	3 1	5 0	1 4	6 4
NORTE URBAN	0 8	2 2	2 5	4 6
NORTE RURAL	4 2	5 8	1 1	7 0
ATLANTICA URBAN	1 1	3 1	3 7	6 8
ATLANTICA RURAL	2 3	3 7	1 0	4 7

The results on extreme poverty are shown in the first column of Table 2. The highest percentages of households who are extreme poor are located in the rural areas of Norte (4.2), Segovias (3.7), and Central (3.1). According to the previous results, if the objective of policy is to alleviate poverty and/or extreme poverty of a sizable group of families, the rural areas of Norte, Segovias and Central regions may be given the highest priority.

#### IV The Poverty Gap by Regions and Areas

In this section the estimated poverty gap and extreme poverty gap indices by areas and regions are presented. For the total sample the poverty gap (PG) is 0.53 meaning that on average the deficit of income respect to the poverty line for all poor families is 53 percent. For the urban area as a whole the PG is 0.45 and for the rural area is 0.60.

**TABLE 3: POVERTY GAP BY REGION AND AREA**

REGION	RURAL	URBAN	TOTAL
SEGOVIAS	0 66	0 52	0 60
OCCIDENTE	0 58	0 46	0 52
MANAGUA	0 48	0 42	0 44
SUR	0 54	0 44	0 49
CENTRAL	0 58	0 44	0 53
NORTE	0 65	0 44	0 59
ATLANTICA	0 60	0 44	0 53

According to Table 3, the regions with the highest poverty gap indices are Segovias (0 60) and Norte (0 59) These are followed by the regions of Atlantica (0 53), Central (0 53) and Occidente (0 52) The poverty gaps in the rural areas are systematically greater than those in the urban areas The highest poverty gaps are in the rural areas of Segovias (0 66), Norte (0 65) and Atlantica (0 60) The results for the extreme poverty gap are presented in Table 4

**TABLE 4 · EXTREME POVERTY GAP BY REGION AND AREA**

REGION	RURAL	URBAN	TOTAL
SEGOVIAS	0 50	0 45	0 49
OCCIDENTE	0 53	0 42	0 48
MANAGUA	0 40	0 41	0 41
SUR	0 46	0 45	0 46
CENTRAL	0 47	0 40	0 45
NORTE	0 52	0 39	0 50
ATLANTICA	0 50	0 38	0 46

The regions with the highest extreme poverty gap are Norte (0 5) and Segovias (0 49) By areas, the highest extreme poverty gap indices are found in the rural areas of Occidente (0 53) and Norte (0 52), followed by Segovias and Atlantica (0 50 for each of them)

## V How Big Are the Differences by Regions and Areas?

The purpose here is to evaluate the magnitude and significance of the differences in the poverty gap and extreme poverty gap indices by regions and areas. Table 5 reports the estimated poverty and extreme poverty gaps for the urban and rural areas taken as a whole. The t-tests for the differences in poverty gaps are reported in sections A and B of the Appendix. First of all the difference between urban and rural areas is evaluated. For the urban area as a whole the PG is 0.45 and for the rural area 0.60. The t-test rejects the hypothesis that the PG of urban and rural areas are equal. For the extreme poverty gap index similar results are obtained.

The index for the urban area is 0.42 and for the rural area it is about 0.50, and the hypothesis that they are statistically equal is rejected. According to this results, the urban and rural areas of Nicaragua differ significantly from each other.

**TABLE 5: POVERTY AND EXTREME POVERTY GAP BY AREA**

AREA	POVERTY GAP	EXTR POV GAP
URBAN	0.45	0.42
RURAL	0.60	0.50
TOTAL	0.53	0.47

By regions, the following result is obtained: the poverty gap of Managua region is significantly different from all the other regions. On the other extreme the regions Norte and Segovias present differences significantly from all the other regions. The regions Sur, Occidente, Atlantica and Central do not have significant differences among themselves, i.e. their poverty gaps are statistically similar. The results are shown in Table 6 and also in Appendixes C and D.

With respect to the extreme poverty gap, only Managua region differs significantly from the regions of Occidente, Segovias and Norte. More importantly, all the regions of Nicaragua except Managua do not differ significantly to each other regarding the extreme poverty gap.

Finally, each region is split according to its urban and rural area. The results regarding the poverty gap are presented in Table 7 and also in parts D and E of the Appendix. The urban areas of all regions except Segovias and the rural area of Managua do not present significant differences in their poverty gap indices, but they do differ from the rural areas of all other regions including the urban region of Segovias. The first group have the lower PG indices than the second group. According to the extreme poverty gap, the rural areas of Segovias, Norte and Occidental do not present significant differences from other rural areas, with exception of the rural area of Managua.

**TABLE 6: DIFFERENCES IN POVERTY AND EXTREME POVERTY GAP BY REGIONS**

REGIONS	M	S	O	A	C	N	S
MANAGUA							
SUR	*						
OCCIDENTE	* +						
ATLANTICA	*						
CENTRAL	*						
NORTE	* +	*	*	*	*		
SEGOVIAS	* +	*	*	*	*		

**TABLE 7 DIFFERENCES IN POVERTY AND EXTREME POVERTY GAP BY REGIONS AND AREAS**

REGION AREA	M U	BM U	Su U	C U	A U	O U	M R	Se U	Su R	C R	O R	A R	N R	Se R
MANAG URB														
NORTE URB														
SUR URBAN														
CENTR URB														
ATLAN URB														
OCCID URB														
MANAG RUR														
SEGOV URB	*	*	*	*	**	*								
SUR RURAL	*	*	*	*	*	*								
CENTR RUR	*	*	*	*	*	*	*							
OCCID RUR	**	**	*	**	**	**	**							
ATLAN RUR	*	*	*	**	**	*	*	*						
NORTE RUR	**	**	*	**	**	**	**	*	*	*	*			
SEGOV RUR	*	**	*	**	*	*	*	*	*	*	*	*		

(\*) Indicates significant differences in poverty gaps

(+) Indicates significant differences in extreme poverty gaps

## VI. Conclusions

According to this study about 52.4 percent of households in the sample fall below the poverty line and 27.1 fall below the extreme poverty line. The highest proportion of poor families out of the total sample is mainly concentrated in the urban area of Managua (7.0), followed by the rural areas of Norte (5.8), Central (5.0), and Segovias (4.9). The results on extreme poverty show that the highest percentages of households (out of the total households surveyed) who are extreme poor are located in the rural areas of Norte (4.2), Segovias (3.7), and Central (3.1).

For the total sample the poverty gap (PG) is 0.53 meaning that on average the deficit of income with respect to the poverty line for all poor families is 53 percent. For the urban area as a

whole the PG is 0.45 and for the rural area is 0.60. The extreme poverty gap for the urban areas is 0.42 and for rural areas is 0.5. Both indices are shown to be statistically different between areas. On this basis it can be concluded that the urban and rural areas of Nicaragua present significant differences regarding poverty and extreme poverty gaps. In other words taken as a whole the rural area of Nicaragua is unambiguously poorer than the urban area.

The regions with the highest poverty gap indices are Segovias (0.60) and Norte (0.59). These are followed by the regions of Atlantica (0.53), Central (0.53) and Occidente (0.52). The poverty gaps in the rural areas of each region are systematically greater than those in the urban areas. The highest poverty gaps are in the rural areas of Segovias (0.66), Norte (0.65) and Atlantica (0.60). The regions with the highest extreme poverty gap are Norte (0.5) and Segovias (0.49). By areas, the highest extreme poverty gap indices are found in the rural areas of Occidente (0.53) and Norte (0.52), followed by Segovias and Atlantica (0.50 for each of them).

Regarding the differences across regions the following results are obtained. The poverty gap of Managua region is significantly different (less) from the PG of all other regions. On the other extreme the regions Norte and Segovias present differ significantly from all other regions. The regions Sur, Occidente, Atlantica and Central do not have significant differences among themselves, i.e. their poverty gaps are statistically similar. With respect to the extreme poverty gap, only Managua region differs significantly from the regions of Occidente, Segovias and Norte. More importantly, *all the regions of Nicaragua except Managua do not differ significantly from each other regarding the extreme poverty gap.*

Finally, each region is split according to its urban and rural area. The results regarding the poverty gap are as follows. The urban areas of all regions except Segovias and the rural area of Managua do not present significant differences in their poverty gap indices, but they do differ from the rural areas of all other regions and from urban region of Segovias. The first group has lower PG indices than the second group. According to the extreme poverty gap, the rural areas of Segovias, Norte and Occidental do not present significant differences from other rural areas, with the exception of the rural area of Managua.

Some implications for policy can be obtained from the results of this study. In terms of policy directed to alleviate poverty, one possible target could be defined as the rural areas of all regions excluding Managua. It has been found in this study that regarding extreme poverty gaps the rural areas of all regions except Managua do not present significant differences in their extreme poverty gaps. On the other hand this study shows that although Segovias and Norte contain an important number of poor and extreme poor families, there are also other regions such as Central and probably Occidental that are not so different of the former and could also be considered as targets for policy.

**Appendix A. Testing The Difference In Poverty Gap Between Areas**

<b>Variable</b>	<b>Number of Cases</b>	<b>Mean</b>	<b>SD</b>	<b>SE of Mean</b>
<b>(PG)</b>				
<b>URBAN</b>	918	4500	259	009
<b>RURAL</b>	997	6002	254	008

Mean Difference = - 1502

**t-test for Equality of Poverty Gap**

<b>t-value</b>	<b>df</b>	<b>2-Tail Sig</b>	<b>SE of Diff</b>	<b>CI for Diff</b>
-12.81	1913	.000	.012	(- .173, - .127)

**Appendix B. Testing The Difference In Extreme Poverty Gap Between Areas**

Variable	Number of Cases	Mean	SD	SE of Mean
		(EPG)		
URBAN	351	4158	280	015
RURAL	638	4953	273	011

Mean Difference = - 0796

**t-test for Equality of Extreme Poverty Gap:**

t-value	df	2-Tail Sig	SE of Diff	CI for Diff
-4.31	706.92	.000	.018	(-.116, -.043)

**Appendix C. Testing The Difference In Poverty Gap Among Regions**

Multiple Range Tests LSD test with significance level 05

(\*) Indicates significant differences which are shown in the lower triangle

PG	REGION	M	S	O	A	C	N	S
4358	MANAGUA							
4857	SUR	*						
5161	OCCIDENT	*	*					
5285	ATLANTIC	*	*	*				
5322	CENTRAL	*	*	*	*			
5895	NORTE	*	*	*	*	*		
6037	SEGOVIAS	*	*	*	*	*	*	

**Appendix D: Testing The Difference In Extreme Poverty Gap Among Regions**

Multiple Range Tests LSD test with significance level 05

(\*) Indicates significant differences which are shown in the lower triangle

EPG	REGION	M C S A O S N
4063	MANAGUA	
4537	CENTRAL	
4563	SUR	
4579	ATLANTIC	
4820	OCCIDENT	*
4854	SEGOVIAS	*
4996	NORTE	*

**Appendix E. Testing The Difference In Poverty Gap Among Regions By Area**

Multiple Range Tests LSD test with significance level 05

(\*) Indicates significant differences which are shown in the lower triangle

EPG	REG/AREA	M	N	S	C	A	O	M	S	S	C	O	A	N	S
----	-----	U	U	U	U	U	U	U	R	R	R	R	R	R	R
4240	MANAG UR														
4361	NORTE UR														
4376	SUR URBA														
4416	CENTR UR														
4427	ATLAN UR														
4613	OCCID UR														
4803	MANAG RU														
5234	SEGOV UR	*	*	*	*	*	*	*	*						
5381	SUR RURA	*	*	*	*	*	*	*	*						
5780	CENTR RU	*	*	*	*	*	*	*	*	*					
5824	OCCID RU	*	*	*	*	*	*	*	*	*					
6016	ATLAN RU	*	*	*	*	*	*	*	*	*	*				
6451	NORTE RU	*	*	*	*	*	*	*	*	*	*	*	*	*	*
6595	SEGOV RU	*	*	*	*	*	*	*	*	*	*	*	*	*	*

**Appendix F- Testing The Difference In Extreme Poverty Gap Among Regions By Areas**

Multiple Range Tests LSD test with significance level 05

(\*) Indicates significant differences which are shown in the lower triangle

EPG	REG/AREA	A	N	M	C	M	O	S	S	C	A	S	N	O
----	-----	U	U	R	U	U	U	U	U	U	R	R	R	R
3775	ATLAN UR													
3852	NORTE UR													
4021	MANAG RU													
4026	CENTR UR													
4076	MANAG UR													
4234	OCCID UR													
4479	SUR URBA													
4492	SEGOV UR													
4623	SUR RURA													
4683	CENTR RU													
4981	ATLAN RU	*												*
5009	SEGOV RU	*	*											*
5203	NORTE RU	*	*	*	*	*	*	*	*	*	*	*	*	*
5329	OCCID RU	*	*	*	*	*	*	*	*	*	*	*	*	*

**Employment And Poverty In Nicaragua, 1993**

by

Janna V Leon  
March 12, 1995

## EXECUTIVE SUMMARY

### 1. Common Considerations In The Analysis Of Poverty

- Poverty in Nicaragua is an important problem, especially for the rural areas
- Urban poverty is not related to employment status of the workers, nor is more extreme poverty related to lower poverty
- The large number of dependents, associated with a large reproduction rate, is an important determinant of poverty poor families are larger in number of their members than non-poor families There is no mention about the importance of relatives and the concept of extended families among the poor families
- The low activity rate of poor families is an important determinant of poverty, mainly for the comparison between rural and urban families
- Ownership of some kind of human or physical capital—even in the informal sector—correlates inversely with poverty
- From a gender perspective, women suffer greater from poverty, participate more as unpaid family workers and the families they head are less likely to be extremely poor than male-headed households

### 2. Follow Up

Based on the MITRAB data base and on the pertinent questions of the *Scope of Work*, the present study has explored some of the above issues about the relation between poverty of families

and the participation of their members in the labor market. Issues relating to rural areas have been discarded since the data only pertains to eight urban cities representing all the regions of Nicaragua.

The main findings of this study, following the basic questions of the *Scope of Work*, support some of the above beliefs but refute others. In short, unemployment—which affects mainly those with low educational levels—is large compared to usual rates for the rest of Latin America, unemployment and poverty are highly correlated in all regions of the country, and there are important differences between poor and non-poor family groups and within them. Because of the significant presence of relatives of working age, extended families are important among poor families, the dependency rate is important only for poor families of Poor areas<sup>9</sup>. The informal sector is minimal in the urban areas of Nicaragua, even in Managua. Female-headed families systematically get lower income than those headed by men, even when the dispersion of such incomes is similar in both groups.

Several policy implications are suggested, but are not conclusive because of the lack of pertinent data for analysis. Continuity in the building up of data base for employment and income information through surveys, census, and other academic research channels, as well as good quality statistics for complementary variables (migration, work experience, business criteria for investment and for hiring, management of local institutions, etc.) will be useful for more precise proposals. A general policy orientation toward sustainable solutions of the poverty problems through a sound business and markets environment requires at least this kind of information.

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<sup>9</sup> See section II for definitions of Poor, Capital City and Other areas.

### 3 Blind Spots

Specific issues that I think must be incorporated in the *Scope of Work* and must be part of the priorities of the next studies are mainly

- Conduct deeper studies about internal migration, incorporating the specific effects of the past recent war in the mobility of the labor force and in the population in general
- Conduct more detailed studies of the role of relatives and their incorporation in extended families. Some anthropological case studies may be illustrative, by areas and type of family
- Build up more detailed questions about work experience of workers of all age and gender, specifically about their labor history in urban labor markets, to find the mechanisms of incorporation of labor into the urban labor markets. Disaggregated analysis by migratory status would be interesting
- Under the above studies, detailed consideration of open and hidden unemployment will be necessary: characteristics of the workers, timing between one position and another, entry and exit to formal/informal sectors, etc
- There is nothing clear about the economic behavior or characteristics of employers of the different types of firms, by economic activity, origin, etc. to know about their hiring criteria and how they have changed in the last years. The designing of surveys of employers is required, guaranteeing minimum response rate and high quality of the data
- Some analysis of informal sector and the relevance and performance of programs and/or institutions providing financial and non-financial services to the microenterprises. This is an

important topic since the efficient expansion of this sector may offer some significant reduction of unemployment in the short run and with relatively low costs of implementation

**Employment And Poverty In Nicaragua, 1993**

## I. Introduction

The objective of the present study is to explore some explanations of poverty in Nicaragua, specifically the poverty associated with the participation of individuals in labor markets. Some social and economic aspects are tested as possible determinants of poverty in the main cities, and in the regions considered poorest (I and VI)<sup>10</sup> of the country.

The data used in the study come from the Second Household Survey for Measurement of Employment implemented by the Ministry of Labor of Nicaragua during October, 1993. The information refers to eight cities, from six regions, including the poorest regions. The variables reported in this survey are those usually implemented in these kinds of studies, following the International Labor Office methodology to build up employment statistics.

The analysis here has two levels. First, some statistical description of the main characteristics of individuals and families is presented. Second, inferential statistical analysis is done to test the significance of associations and correlations—not necessarily causalities—between poverty and some usually hypothesized variables of employment and labor income generation by areas. Results from comparative statistical analysis between the two cities of the poor regions enable us to see relevant associations between employment, labor income and poverty. Some conclusions and policy implications are presented at the end of the study.

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<sup>10</sup> According to the *Scope of Work*

## II Theoretical and Methodological Issues

In economic terms, unemployment may be explained by diverse micro and macroeconomic determinants. At the micro level, the usual argument considers that the individual chooses between work or remaining unemployed depending on the difference between his/her opportunity cost and the market wage, thus, any observed unemployment is a voluntary decision of individuals. At the macro level, the usual argument is related to the business cycle of the economy, the performance of the total economy determines the aggregate level of employment and unemployment. Thus, during recessions we will observe higher unemployment rates than at other times, this observed unemployment is then involuntary.

Going beyond the short term macroeconomic determinants, some arguments from development theory state that the inequality in income distribution and the low family income levels restrict individual choices since the family's survival may be affected. If some unemployment is observed among these families, it is not a result of a voluntary individual decision but is an involuntary effect of economic activity and development levels. Given the developing nature of the Nicaraguan economy and the data that is available, in the present study we explore this last perspective, trying to identify such income threshold levels with the usual concept of the poverty line. In methodological terms, poverty and poverty line measures used in this study are those set by the LSMS-WB, 1993 study for Nicaragua<sup>11</sup>

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<sup>11</sup> Human Resources Operations Division Country Department II, Latin America and the Caribbean, of the World Bank, *Nicaragua Poverty Profile Preliminary Findings of the 1993 Living Standards Measurement Survey*, World Bank Paris, 1994

The data has been arranged to set three areas of analysis from the eight cities, following the *Scope of Work*, as

- **Poor Area:** Esteli and Matagalpa cities, representing Regions I and VI ,
- **Capital City Area:** Managua city, representing Region III ,
- **Other Regions Area** the cities of Chinandega and Leon, Masaya and Granada, and Juigalpa, representing Regions II, IV and V

The study will use these terms to refer to the three areas Capital City and Managua are used interchangeably

### III General Characteristics

#### III-1 *Population and Households*

In terms of the composition of the population by gender and age, the common pattern is that there are more males than females among children and young groups (up to 17 years old), while there are more females than males in the rest of the age groups This may be—at least in part—a result of the war, which reduced the male presence in the older groups In Table A 1 we can see that comparing the three areas of study, some differences exist in Poor areas the male majority goes up to 17 years old and the pattern in Managua is similar (except in the group of 10 to 14), while the age of reversal for the Other regions is 14 Thus, the war (or other determinants) has affected the population age structure of different areas of the country in different ways (i.e. proportionally less young males between 14 and 17 of Managua and Poor regions than of the Other regions, were recruited as soldiers or fled the area)

TABLE A 1 AGE BY SEX

YEARS	POOR AREAS			MANAGUA CITY			OTHER REGIONS		
	Male	Females	Total	Male	Female	Total	Male	Female	Total
UP TO 9	230	216	446	1176	1110	2286	791	775	1566
% Row	51.6	48.4	100.0	51.4	48.6	100.0	50.5	49.5	100.0
% Column	31.7	26.0	28.6	27.6	24.0	25.7	28.2	24.9	26.4
10 TO 14	115	115	230	587	641	1228	411	379	790
% Row	50.0	50.0	100.0	47.8	52.2	100.0	52.0	48.0	100.0
% Column	15.9	13.8	14.8	13.8	13.9	13.8	14.6	12.2	13.3
15 TO 17	58	53	111	283	272	555	178	235	413
% Row	52.3	47.7	100.0	51.0	49.0	100.0	43.1	56.9	100.0
% Column	8.0	6.4	7.1	6.6	5.9	6.2	6.3	7.5	7.0
18 TO 24	81	132	213	576	638	1214	402	406	808
% Row	38.0	62.0	100.0	47.4	52.6	100.0	49.8	50.2	100.0
% Column	11.2	15.9	13.7	13.5	13.8	13.7	14.3	13.0	13.6
25 TO 39	124	176	300	913	1066	1979	545	677	1222
% Row	41.3	58.7	100.0	46.1	53.9	100.0	44.6	55.4	100.0
% Column	17.1	21.2	19.3	21.5	23.0	22.3	19.4	21.7	20.6
40 TO 60	84	102	186	543	644	1187	362	454	816
% Row	45.2	54.8	100.0	45.7	54.3	100.0	44.4	55.4	100.0
% Column	11.6	12.3	11.9	12.8	13.9	13.4	12.9	14.6	13.8
OVER 60	33	38	71	178	256	434	117	191	308
% Row	46.5	53.5	100.0	41.0	59.0	100.0	38.0	62.0	100.0
% Column	4.6	4.6	4.6	4.2	5.5	4.9	4.2	6.1	5.2
	725	832	1557	4256	4627	8883	2806	3317	5923
TOTAL	46.6	53.4	100.0	47.9	52.1	100.0	47.4	52.6	100.0

Among the adult population, most males are single sons or married household heads, while the females are single daughters or married spouses of household heads. The proportion of non-nuclear family relatives among the family members reflects the importance of extended families. No significant differences in these patterns are found among areas.

Two out of three adults do not study currently. This proportion is slightly higher in the Other regions area, but is similar for Poor areas and Managua. This proportion is observed to be higher for females than males in the three areas. Table A.2 gives the distribution of education levels attained by gender for the three areas. A larger proportion have no schooling in Poor areas while this group is smaller in Managua, a larger proportion have university level education among the Managua people than in the other areas. In all cases, the educational levels are higher among males than among females. But in general, about 90 per cent of both males and females have some elementary or high school level of education.

TABLE A.2 EDUCATIONAL LEVEL BY SEX

	POOR AREAS			MANAGUA CITY			OTHER REGIONS		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
NO LEVEL	46	78	124	173	336	509	187	260	447
% Row	37.1	62.9		34.0	66.0		41.8	58.2	
% Column	9.3	12.7	11.2	5.6	9.6	7.7	9.3	11.1	10.3
ELEMENTARY	268	303	571	1453	1655	3108	1013	1131	2144
% Row	46.9	53.1		48.1	51.9		47.2	52.8	
% Column	54.1	49.2	51.4	47.2	47.1	47.1	50.3	48.3	49.2
SECONDARY	142	211	353	1113	1238	2351	671	833	1504
% Row	40.2	59.8		47.3	52.7		44.6	55.4	
% Column	28.7	34.3	31.8	36.1	35.2	35.6	33.3	35.6	34.5
UNIVERSITY	39	24	63	341	288	629	144	118	262
% Row	61.9	38.1		54.2	45.8		55.0	45.0	
% Column	7.9	3.9	5.7	11.1	8.2	9.5	7.1	5.0	6.0
TOTAL	495	616	1111	3080	3517	6597	2015	2342	4357
	44.6	55.4	100.0	46.7	53.3	100.0	46.2	53.8	100.0

A variable that is usually postulated as a cause of poverty is the family size. From our results, in Table A.3, the most important result is the relevance of large families in all the studied areas. Among areas, the mean values of family size are 6.3 persons in the Poor areas, 6.3 also in Managua,

and 6.5 in the Other regions. There is no evidence of a relation between family size and poverty of the areas. Moreover, the largest families are just in Managua.

TABLE A.3 FAMILY SIZE

NUMBER OF	POOR AREAS	MANAGUA CITY	OTHER REGIONS
PERSONS			
MEAN	6.32	6.28	6.51
STANDARD DEV	3.23	2.98	3.00
MINIMUM VALUE	1	1	1
MAXIMUM VALUE	19	24	18

### *III-2 Employment Characteristics of the Families*

One form to test hypotheses about family size, (un)employment and poverty is to set the dependency rate for each family, defining it as the proportion of family members—children, inactive potential workers, old people, etc—who depend on the family workers. We used two definitions of dependency rate: one refers only to children under ten years old, the other for those under fourteen; we keep only the first one for simplicity. The results in Table B.1 show some differences among families by area; the median values are around 0.25 for the Poor regions, and slightly lower for Managua (0.23) and the Other regions.

The members of working age who do not work nor look for a job—"inactive population"—are on average 1.6 members in Poor areas, 1.9 in Managua, and 2.0 in the Other regions. Most of them do not work because they are mainly students, owners of some property, retired workers, or 'only housekeepers', in this order. Even when the proportions change, this order is the same for the three areas of study.

TABLE B 1 DEPENDENCY RATE - Definition 1

RATE	POOR AREAS		MANAGUA CITY		OTHER REGIONS	
	%	Cumulated %	%	Cumulated %	%	Cumulated %
0%	32.7	32.7	33.3	33.3	32.1	32.1
1% TO 25%	19.5	50.2	23.2	56.5	23.2	55.3
26% TO 50%	42.2	92.4	37.1	93.6	36.4	91.7
51% TO 75%	7.6	100.0	6.3	99.9	8.2	99.9
76% TO 100%	0.0	100.0	0.1	100.0	0.1	100.0

### III-3 Labor Market and Individual Workers.

From the results presented in Table C 1 we can identify important differences by area in the results for individuals in the labor markets. The conventional measurement of the open unemployment rate shows unusually high rates in all the areas, in the Poor areas it is 27%, in Managua it is 22% and in the Other regions it is 19%. Not only is the unemployment rate high, but it is also higher in the Poor regions of the country. Unemployment is higher among those with only elementary education or none at all. By age groups, there are differences among areas: in the Poor regions, unemployment for those who are between 18 and 24 is (31.4%) as important as for those between 40 and 60 (33.3%), followed closely by those between 25 and 39 years old (26%), while in Managua such rates are lower for all age groups. In short, unemployment is a problem not only at entry level but also for experienced workers.

Most of the employed workers are conventionally identified as adequately employed, as seen in Table C 1. Underemployment shows very low figures. Considering not the conventional minimum legal wage but the poverty line values as the exogenous threshold to compute underemployment for income, we estimate two of them: one at the poverty line and another for extreme poverty. Also, the underemployment for hours has been estimated. This was higher than expected, and higher than

underemployment for income (contrary to the usual situation) The underemployment for hours is specially important in Other regions area and in Managua, where its rate is near 15%, while in Poor regions it is just around 3.5%. As a general pattern, underemployment seems to affect those with low or no education more. It also affects more males than females, in similar proportions in all the areas.

TABLE C 1 EMPLOYMENT LEVELS

	POOR AREAS		MANAGUA CITY		OTHER REGIONS	
	No Cases	%	No Cases	%	No Cases	%
OPENLY UNEMPLOYED	163	27.4	697	21.9	391	18.8
EMPLOYED	432	62.6	2490	78.1	1684	81.2
Underempym hours	55	9.2	469	14.7	350	16.9
Underempym income	44	7.4	37	1.2	60	2.9
Adequately Employed	333	56.0	1984	62.2	1274	61.4
TOTAL	595	100.0	3187	100.0	2075	100.0

The incorporation of individual workers to the market appears to be different across areas of study. In Table C 2 we can see three such differences. As expected, the highest levels of individual labor income are in Managua, and the lowest in Poor Regions, however the dispersion of incomes among individuals is highest by far in the Other regions. On average the weekly hours of work show that in Poor areas people work more than in Managua or the rest of the country. The main source of labor income is mainly wages, as seen in Table C 3, those incomes from informal sector are in general the most important only for a little more than one third of the individuals. These results are consistent with those about the type of institution individuals work for: three out of four of them are employees in private sector, as shown in Table C 3. The pattern is the same in all the areas.

TABLE C 2 INDIVIDUAL LABOR INCOME AND TIME OF WORK

	POOR AREAS	MANAGUA CITY	OTHER REGIONS
1 INDIVIDUAL MONTHLY INCOME			
Mean	614 38	957 33	739 68
Standard Deviation	697 09	1052 26	2597 85
2 WORK TIME (Hours per week)			
Mean	49 24	46 56	45 95
Standard Deviation	13 77	13 92	14 59

TABLE C 3 MAIN SOURCES OF LABOR INCOME

% OF WORKERS	POOR AREAS	MANAGUA CITY	OTHER REGIONS
1 MAIN SOURCES OF LABOR INCOME			
Wage	63 4	63 1	58 8
Self-worker Income	36 6	36 9	41 2
2 TYPE OF FIRM			
Public Sector	21 8	21 6	20 3
Cooperative	1 2	2 2	1 3
Private Sector	77 0	76 2	76 4

Finally, to see if the labor market discriminates by sex, in the Table C 4 we present the family income of the household heads by sex. Clearly, in all areas, the families which have a male head earn higher incomes than those with female heads, this is true for the mean as well as for the minimum and maximum amounts. Around seven out of ten families are headed by men.

TABLE C 4 FAMILY INCOME BY GENDER OF HOUSEHOLD HEAD

	POOR AREAS	MANAGUA CITY	OTHER REGIONS
<b>MALE</b>			
Mean	1331 05	1635 88	1412 89
Standard Deviation	1257 03	1697 81	4049 78
Minimum	50 00	100 00	60 00
Maximum	7300 00	19160 00	10299 00
% of Sample Families	66 0	69 7	68 7
<b>FEMALE</b>			
Mean	793 20	1244 19	811 30
Standard Deviation	884 88	1195 69	666 41
Minimum	40 00	120 00	40 00
Maximum	6506 00	10900 00	3600 00
% of Sample Families	34 0	30 3	31 3

#### IV Poverty and Employment

##### *IV-1 Who are the Poor? Main Characteristics*

Within the areas of study there are significant differences even among families in Poor areas, we need to analyze such differences to understand the poverty problem. Here we present results separated by poor/non-poor families, about their characteristics such as family income, family size, age groups, dependency rate and activity proportion of potential workers of the families. The headcount ratio—or proportion of the population below the poverty line—shows that a large proportion of the population are poor in the three areas: 55% in the Poor areas, 43% in Managua and 60% in Other regions.

As seen in Table D 1, in the Poor areas the global monthly family income mean is C/ 1148, but the median is just C/ 800. This may imply wide dispersion of incomes among individuals, the large standard deviation of C/ 1171 supports this idea. Related to this we can see the distribution of these labor family incomes: the poorest quartile has income between C/ 40 and C/ 400, while the richest

quartile gets between C/ 1446 and C/ 7300. This inequality is relevant even within the poor/non-poor family groups. The relations among mean, median and standard deviation for each poverty family group—as seen in Table D 1—induce one to postulate that there is more inequality among the non-poor than among the poor families in the Poor areas. In the Capital city area the family monthly income is C/ 1517, but the median is just C/ 1000 and the deviation is greater than both. That dispersion of income is also seen in the respective income distribution for all families, the highest income of the poorest quartile is around one third of that for the richest one (1/3). Within groups, such a relation is higher among poor families this is around 1/7, and among non-poor families it is 1/18. While it is true that mean income in Managua is higher than in the rest of the country, the relative inequality of its distribution seems to be higher as well. In the Other cities the average family income is C/ 1225, the median is C/ 800 and the deviation is C/ 1400, showing also high dispersion among worker families. The results of income distribution at the aggregate level as well as at the family groups level also support the above finding that inequality has a considerable magnitude.

TABLE D 1 FAMILY MONTHLY INCOMES BY AREA AND POVERTY

	POOR AREAS	MANAGUA CITY	OTHER REGIONS
<b>1 POOR FAMILY MONTHLY INCOMES</b>			
Mean	537 59	636 57	606 71
Median	457 00	600 00	500 00
Standard Deviation	392 58	351 28	374 70
Quartile Upper Limits			
1o	250 00	400 00	350 00
2o	457 00	600 00	500 00
3o	715 00	800 00	800 00
4o	2580 00	2840 00	2262 00
% of Families	54 9	42 5	60 0
<b>2 NON-POOR FAMILY MONTHLY INCOMES</b>			
Mean	1889 68	2167 96	2150 53
Median	1450 00	1600 00	1500 00
Standard Deviation	1365 49	1793 58	5203 78
Quartile Upper Limits			
1o	960 00	1100 00	1000 00
2o	1450 00	1600 00	1500 00
3o	2500 00	2600 00	2350 00
4o	7300 00	19160 00	16000 00
% of Families	45 1	57 5	40 0
<b>3 TOTAL FAMILY MONTHLY INCOMES</b>			
Mean	1148 38	1517 38	1224 55
Median	800 00	1000 00	800 00
Standard Deviation	1170 70	1572 94	3387 86
Quartile Upper Limits			
1o	400 00	600 00	400 00
2o	800 00	1000 00	800 00
3o	1445 00	1800 00	1400 00
4o	7300 00	19160 00	16000 00

In short, the average descriptive statistic indicators of income given in Table D 1 show that important differences exist not only among the areas of study but also within these areas. Far from uniformity, there is a large dispersion in the income distribution among families of the same area. Moreover, such differences are pertinent among poor/non-poor family groups as well as within the family groups. Thus, any income transfer policy needs to target not necessarily whole areas but specific family groups, by area.

TABLE D 2 SOME CHARACTERISTICS OF THE FAMILIES BY AREA AND POVERTY CATEGORY

	POOR AREAS	MANAGUA	OTHER AREAS
<b>A POOR FAMILIES</b>			
1 Family Type (%)			
Nuclear	61.4	55.7	56.4
Extended	38.6	44.3	43.6
2 Family Size (#)			
Mean	5.74	6.08	6.02
Quartile UpperLevel			
1st	4	4	4
2nd	5	6	6
3rd	7	7	7
4th	19	24	18
3 Members by Age(#)			
Up to ten	1.84	1.64	1.64
Ten to Seventeen	1.32	1.30	1.33
Eighteen and up	2.58	3.14	3.05
4 Mean Depend Rate	0.30	0.26	0.26
5 Mean Activity Rate	0.30	0.52	0.50
<b>B NON POOR FAMILIES</b>			
1 Family Type (%)			
Nuclear	57.1	64.3	68.6
Extended	42.9	35.7	31.4
2 Family Size (#)			
Mean	4.43	4.38	4.61
Quartile UpperLevel			
1st	3	3	3
2nd	4	4	4
3rd	5	5	6
4th	11	19	13
3 Members by Age(#)			
Up to ten			
Ten to Seventeen	1.04	1.09	1.11
Eighteen and up	0.94	0.82	0.83
4 Mean Depend Rate	2.45	2.48	2.67
5 Mean Activity Rate	0.22	0.22	0.22
	0.37	0.58	0.63
<b>C TOTAL FAMILIES</b>			
1 Family Type (%)			
Nuclear	61.9	61.8	61.7
Extended	38.1	38.2	38.3
2 Family Size (#)			
Mean	4.91	5.09	5.25
Quartile UpperLevel			
1st	3	3	4
2nd	4	5	5
3rd	6	6	6
4th	19	24	18
3 Members by Age(#)			
Up to ten	1.4	1.31	1.39
Ten to Seventeen	1.1	1.02	1.07
Eighteen and up	2.4	2.76	2.79
4 Mean Depend Rate	0.26	0.23	0.24

Other family characteristics are also relevant to understand the differences between poor and non-poor families within areas of study, as shown in Table D 2. Based on the relation of all members to the household head, we identify as important the presence of extended families in the whole sample, their importance differs according to the poverty status and area of location of the families. In the poor areas, around one out of three families have other relatives as permanent members of the family. The proportion is almost the same for the poor families in these areas, but higher for the non-poor families. Several explanations may be postulated. One plausible argument, following the usual explanations for very marginal and rural areas in developing countries, may be that the housing costs for dwellers and other poor family houses are the lowest in the market such that it is not necessary for many families to live under one roof in these areas, since every nuclear family can have one house. Besides, it is probable that the poor areas are not migration (internal or external) attracting locations but expulsion poles, thus, the demand for housing in these poor areas is permanently decreasing, and even if no land market officially existed, the access to some kind of house would be more likely to be guaranteed than in the rest of the country. The non-poor families in these poor areas are extended in greater proportion than the poor families. The housing cost argument may still be used because of better location and probably better quality of their houses, the non-poor families are more likely to live with relatives than the poor families. In Managua and the Other regions, as shown in Table D 2, the figure is exactly opposite: even when in the aggregate most of the families are nuclear, the relevance of extended families is higher among poor families than among non-poor families. These, especially Managua as in the rest of Latin America, are target areas for internal—rural or small urban

town—migrants, who are relatively rich in their places of origin but form part of poor families in their location of arrival

In average terms, the family size is similar among 75% of the families of the three areas studied, at between 3 and 6 members, the main difference is for the remaining 25%, for which the family size goes from 7 to larger numbers (the largest families being just in Managua) The Table D 2 also shows that in the three areas the poor families are larger than the non-poor, by quartiles and in the mean The explanation of these results must be different among areas In Poor areas where nuclear families are more important among poor families, the larger size may be associated with a large reproductive rate (i.e. a large number of sons and daughters) It is also reflected in the number of younger family members and the dependency rate, which are the highest relative to the other groups, and their low activity rate The explanation for the size of the non-poor families of poor areas, as well as the poor families of Managua and the other regions must be quite different since the extended type of family is important here, the large family size reflects the presence of relatives instead of a large reproductive rate We consider that these relatives are—as typical migrants—mainly working age, because of the larger number of adult members in these families, their larger activity rate and lower dependency rate

In summary, the presence of relatives is important among families and affects their characteristics, and in most cases affects also the composition of the labor supply in the labor market of the areas The large size is mainly explained by the presence of relatives instead of a high productivity rate Hence, any policy to improve the living conditions of the poor needs to consider measures relating to internal migration, housing markets and property right issues in rural and urban

areas, among others Global policies and/or incentives for public and private investments in the rural and small towns may be useful to reduce the migratory process, while more industrialization and productive and intensive-labor technologies in urban areas may help the absorption of this migrant supply of labor The choice for one or another option is a political decision, other variables such as the provision of basic utilities, either publicly or privately managed will be also important

#### *IV-2 Unemployment and Income by Poverty Categories.*

In this section we explore the relevance of open unemployment across the areas of study, for poor and non-poor families, the main results are reported in Table E 1 On average the family unemployment rate of Poor areas is the highest 24%, versus 19% for Managua and 16% for other regions But by poverty status of the family, some interesting differences emerge the open unemployment rate is larger among poor families than among non-poor families, and this is true for all three areas Comparing only the poor families across the three areas, those in Poor areas have the highest unemployment rate (20%) Among the non-poor families, those in Managua have the highest rate (9%) for this type of family In short, open unemployment is a problem which affects poor families almost exclusively, independent of their geographical location If hidden unemployment could be computed, we may expect higher values for poor families, because of the relevance of relatives of working age We can expect that total unemployment for poor families would be significantly higher, mainly in Managua and in Other regions, as well as for non-poor families of Poor areas

TABLE E 1 UNEMPLOYMENT, EDUCATION AND INCOME SOME INDICATORS BY AREAS

	POOR AREAS	MANAGUA	OTHER REGIONS
<b>A POOR FAMILIES</b>			
1 Unemployment Rate (UR)	20%	15%	15%
2 Employed Workers	1 44	1 29	3 91
3 UR by Family Income F test	3 75	11 73	3 22
<b>B NON-POOR FAMILIES</b>			
1 Unemployment Rate (UR)	8%	9%	4%
2 Employed Workers	1 83	1 91	3 43
3 UR by Family Income F test	0 14	4 12	0 49
<b>C TOTAL FAMILIES</b>			
1 Unemployment Rate(UR)	24%	19%	16%
2 Employed Workers	1 44	1 43	3 51
3 UR by Family Income F test	2 96	15 53	1 47

In the aggregate, the number of employed workers per family is surprisingly similar between Poor areas and Managua (1 4), but higher for Other regions (3 5), this last area seems to follow another pattern

A pertinent issue is the relation between unemployment and poverty. If we test it using the family monthly labor income as a proxy of poverty—such as used in this study—the data shows significant differences between poor and non-poor families for Managua and Poor areas ( $F= 15.5$  and  $F= 2.97$  respectively), but not in Other regions, whose pattern is again different. The results of the mean differences between family types within areas show always that such differences are significant among poor families but are not significant among the non-poor families, except in Managua, as shown in Table E 1 through the high values for the F-test. In other words, among the poor, family income—as proxy of poverty—is strongly and directly related to open unemployment. Again, poverty and unemployment are highly related, almost independently of the location of the family

The results seem to suggest that the unemployment rate faced by families is more related to contextual and/or more external variables affecting all of them, rather than their internal or peculiar characteristics. Since unemployment affects mainly the poor, any policy oriented to alleviate the poverty problem will require measures to reduce unemployment in each area. Probably global or macro policies of sustainable economic growth will be more suitable—and imply less costs—than microeconomic region or family oriented policies to achieve this goal. These two results of higher unemployment rate and lower number of employed workers for poor families, relative to non-poor families may imply some qualitative differences in the incorporation of the poor and non-poor workers in the labor market (e.g. if the market pays for education, potential workers with lower educational levels will not get a job easily).

Besides, considering underemployment (as previous defined) the results here show that both types of underemployment for income and for hours affect non-poor families (almost 0.18 members) more than poor families (around 0.15 members) even when the underemployment is really low, while underemployment by hours is the more important. Thus, any policy of poverty alleviation must solve the problem of unemployment instead of underemployment, contrary to the usual proposals for other Latin American countries.

#### ***IV-3 Cities of the Poor Area Main Differences between Esteli and Matagalpa.***

In this section we test the relations among unemployment, income and poverty by city of the Poor area studied, to explore how different the poorest cities of the country are, represented here by Esteli and Matagalpa. It is relevant for policy implications, because if the differences are significant between these cities, we may need very specific policies to remove the poverty problem in each city,

which may be more expensive but more efficient for poverty alleviation objectives. However, if the relations are not significant, similar general policies may be implemented in all the poor regions, with the same policy objectives. Here we present some basic differences between both cities based on selected indicators of unemployment, family income and other selected variables. These variables should suffice to detect if pertinent differences exist. Based on statistical analysis of comparison of medians and linear regressions, some interesting results are presented in this section.

Matagalpa has higher mean family income (C/ 1478) than Estelí (C/ 896), as presented in Table F 1. Such family incomes differ among families, and one important variable related with the final income available to the family is the open unemployment among their members. The results show that within each city, there is an inverse relation between both variables: families with less unemployed workers have higher incomes than those with more unemployed members. In the aggregate, most of the families (71% in Estelí and 66%) do not have unemployed members or have just one. However, as Table F 1 shows, such differences are statistically significant only in Estelí ( $F=2.6$ ) but not in Matagalpa ( $F=0.5$ ). This means that in Matagalpa there is no significant relationship between the mean income of the families and the number of unemployed workers. These average results between cities also differ among families within each city. By poverty status, it is clear that for the non-poor families the differences of family income are not significantly affected by the number of unemployed members (i.e. very low values for  $F$ ), contrary to the significant income differences among poor families of Estelí ( $F=2.16$ ), even when the relation is not exactly linear. The dispersion of incomes across different number of unemployed is larger among poor families than among non-poor, and the dispersion is wider for Matagalpa, where proportionally more families have

more than one unemployed than in Esteli. The important result of significant differences of income among poor families of Esteli and their low income levels—lowest in the whole sample—may imply that direct income transfer policy must be targeted to this specific group of poor families in Esteli.

TABLE F 1 MEAN INCOME BY UNEMPLOYMENT WITHIN POOR AREAS

1 POOR FAMILIES	POOR AREAS		ESTELI		MATAGALPA	
	C/	%Tot Fam	C/	%Tot.Fam	C/	%Tot Fam
Whole Group	537.59	54.7	459.33	62.7	681.82	44.3
#Unemployed by Family		100.0		100.0		100.0
0	573.87	60.0	523.29	61.7	675.03	56.9
1	435.83	29.0	347.43	29.8	612.64	27.4
2	749.83	8.3	515.60	5.3	917.14	13.7
3	200.00	2.1	200.00	2.1	200.00	2.0
4	120.00	0.7	120.00	1.1		
F-test Among Groups	2.73		2.16		1.05	
2 NON-POOR FAMILIES	C/	%Tot Fam.	C/	% Tot.Fam.	C/	%Tot Fam
Whole Group	1889.68	45.3	1628.86	37.3	2121.52	55.7
#Unemployed by Fam		100.0		100.0		100.0
0	1913.46	80.0	1689.31	87.5	2147.15	74.6
1	1754.00	16.6	1205.71	12.5	2049.23	20.6
2	2033.33	3.3			2033.33	4.8
F-test Among Groups	0.13		0.84		0.03	
3 TOTAL FAMILIES	C/	%Tot Fam	C/	% Tot.Fam.	C/	%Tot.Fam.
Whole Group	1148.38	100.0	895.95	100.0	1477.64	100.0
#Unemployed by Fam						
0	1276.61	69.0	1057.26	71.4	1585.42	66.1
1	871.19	23.8	519.09	23.3	1311.32	24.3
2	1006.53	5.7	515.60	3.3	1252.00	8.7
3	200.00	1.1	200.00	1.3	200.00	0.9
4	120.00	0.4	120.00	0.7		
F-test Among Groups	2.21		2.58		0.52	

TABLE F 2 UNEMPLOYMENT BY DEPENDENCY RATE AND FAMILY INCOME Correlation Coefficients

UNEMPLOYMENT RATE BY	POOR FAMILIES		NON POOR FAMILIES	
	Depend Rate	Unemp Rate	Depend Rate	Unemp Rate
1 DEPENDENCY RATE - 1				
A ESTELI				
Dependency Rate	1 00	-0 10	1 00	0 18
Unemployment Rate	-0 10	1 00	0 18	1 00
B MATAGALPA				
Dependency Rate	1 00	-0 17	1 00	-0 07
Unemployment Rate	-0 17	1 00	-0 07	1 00
2 FAMILY INCOME				
A ESTELI				
Family Income	1 00	-0 30	1 00	-0 13
Unemployment Rate	-0 30	1 00	-0 13	1 00
B MATAGALPA				
Family Income	1 00	-0 03	1 00	-0 12
Unemployment Rate	-0 03	1 00	-0 12	1 00
C TOTAL POOR AREAS				
Family Income	1 00	-0 20	1 00	-0 05
Unemployment Rate	-0 20	1 00	-0 05	1 00

The above conclusions are supported by the results of dependency rates, income and unemployment by family status and areas presented in Table F 2. The coefficients found show an expected negative correlation between the unemployment rate and the dependency rate, for all families of Matagalpa and poor families of Esteli, but a positive correlation for non-poor families of Esteli. However, such coefficients are statistically non-significant (i.e. high P-values for the coefficients in the Table F 2). These results are related to those presented in above sections about the relevance of extended families and the presence of relatives of working age. These last variables as well as other external-to-the-family variables are more important determinants of the unemployment rate than the dependency rate. In this same sense, the family income is significantly negatively correlated to unemployment rate among poor families, mainly among the poor families of Esteli. From this we conclude, as before, that open—and probably also hidden—unemployment affects the

poor more, specially the poorest, reducing the available income for these families. Thus, not only is an income transfer policy important, but also more sustainable labor income sources are urgent for the poor families, mainly for the poorest who are in Esteli, short-term or grant-policy which generate only temporary income will not solve the poverty problem for these families.

One final analysis is referred to test the hypothesis that in poor areas the family income is mainly determined by unemployment (i.e. number of unemployed workers) and the activity rate of the families. The results of the regression analysis are presented in the Table F 3, by poverty status of the families. The results confirm the above conclusions: for poor families both explanatory variables are important, but also the constant is very significant, which may indicate that there are other important additional explanatory variables not included in the regression (i.e. number of relatives per family, migratory status of family workers, previous labor experience of family workers, life cycle in the family, education level, etc.). The results for the non-poor families are similar, unemployment—as found before—is less significant, but activity rate and the constant very important (i.e. large t values). Availability of additional data on the possible variables suggested above may help to improve the explanatory power of these regressions.

TABLE F 3 UNEMPLOYMENT AND INCOME FAMILY IN POOR AREAS Regression Analysis Results

POOR FAMILIES	INGFAMES = 786.57 - 88.20*UNEMP - 677.86*TASACTIV		
	(13.96)	(-2.26)	(-5.24)
NON POOR FAMILIES	INGFAMES = 2945.55 - 302.95*UNEMP - 2684.54*TASACTIV		
	(-1.24)		(-5.31)
INGFAMES	MONTHLY FAMILY INCOME		
UNEMP	NUMBER OF UNEMPLOYED WORKERS IN THE FAMILY		
TASACTIV	ACTIVITY RATE PER FAMILY		

## V Conclusions

- 1 The structure of the population by age and gender show that males predominate in very young people (up to seventeen), and females are the majority in the other age groups. In general this figure is the same in Poor areas, Managua and Other regions, and is probably related to the war.
- 2 Among the adult population, males are single sons or household heads, and females are single daughters or spouses of heads. More important, the presence of non-nuclear family relatives is evident for around one third of the families, it is true for the three areas of study.
3. Around one third of all the adults are not currently studying. The education level does differ among areas: a greater proportion of the population has no schooling in Poor areas, this is less so in Managua, on the opposite side, a larger proportion of Managuans have university level education than in any other areas.
4. The family size is large in all areas, partially affected by the presence of relatives in the families. The low dependency rate for most of the families, specially in Managua and Rest of regions is evidence of the contribution of the extended family to family size. The largest families are just in Managua.
5. Between 1.6 and 2 members of the families are of working age but do not work because of studies, ownership of property, retirement or 'just housekeeping', these results are similar for the three areas. But there are significant differences in the number of potential workers per family by area.
6. The open unemployment rate by area is high, and larger in Poor regions, than in Managua and in the Other regions. This unemployment is found largely in the group with low (or no) education level,

and is present among those with some experience in the labor market as well as those who are just entering it

7 Most economically active members are adequately employed. The underemployment for income is very low, and the underemployment for hours is higher, contrary to usual figures. This last type of underemployment is highest for Managua and lowest for the Poor area.

8 Individual workers get the highest incomes in Managua and the lowest in the Poor area. However, on average, the weekly hours of work are greater in the Poor area and in the Other regions. Most of the individuals work for the private sector for a wage. This pattern is similar in all the three areas. The informal sector and self-generated employment and incomes are relevant only for around one third of the employed workers.

9 Families headed by males (around 7 out of 10) earn higher family incomes than families headed by females. This pattern is similar in the three areas.

10 The headcount index shows a large proportion of the population as being poor, this proportion is greater than 50% in Poor areas and Other regions.

11 Important differences of income exist not only between the three areas of study but also within each area, between poor and non-poor family groups. The dispersion of incomes among families within the areas are large. Moreover, there is also significant dispersion or inequality in the income distribution within poor and non-poor groups, in each area.

12 In the presence of extended families the Poor area differs from Managua and Other regions. In the first area such families are more prevalent among non-poor than among poor families, while in the other areas the relation is the opposite. Costs of housing and the large presence of factors of

expulsion or attraction of the different areas are possible explanations of these results. Also, the fact that the recently past war took place mainly in the Poor area must have also contributed to these results. Important internal migratory process may have been the base of these results, but pertinent data would be required for more precise conclusions.

13 On average, three out of four families have similar family size (between 3 to 6) in the three areas, for the rest of the families the size varies significantly. In general poor families are larger in the three areas. Explanations differ by area. In the case of the Poor areas, the usual arguments of high reproduction rates may be pertinent, while in Managua and the Other areas the presence of relatives is more important to explain the large size of poor families.

14 The unemployment rate per family implies the same results as those from the number of unemployed workers for poor and non-poor families. The rate is significantly larger among poor families than among non-poor, the highest rate (20%) being in the Poor area. Among the non-poor families, those of Managua have the highest unemployment rate (9%).

15 The number of employed workers per family is relatively higher in the non-poor families than in the poor families in Poor areas and Managua, but the figure is the opposite for Other regions.

16. Underemployment per type of family is significant only for non-poor families in all the areas. However both underemployment for income and for hours are low even among them.

17 Testing the differences of family income by unemployment rate per family type and areas yields interesting findings. Such income differences are statistically significant between poor and non-poor families of the Poor area and Managua, and within the poor group of all areas. Again we conclude

that families differ by income not only by areas, but also by their poverty status, moreover, the poor families are not homogeneous but differ significantly in each area

18 Analyzing cities of the Poor area separately shows interesting differences among their families. First, the average income in Estelí is lower than in Matagalpa. Second, the headcount ratio is higher in Estelí than in Matagalpa. Third, the income differences by number of unemployed workers in the family is significant for Poor areas. Such differences are significant in Estelí but not in Matagalpa, specifically they are significant among the poor families of Estelí. For these reasons Estelí (representing Region I) is poorer than Matagalpa (representing region VI).

19 Correlation between unemployment and dependency rate appears as non significant for any type of the families in any of the cities, as found before in the aggregate Poor area. Correlation between unemployment and family income shows significant coefficients only for poor families of the whole area, and specifically for those of Estelí. In general, low family incomes in the Poor area are mainly determined by unemployment and the low activity rate faced by families, but other variables may be also important, specially for the poor families.

## **VI. Policy Implications**

From the above results we may postulate some policies helpful for the poverty alleviation, as follows

1. Macroeconomic and development policies able to increase the economic activity and thus the employment, to reduce the large unemployment rate affecting mainly poor families and the Poor areas

in general Sectoral policies as well as price policies, monetary policies, and even commercial policies will need to be orientated to the expansion of markets

2 Financial reform which engages private investment as well as international institutional aid to increase the emergence of sustainable firms in the long run Credit programs oriented to the emergence and reinforcement of only efficient and sustainable microenterprise programs The wide and diverse experience of the rest of Latin American countries can be useful in this area The main objective would be the generation of sustainable positions in firms with possibilities to grow in the long run, to reduce the unemployment (but not to increase the underemployment, as usually happens)

One relevant advantage of these programs is that they can be implemented near location of poor families, which may not only reduce unemployment but also increase the activity rate—or reduce the hidden unemployment—among poor families Also, the participation of females in the labor market can be increased Besides, the implementation of such kind of programs in the Poor areas may reduce the possible impact of internal migration, retaining these workers in their areas of origin, helping to reduce the pressure in Managua and Other regions labor markets, if this process is as usually observed in the rest of Latin America

3. Totally related to the above policies, the retention of people in locations of origin may require not only more job opportunities but also significant improvements in their living conditions, guaranteeing access to basic utilities This implies a large amount of investment in the whole country, which again requires huge funds from private investors and international aid institutions as well as significant local participation The education and health infrastructure policy requires special priority, particularly if education and productivity are important determinants in the labor markets

4 Other legal and administrative reforms may be pertinent to implement the above policies and generate an environment which enables the expansion of the Nicaraguan economy. Also, some kind of prudent regulation may be necessary to be implemented through socially accepted specialized institutions.

5 The non uniformity of poor families among areas and within the Poor area as well as the magnitude of the involved population may imply that some direct monetary and real income transfers may be necessary for this specific target group: poor families of Estelí. International donors may play a key role in the funding of this policy, which may be not expensive since it is oriented to one specific group. However the need for the other policies mentioned above still remains even in these areas because the unemployment rate shows that there are members of these families willing to work and get more sustainable labor income sources if they had the opportunity.

6. Most of these conclusions are based in the findings of the present study as well as the characteristics of these poverty and unemployment problems in similar Latin American countries. However, the available data to support the above policy proposals is very restricted. Continuity in building up the data base for employment and income information through surveys, census, and other academic research channels, as well as good quality statistics for complementary variables (migration, work experience, business criteria for investment and for hiring, management of local institutions, etc.) will be useful for more precise proposals. A general policy orientation toward sustainable solutions of the poverty problems through sound business and markets environment requires at least this kind of information.

**A Study Of Poverty In Nicaragua Preliminary Findings Of The 1991 And 1992 Prodere  
Survey**

by

Miguel Ostos

February 1995

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## EXECUTIVE SUMMARY

This document presents the main poverty characteristics and the possible factors that are associated with its intensity. This profile is based on the PRODERE household surveys of 1991 and 1992. The survey of 1991 covers 3 municipalities, namely Río San Juan, Quilali and Pantasma while the survey of 1992 covers a sample of 4, i.e. Jicaro Murra Wilili and Jalapa. In other words the whole sample includes 7 out of 49 municipalities of Northern and Segovia's Regions of Nicaragua (4,728 households and 31,681 individuals).

The surveys contain raw data on household characteristics, such as education, migration, health, economic activity, employment, agriculture, credit and nutrition. The objective of this study is to extract, process and analyze the information from the mentioned surveys to provide a measurement of poverty, to identify possible associations between levels of poverty and socioeconomic and demographic factors and to suggest some recommendations to alleviate poverty in the municipalities under analysis.

The analysis of poverty in the Latin American literature is based on two methods: the method of Poverty Line and the method of Unsatisfied Basic Needs. The first adopts income or expenditure of the individuals and households as the baseline to identify the poverty levels, while the second considers the access to basic social goods and services. In any case, both methods offer only a partial view of poverty since, when establishing a poverty measure, only some aspects of welfare are considered.

Unfortunately the PRODERE surveys do not contain information on income sources and expenditure patterns. Therefore these data are not appropriate to address questions that relate income

based poverty measurements and socioeconomic and demographic factors were left unanswered. However, the data from the surveys make it possible to provide a measurement on poverty based on potential access to basic needs and to explore how these dimensions are related.

The present report provides a measurement of poverty based on four Unsatisfied Basic Needs: access to shelter, education, water and sanitation and economic independence. In our analysis, poor are those who fail to have access to at least one of these mentioned basic needs. This measure will help us to identify vulnerable groups of individuals that are unable to reach an appropriate standard of living. We will assess the geographic incidence of poverty and the relation of headship, education, malnutrition, access to credit, employment pattern, age and gender with poverty.

Nation wide estimations report that almost 75% of the Nicaraguan population is considered poor and that poverty is basically concentrated in rural areas. A regional distribution of poverty shows that the Northern and Segovia regions ( regions I and VI ) are the most affected by extreme poverty.

The main findings of this report are the following:

1. Approximately 90% of the households in the municipalities are considered poor.
2. Water and sanitary provision and housing overpopulation are the most severe problems faced by extremely poor people in the municipalities under analysis. This suggests that special attention should be directed for increasing access to these basic needs.
3. Rio San Juan, Murra and Pantasma (in that order) are the municipalities where poverty is most severe.

- 4 Although the literature relates female headship to prevalence in determining poverty, in our study gender of the household head is not a major explanatory variable of poverty
- 5 Housing tenure is mostly not legalized especially among extremely poor households, thus access to credit is constrained Almost 70% of the extremely poor population has no access to any kind of agricultural credit It is worth mention that, contrary to the common belief, the legal status of land ownership is not associated with poverty
- 6 Malnutrition is of major importance when analyzing poverty Multivariate and univariate analysis show a strong positive correlation between them According to our estimations between 46% and 54% of the extremely poor individuals consume below the minimum caloric intake in Nicaragua Although many studies argue in favor of food assistance, the literature does not provide estimations of the impact effects of this assistance on alleviation of poverty
- 7 Illiteracy rates reach extremely high levels at a male and female level and poor inhabitants are less likely to report being able to read and write Among the poorest women are more likely to be illiterate Based on our estimations it is highly recommended to implement programs to increase school enrollment rates, specially for women, and at the same time it is of major priority to expand primary schooling to increase the level of literacy of younger individuals that are more likely to be extremely poor

Due to the available data and to the inappropriate way of stating the questionnaire many areas of possible research are left open Questions regarding access to health services, agricultural credit are of special interest when addressing poverty problems Further research should be implemented on the relation of poverty and nutrition It would be interesting to estimate

the impact on poverty of food donations programs to the rural areas that are supposed to increase the average caloric intake of the extremely poor

**A Study Of Poverty In Nicaragua· Preliminary Findings Of The 1991 And 1992 Prodere  
Survey**

## I Introduction

In the literature there is an ample variety of poverty measures and definitions. The most important reason to measure poverty is to make a poverty comparisons. Poverty exists in a society when an individual does not attain a certain level of economic and social well-being.

Based on previous nation-wide studies, this report aims to analyze poverty in regions that *a priori* are considered the poorest of Nicaragua. However, saying that poverty exists is only the first step, for many purposes, including policy recommendations, it is also necessary to say how much poverty exists.

Based on the available data and for comparison purposes, this report makes use of the so called 'direct method' or method of Unsatisfied Basic Needs. The idea behind this method is that essential social needs are specified along with minimum levels of satisfaction of those needs. Individuals and households that do not achieve those minimum thresholds are considered poor.

The report is organized as follows: the first part is devoted to a clear explanation of the analytical framework of poverty measurement. In a second section we estimate the magnitude of poverty for the whole sample of 7 municipalities and then for each separately. The third section describes the main characteristics of the households by analyzing possession of assets and issues related to gender and age. The next three sections relate poverty and nutrition indicators, education and employment patterns. Finally we implement a multivariate analysis to estimate the net effects of the different determinants of poverty. The last section concludes and provides some preliminary recommendations to reduce poverty in the municipalities under analysis.

## **II Measurement of Poverty Index**

The are three main objectives for developing a poverty measure, such as the index based on UBN The first is to identify and divide groups of individuals whose needs are not satisfied, so that they are not able reach a standard of living that corresponds with social standards Secondly it will help us to find a measure that captures the intensity of poverty and that provides a relatively good ordering when poverty changes are measured over time Finally the index can determine the optimal allocation of government resources so that poverty can be minimized

There are different approaches to decide when an individual or a household should be defined as poor Poverty measurement generally assumes that there exists a predetermined and arbitrary minimum level of standard of living that is normally called the poverty line, which must be excluded if an individual or household is not to be considered as poor

It is of common knowledge that there are levels of consumption of goods and services such as food, clothing, housing, education, health, below which the survival of an individual is threatened The problem is to state clearly what those levels are and if in practice welfare involves more than survival

The literature suggests income and expenditure indicators, quality of life indicators and measures of access to social basic needs and services The available data from the PRODERE household surveys of 1991 and 1992 do not provide information about income nor expenditure Thus income based indices, such as the income poverty line are not possible to be constructed Quality of life indicators include for example nutrition levels, morbidity and mortality rates, life expectancy,

literacy, etc Although the data for some of these indicators is available, acceptable thresholds for such variables are not found in the literature

In the case of access to social basic needs and services, the unit of measurement can be composed of a large number of variables These variables measure access to education or school attendance, access to potable water and sanitation, access to housing, access to free primary health care and hospitals, access to regularized land titles, etc An indicator of access to basic needs and services is determined, like many other indices, by convention For example, if there are in rural areas more than 5 persons per bedroom in the household, then the household is overpopulated That is why it is convenient to state the different criteria that determine the poverty thresholds with respect to the access to basic services Since most of the variables under analysis are discrete, that means either you have access to the service or not or the basic need is satisfied or not, the poverty index will show how many people are below or above those thresholds

The present report incorporates measures of access to social basic needs and services into the analysis of poverty in the seven municipalities of Regions I and IV The reason is two fold first, the only available information in the surveys was the one related to social services rather than income and expenditure and second, it will help to compare the results with other studies

Since this study will measure to what extent individuals and households in Regions I and VI satisfy their needs of housing, education, water and sanitary provision and economic dependency, poverty is defined as the deprivation of goods and primary services to reach a minimum standard of living

The methodology for constructing a poverty index based on Unsatisfied Basic Needs (UBN) is presented in the appendix. The index combines five indicators, namely housing overpopulation, access to school education, water and sanitary provision and economic dependency<sup>12</sup>. The fifth indicator is a measure of potential lack of income. It includes the relation of household members per working member and level of education of household head. The study our index is based on, considers an individual or a household as 'non poor' when all the basic needs are satisfied or adequate. Poor are those with at least one of the needs not satisfied, i.e. if one basic need is inadequate. Extremely poor are the individuals and households that have more than two basic needs unsatisfied. This report, however, provides five categories (from 0 UBN to 4) in order not to lose relevant information provided by the index such as the intensity of the poverty. The PRODERE household Survey includes municipalities that correspond to Regions I and VI. According to most of the studies of the rural areas in Nicaragua, Regions I and VI are the poorest regions in the country. Thus, the information provided by the index below the poverty line is of valuable importance.

### III The Magnitude of Poverty

At the individual level, table 1 shows that only 5.2% of the individuals fulfill completely their social basic needs, i.e. have 0 UBN, and close to one fifth of the population has no access to social

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<sup>12</sup> In this report the index is constructed by giving the same weights to all the indicators. An alternative approach measures poverty with the so called deprivation index which is based also on access to services and household assets, like social services, information, potable water, education, availability of electricity, ownership of household durable goods, access to shelter and to sanitation services. This index weights deprivations in various sectors using modal values as weights. The weights are based on the assumption that the current distribution of services represent revealed preferences.

basic needs, i e has 4 UBN According to the classification of a preliminary document "Estudio de la Pobreza en Nicaragua" of the Ministerio de Accion Social, more than 80% of the individuals surveyed fall below the extremely poor line

At the household level the basic composition of the frequency distribution is similar to that of the individual level Table 2 shows that approximately 7% of the households have access to all the basic needs, while almost 15% of the households have no access to social services Again 3 out of 4 households are considered extremely poor

**TABLE 1**  
**DISTRIBUTION OF POVERTY**  
(Individual level)

<b>UNSATISFIED BASIC NEEDS</b>	<b>NUMBER OF INDIVIDUALS</b>	<b>PERCENTAGE</b>
0	1560	5.2
1	4395	14.5
2	8280	27.3
3	10556	34.9
4	5495	18.1
<b>TOTAL</b>	<b>30286</b>	<b>100.0</b>

**TABLE 2**  
**DISTRIBUTION OF POVERTY**  
 (Household level)

<b>UNSATISFIED BASIC NEEDS</b>	<b>NUMBER OF HOUSEHOLDS</b>	<b>PERCENTAGE</b>
<b>0</b>	334	7 0
<b>1</b>	923	19 5
<b>2</b>	1383	29 3
<b>3</b>	1413	29 9
<b>4</b>	675	14 3
<b>TOTAL</b>	4728	100 0

Table 3 shows the number and percentages of individual that reported to have inadequate access to the four basic needs. The results are ordered by magnitude. Thus approximately 8 out of 10 individuals live in households that have inadequate water and sanitation provision, 64% live in households that are overpopulated and slightly more than one half of the individuals have low education and are economically dependent. All these figures are higher than the nation-wide estimates given in "Estudio de la Pobreza en Nicaragua". The obvious explanation is that our results are based on a sample that includes the poorest municipalities of Nicaragua. However, our figures resemble those of the individuals in rural areas in the same study.

**TABLE 3**  
**CHARACTERISTICS OF INDIVIDUAL POVERTY**  
(Individual level)

UBN INDICATOR	NUMBER	PERCENTAGE
Unsatisfied Services	23451	77.4
Housing Overpopulation	19598	64.7
Low Education	16135	53.9
Economic Dependency	15491	50.9

Table 4 presents the incidence of each of the indicators in the different categories of poverty at an individual level. For all levels of poverty, poor water and sanitary provision is the indicator with more relevance in the distribution, followed by housing overpopulation. The other indicators are not clearly ordered. Similarly table 5 shows the same analysis, but at a household level. The composition of both levels are the same. Our ranking at the household level does not coincide with the "Estudio de la pobreza en Nicaragua". Again, the figures in that report are nation wide. They include urban areas, where economic dependency and housing overpopulation are the indicators with more incidence in the poverty index based on UBN.

**TABLE 4**  
**LEVELS OF POVERTY BY UBN INDICATORS**  
(Individual level)

UBN	UBN INDICATOR			
	UNSATISFIED SERVICES	HOUSING OVERPOPULATION	LOW EDUCATION	ECONOMIC DEPENDENCY
1	48.9	18.6	8.7	23.8
2	75.9	46.1	30.3	48.6
3	90.9	89.7	66.6	52.7
4	100.0	100.0	100.0	100.0

**TABLE 5**  
**LEVELS OF POVERTY BY UBN INDICATORS**  
 (Household level)

UBN	UBN INDICATOR			
	UNSATISFIED SERVICES	HOUSING OVERPOPULATION	LOW EDUCATION	ECONOMIC DEPENDENCY
1	61 0	13 33	6 18	19 5
2	81 06	41 21	24 87	52 9
3	92 57	88 82	62 07	56 5
4	100 0	100 0	100 0	100 0

Table 6 shows the relation between intensity of poverty and its geographic distribution. The municipalities where the ultra poor people are concentrated are Rio San Juan (with 19.1%), followed by Murra (with 16.9%) and Pantasma (with 16.8%). It is worth mentioning that these municipalities also have high percentages in the category of 3 UBN. Notice also that the municipalities of Jalapa, El Jicaró and Quilalí are better off than the rest of the municipalities. The table shows that Jalapa and El Jicaró have more non-poor people with access to all social basic needs. The figures also show how Jalapa's and El Jicaró's participation in the different levels of poverty decreases as poverty is more intense (from 27.5% to 6.1% and from 19.2% to 12.0%).

**TABLE 6**  
**GEOGRAPHIC DISTRIBUTION OF POVERTY<sup>13</sup>**

U B N	1		2		3		4		5		6		7	
	No	% <sup>14</sup>	No	%										
0	299	19.2	75	4.8	180	11.5	428	27.4	288	18.5	190	12.2	100	6.4
1	720	16.4	237	5.4	538	12.2	750	17.1	788	17.9	744	16.9	618	14.1
2	1202	14.5	810	9.8	979	11.8	1138	13.7	1517	18.3	1205	14.6	1429	17.3
3	1215	11.5	1573	14.9	1569	14.9	874	8.3	1815	17.2	1504	14.2	2006	19.0
4	658	12.0	929	16.9	718	13.1	335	6.1	883	16.1	1048	19.1	924	16.8

1=Municipality of El Jicaro  
 2=Municipality of Murra  
 3=Municipality of Wiruli  
 4=Municipality of Jalapa  
 5=Municipality of Quilali  
 6=Municipality of Rio San Juan  
 7=Municipality of Pantasma

#### IV. Household Characteristics of the Poor

This section is focused on the characteristics of poor households of the 7 Municipalities. In general in rural communities, the criteria by which authors like Ravallion and Binadi (1993) judged poverty at the household level are the following: a) possession or lack of assets, b) issues of social status in terms of gender and age.

a) In rural areas, the main assets that people need to sustain livelihood varies according to the culture of each community and productive system. Most of the population of the 7 municipalities own independent housing units. Table 7 shows that of the poorest households (4, 3 and 2 UBN) no more than 42% have legal title to their property. Table 7 also shows the proportion of land that have legal owners to the total amount of disposable land for each level of poverty. The figures show no significant differences between levels of poverty. However, in any case only approximately one third

<sup>13</sup> The strength of association is measured by the Pearson and likelihood-ratio chi<sup>2</sup>. Both statistics reject the hypothesis of independence at a one percent level of significance.

<sup>14</sup> For the percentages figures the rows sum to 100%.

of the land in each group has a legal title This low level of legal ownership has an important implication for investment, since it limits access to credit (mortgages are the most common collateral required to obtain a credit) Figures from table 7 show that 7 out of 10 individuals devoted to agricultural activities do not have any kind of credit available Despite the difference in poverty indices, the figures for rural areas obtained in the World Bank document "Nicaragua Poverty Profile" are very similar to those obtained in this report

**TABLE 7**  
**POSSESSION OF ASSETS BY POVERTY LEVEL<sup>15</sup>**  
(in percentages)

	UBN				
	4	3	2	1	0
Have legal Title to housing	35 85	38 03	41 21	52 06	64 67
Have legal Title to Land	34 2	34 2	33 53	26 7	30 0
No Access to Agricultural Credit	78 41	76 33	76 12	73 99	69 89
Have Radio	36 59	41 26	46 28	51 79	71 26
Have Independent Kitchen	75 26	82 38	84 75	85 16	91 9

b) In rural areas female headed households are believed to have a higher prevalence of poverty than male headed households This is based on the idea that in rural areas female heads have less education and are less likely to be economically active and thus can not afford their basic needs However, since a larger proportion of the population live in male headed households, more of the

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<sup>15</sup> The strength of association is measured by the Pearson and likelihood-ratio chi<sup>2</sup>. Both statistics reject the hypothesis of independence at a one percent level of significance, except for land legal tenure where the hypothesis not rejected.

poor and the very poor live in households headed by males Table 8 shows that female headed households are less likely to be extremely poor than male-headed households Notice that for 4, 3 and 2 UBN the percentages of all female headed households are less than those of the male headed households

The relation between average age of the head of the household and poverty intensity is also shown in table 8 The poorest households present lower average age in all cases Female headed households seem to be on average older than male headed households

**TABLE 8**  
**HOUSEHOLD CHARACTERISTICS BY GENDER AND AVERAGE AGE <sup>16</sup>**

	UBN				
	4	3	2	1	0
% of all Fem Headed HH	11 81	27 06	27 31	23 62	10 21
% of all Male Headed HH	14 82	30 48	29 64	18 67	6 4
Mean Age All HH	41 73	41 61	39 61	42 06	44 05
Mean Age Fem Headed HH	44 88	45 61	44 51	43 92	48 58
Mean Age Male Headed HH	41 13	40 78	38 46	41 51	42 30

#### IV-1 Nutrition and Poverty

Nutritional indicators are usually used as approximating indicators of poverty because poor households are more likely to have a high proportion of malnourished individuals, and the negative

<sup>16</sup> The strength of association is measured by the Pearson and likelihood-ratio chi<sup>2</sup>. Both statistics reject the hypothesis of independence at a one percent level of significance.

impact of malnutrition is greater on the poor and likely to have intragenerational consequences. Inadequate nutrition can be seen as a cause and effect of poverty. As pointed out in the World Bank's document "Nicaragua Poverty Profile", rates of malnutrition are commonly used as proxies for poverty because a low nutritional level indicates an unsatisfactory welfare level caused by a number of poverty-related factors. Besides these considerations, nutrition is also a determinant of poverty because it has a negative impact on learning capacity, productivity and mortality. This puts the individuals considered poor in a situation that makes them impossible to break the mentioned circle.

The data set includes information on daily caloric intake per person, which will be used as an indicator of malnutrition. The variable was divided in four groups<sup>17</sup> individual that take

- 1 less than 1000 kilo calories/ person per day,
- 2 between 1000 and less than 1850 kilo calories/ person per day,
- 3 between 1850 and less than 2170 kilo calories/ person per day,
- 4 more than 2170 kilo calories/ person per day

Table 9 shows that extremely poor people ( 4 and 3 UBN) are less likely to have intakes of high levels of calories per day and more likely to have low levels of calory intake per day in relation to a non poor individual. If the minimum caloric intake in Nicaragua is considered to be 2170, approximately 50% of the extremely poor fall below the threshold compared to only 35% within the non poor.

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<sup>17</sup> These categories were taken as defined in the World Bank study

**TABLE 9**  
**CALORIC INTAKE BY POVERTY LEVEL<sup>18</sup>**  
 (in percentages)

Caloric Intake	UBN				
	4	3	2	1	0
< 1000 kcal/ person/day	8 15	5 39	3 4	3 03	2 10
> 1000 and < 1850 kcal/person/day	30 67	24 95	21 36	16 56	17 66
> 1850 and < 2170 kcal/person/day	15 26	15 66	13 61	11 92	13 77
> 2170 kcal/ person/day	45 93	53 93	61 55	68 47	66 47
Total	100 00	100 00	100 00	100 00	100 00

#### IV-2 Education and Poverty

Next we consider the relation between education and poverty. Education is of major importance, since it gives the individual the possibility to avoid or move out from poverty. Table 10 shows overall illiteracy rates and levels of poverty in the 7 municipalities under analysis. A division by gender is also considered. Illiterate is defined as those individuals that report as being unable to read and write. The figures show a clear direct relation between illiteracy and level of poverty. More than 6 out of 10 individuals reported disability of reading and writing within levels 4 and 3 UBN, while only around 15% of the people within the non poor are considered illiterate. The gender division shows that extremely poor women are slightly less illiterate than men.

<sup>18</sup> The strength of association is measured by the Pearson and likelihood-ratio chi<sup>2</sup>. Both statistics reject the hypothesis of independence at a one percent level of significance.

**TABLE 10**  
**ILLITERACY RATE BY GENDER AND POVERTY LEVEL<sup>19</sup>**  
 (in percentages)

	UBN				
	4	3	2	1	0
Illiteracy Rate	67 56	60 67	46 62	32 71	15 43
Female Illiteracy	68 08	61 13	47 16	33 64	14 60
Male illiteracy	67 13	58 07	45 44	31 69	16 22

### IV-3 Employment Pattern and Poverty

In the municipalities of analysis there are more self-employed workers and less wage earners and unpaid family workers. Table 11 shows that the composition of self employed workers is relatively homogeneous between poverty levels. At a gender level, self employment is lower for women than for men and the non poor women are the most likely to be self employed. Poor women are more likely to be unpaid family workers than non poor. Something that is interesting to point out is that women across all poverty levels are more likely to be wage earners than men, and women are also less likely to be unpaid family workers than men.

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<sup>19</sup> The strength of association is measured by the Pearson and likelihood-ratio chi<sup>2</sup>. Both statistics reject the hypothesis of independence at a one percent level of significance.

**TABLE 11**  
**EMPLOYMENT PATTERN BY GENDER AND POVERTY LEVEL**  
 (in percentages)

TOTAL	UBN				
	4	3	2	1	0
Self-employed	48 96	37 16	47 20	49 83	46 82
Wage earner	26 81	22 01	25 23	31 9	42 54
Unpaid Family	24 24	40 83	27 57	18 26	10 64
Total	100 00	100 00	100 00	100 00	100 00
<b>MALE</b>					
Self-employed	57 22	43 78	54 37	57 92	53 56
Wage earner	15 67	13 63	15 75	21 43	32 79
Unpaid Family	27 11	42 60	29 88	20 65	13 65
Total	100 00	100 00	100 00	100 00	100 00
<b>FEMALE</b>					
Self-employed	18 09	15 11	23 26	27 76	36 7
Wage earner	68 42	49 95	56 9	60 5	57 19
Unpaid Family	13 49	34 94	19 84	11 74	6 12
Total	100 00	100 00	100 00	100 00	100 00

#### V Multivariate Analysis:

The analysis has so far shown a strong correlation between poverty levels and each of the household characteristics, malnutrition, illiteracy rate, housing legal status and access to agricultural credit. At the same time no clear association was found between factors such as gender of household head or employment pattern and poverty levels.

Some of the mentioned factors are related to another. For example, a farmer that does not have legal title of housing is less likely to have access to credit and thus less likely to invest and increase the land productivity and hence more likely to be poor. On the other hand, when establishing the association between a certain factor and the poverty levels we neglect the possible influence that

the other factors might have on the behavior of our dependent variable To identify the net or the independent effects of each factor on the poverty levels, a multivariate ordered probit<sup>20</sup> equation was estimated with the index based on the 5 levels of Unsatisfied Basic Needs as dependent variable and the caloric intake, disposable size of land, illiteracy rate, access to agricultural credit, legal status of housing, age , gender of household head, and employment pattern as independent variables

The results do not attempt to specify a causal relationship, instead they attempt to show the independent association of the various exogenous variables with our index of poverty Additionally the results should tell us something about the relative importance the independent variables have for reducing the probability of being poor

The results of the ordered probit regression are presented in table 12 They show that each of the coefficients of the included variables are significant In particular, four factors affect the probability of being extremely poor the presence of illiterate individuals in a household, the legal status of housing, the size of disposable land for agricultural activities and the caloric intake of the individuals<sup>21</sup>

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<sup>20</sup> Many studies related to models with discrete dependent variables are based on multinomial Logit or Probit models. However there are multinomial choice variables, such as poverty indexes, that are inherently ordered. In the case at issue, although the outcome is discrete, the multinomial logit or probit models fail to account for the ordinal nature of the Unsatisfied Basic Needs Index which is our dependent variable. Estimations via ordinary regression methods would fail in the same way as multinomial logit or probit models. Linear regression models, for example take the difference between 0 and 1 as being the same as that between 1 and 2, while by construction these responses are only a ranking.

<sup>21</sup> The inclusion of this variable in the model and the conclusions that arise from it should be viewed with caution since the causality between poverty and malnutrition is not clearly determined.

**TABLE 12**  
**MULTIVARIATE ANALYSIS OF POVERTY<sup>22</sup>**

Ordered Probit Estimates					
				chi2 (8)	= 884.38
				Prob > chi2	= 0.0000
Log Likelihood = -12773.18				Pseudo R2	= 0.0335
UBN	Coef *	Std Err	t**	P> t ***	
CALORIC INTAKE	- 0000151	2.19e-06	-6.874	0.000	
LAND SIZE	- 0021586	0002278	-9.475	0.000	
ILLITERACY	2233097	0115377	19.355	0.000	
ACCESS TO CREDIT	- 0218645	0223318	-0.979	0.328	
HH LEGAL STATUS	- 2419703	0226114	-10.701	0.000	
AGE	- 0578869	0116308	-4.977	0.000	
HH GENDER	1016719	0340771	2.984	0.003	
EMPLOYMENT PATTERN	0255324	0107056	2.385	0.017	

Note  
 \* The size of the impact of the independent variables on the probabilities are not completely captured by the coefficient  
 \*\* t statistic  
 \*\*\*All coefficients significant at one percent level, except for Access to Credit

It is necessary to point out that there were two types of independent variables considered in the regression analysis: continuous and discrete. The first two independent variables in table 12, namely caloric intake<sup>23</sup> and land size, are continuous while the rest were taken as discrete variables.

To evaluate the impact of changes of the independent variables on the probabilities of the 5 categories of UBN, it is necessary to state clearly the difference between both types of variables. For the continuous variable case we estimate the marginal effects of the independent variables on the probability of the different categories, e.g. a 1% increase of caloric intake increases in X% the probability of being non-poor, or reduces in Y% the probability of being extremely poor.

For the 5 probabilities, the marginal effects of changes in the continuous independent variables are shown in the following table:

<sup>22</sup> Several regression models were undertaken. The different experiments conclude that variables like land legal status should be excluded due to its poor statistical significance.

<sup>23</sup> An interesting exercise would be to consider the impact of the calories contained in a specific food basket on the probability of the different poverty categories to evaluate any program of food donations that USAID might consider relevant to alleviate extreme poverty.

**TABLE 13**

MARGINAL EFFECT OF	Prob(UBN=0)	Prob(UBN=1)	Prob(UBN=2)	Prob(UBN=3)	Prob(UBN=4)
Caloric Intake*	1 04	2 84	2 10	-2 68	-3 31
Land Size**	1 49	4 06	3 01	-0 38	-0 47

\* To capture the size of the marginal effect of 'caloric intake' on the different probabilities, the values on the table should be multiplied by 0 000001

\*\* To capture the size of the marginal effect of 'land size' on the different probabilities the values on the table should be multiplied by 0 0001

Table 13 shows that an increase of the intake of calories increases the probability of being non poor, and reduces the probability of being extremely poor, i.e. increases the probability of 0 UBN and reduces the probability of 3 and 4 UBN

Regarding the impact of a change in land size on the probabilities of the different categories of poverty, table 13 shows that an increase in the size of disposable land devoted to agricultural activities has a positive effect on the probability of being non poor and reduces the probability of being extremely poor

The approach taken so far is not appropriate for evaluating the effect of a discrete variable. We can analyze a discrete variable by comparing the probabilities that result when the variable takes its different values with those that occur with the other variables held at their sample means

Table 14, for instance, shows how the probability of being extremely poor decreases as the individual becomes more literate. The probability of not having access to 4 basic needs (last columns of table 14) falls from 0 19 to 0 13 when an illiterate individual becomes semiliterate, that means when an individual either learns how to read or learns how to write. Following the same reasoning,

the probability that a semiliterate individual had 4 UBN falls from 0.13 to 0.10 when the individual becomes literate, that means when the individual learns how to write and read. Similar conclusions arise from the column of not having access to 3 basic needs.

Regarding the probability of being non poor table 14 shows it increases as the individual becomes more literate.

**TABLE 14**

ILLITERACY	Prob(UBN=0)	Prob(UBN=1)	Prob(UBN=2)	Prob(UBN=3)	Prob(UBN=4)
ILLITERATE	0.02	0.11	0.25	0.43	0.19
SEMILITERATE	0.03	0.14	0.30	0.40	0.13
LITERATE	0.05	0.19	0.31	0.35	0.10

Table 15 shows, on one hand, that the probability of being extremely poor (Prob(UBN=3) and Prob(UBN=4)) fall as the individual has more access to different types of agricultural credit, which include banking, cooperative, private and family credit. On the other hand the probability of being non poor increases as the individual has more access to credit.

**TABLE 15**

No. of Credit Types	Prob(UBN=0)	Prob(UBN=1)	Prob(UBN=2)	Prob(UBN=3)	Prob(UBN=4)
0	0.02	0.13	0.27	0.42	0.16
1	0.04	0.17	0.30	0.38	0.11
2	0.06	0.21	0.32	0.33	0.08
3	0.09	0.26	0.33	0.27	0.05
4	0.13	0.30	0.32	0.22	0.03

Table 15 together with table 16 confirm the findings above. Although the significance of the estimated coefficient of the legal housing status as independent variable, the probability of being extremely poor can be reduced only slightly as individuals legalize their dwellings. This can be

explained basically by fact that the impact on the estimated probabilities is a pure effect that does not consider the effects of other factors that ordinarily change along with the titling of a home

**TABLE 16**

HH Legal Status	Prob(UBN=0)	Prob(UBN=1)	Prob(UBN=2)	Prob(UBN=3)	Prob(UBN=4)
Do not have legal title	0 02	0 13	0 28	0 47	0 13
Have Legal Title	0 04	0 17	0 30	0 38	0 10

As stated in the preliminary document "Estudio de la pobreza en Nicaragua", several studies in Latin America show that the lower the age the greater the likelihood of being extremely poor Table 17 confirms those findings

**TABLE 17**

AGE (years)	Prob(UBN=0)	Prob(UBN=1)	Prob(UBN=2)	Prob(UBN=3)	Prob(UBN=4)
Less than 5	0 02	0 12	0 27	0 42	0 17
Between 6 and 14	0 03	0 13	0 28	0 41	0 15
Between 16 and 19	0 03	0 14	0 29	0 40	0 14
Between 20 and 24	0 04	0 15	0 30	0 39	0 12
Between 25 and 59	0 04	0 17	0 30	0 38	0 11
More than 60	0 05	0 18	0 31	0 36	0 10

Although the estimated coefficients of gender of the household head is statistically significant the estimated probabilities of being non poor and extremely poor in table 18 show that there are that no significant differences between a female and a male headed household

**TABLE 18**

GENDER OF HH HEAD	Prob(UBN=0)	Prob(UBN=1)	Prob(UBN=2)	Prob(UBN=3)	Prob(UBN=4)
Female	0 09	0 20	0 28	0 30	0 13
Male	0 09	0 21	0 29	0 28	0 13

The figures in table 19 surprisingly show no clear association between that the employment pattern and the probability of the different categories of poverty

**TABLE 19**

EMPLOYMENT PATTERN	Prob(UBN=0)	Prob(UBN=1)	Prob(UBN=2)	Prob(UBN=3)	Prob(UBN=4)
Owner	0 03	0 15	0 30	0 39	0 13
Independent Employed	0 03	0 15	0 29	0 40	0 13
Employee or Worker	0 03	0 14	0 29	0 40	0 14
Domestic Worker	0 03	0 14	0 29	0 40	0 14
Unpaid Family Worker	0 03	0 13	0.28	0 41	0 15

## VI. Conclusions and some policy recommendations

Poverty is alarming in the 7 municipalities of analysis. More than 90% of the households fall below our measure of poverty line, i.e. 9 out of 10 people do not have access to at least 1 of the 4 social basic needs. The rest correspond to the category of non poor, i.e. households that have access to all social basic needs.

Almost 8 out of 10 individuals live in households that do not have access to adequate water and sanitation services, almost 7 out of 10 live in households that are overpopulated and 5 out of 10 individuals have low education and are economically dependent. These figures suggest that political

attention, to increase the access to those needs and consequently reduce poverty, should be programmed mainly in that order

The geographic analysis indicates that special attention should be given to the municipalities of Rio San Juan, Murra and Pantasma since extremely poor individuals are more likely to be concentrated in those areas

Contrary to our expectations and results of other studies, households headed by women are less likely to be extremely poor than households headed by men. In that sense gender does not seem to play a special role in explaining poverty in the municipalities of analysis

The vast majority of individuals live in households and with no legal ownership and among them extremely poor people have the greatest probability of having no legal title. These results are consistent with the low levels of access to credit for extremely poor individuals. The figures reported that more than 7 out of 10 of the extremely poor individuals do not have access to any type of credit. This indicates that a major action area to reduce poverty is to implement an urgent process of housing tenure legalization

There is an evident association between nutrition and poverty. However the direction of the effect is not clearly determined since any of them can be considered as cause or effect of the other. The multivariate analysis shows that the relation of malnutrition and poverty exists. Many studies argue in favor of direct food assistance to rural areas to improve their level of caloric intake. However, most of the poor households produce their own food. What should be recommended, instead, are programs that develop off-farm job opportunities in rural areas to generate more income that improve the caloric intake level and programs that improve agricultural productivity

Illiteracy rates are extremely high in relation to the nation wide figures reported by the World Bank. Extremely poor individuals have more probability to be illiterate since people with low levels of education are usually less productive workers and lower income earners. It is strongly recommended to implement programs to increase the school enrollment rates, specially for women, and at the same time it is of major priority to expand primary schooling to increase the level of the younger individuals that, according to the preliminary report "Estudio de la pobreza en Nicaragua", are the more likely to fall below the poverty line.

Univariate and multivariate analysis show that overall employment pattern has no clear association with poverty levels. However the analysis at a gender level show that employment is lower for women than for men and it the non poor women that is more likely to be to be self employed.

## **Appendix Methodology for the Elaboration of the Index of Unsatisfied Basic Needs**

The method of Unsatisfied Basic Needs (UBN) identifies the basic needs of the population analyzed. A poverty index is constructed out of them, so that individuals and households can be classified according to a number of unsatisfied needs. A correct screening of the poor will help to assign accurately the resources of the economy and to establish social programs that help to relieve individuals and households in that situation.

In the elaboration of the index based on UBN we followed the methodology used in the preliminary report "Estudio de la Pobreza en Nicaragua" which is based on standards and international measures. According to this study the UBN index is based on four indexes:

### **1) Density Index:**

-We calculated the rate of density for the individual and household by dividing the total number of persons that usually live in a house by the number of rooms in each house. If the rate of density for a household in the rural area was greater or equal to 5, the house was considered overpopulated or dense.

-We calculated the housing overpopulation index which takes two values:

1 for a rate of density greater or equal to 5

0 otherwise

### **2) Unsatisfied Services Index:**

To construct this index we implemented the following steps:

#### ***a) Sanitary Services Index***

-For each housing we calculated the Sanitary Services Index which took two values:

1 if the service is inadequate, i.e. the housing does not have toilet or lavatory

0 if the service is adequate, i.e. the housing has toilet or lavatory

**b) *Water Provision Service Index***

-This index took two values

1 if the service is inadequate, i.e. the housing does not have water provision from a public network inside or outside the house. Water provision comes from river or gorge, well or water eye

0 if the service is adequate, i.e. the housing has water provision public network inside or outside

**c) *Unsatisfied Services Index***

-This index is a combination of the former ones. It took two values

1 if at least one of the former services is inadequate

0 otherwise

**3) Low Education Index**

The following steps were implemented

a) We determined the population between 7 and 14 years that do not attend school

b) We constructed the index of low education that took the following values

1 if in the household at least one of the population between 7 and 14 do not attend school

0 otherwise

**4) Economic Dependency Index**

This index is an approximation for a probable lack of income in the household. It is the combination of two variables. The first one is the employment rate which is the ratio of the amount of persons that live in a household to the economically active population and the other is the level of education of the head of the household.

Three basic steps were implemented:

a) We calculated the index of employment that took two values:

1 if the employment rate was greater or equal than 3

0 otherwise

b) We calculated a variable that represented the education level of the head of the household, which took two values:

1 if the head of the household has an education less or equal the 5th level of primary school

0 otherwise

c) The Economic dependency index took two values:

1 if in a household the employment rate was greater or equal than 3 and the head of the household has an education less or equal than the 5th level of primary school

0 otherwise

UBN Index

Once the four indexes were calculated our poverty index was obtained by classifying individuals and households in the following way The following table shows the preliminary report “Estudio de la pobreza en Nicaragua” and ours

“Estudio de la Pobreza en Nicaragua”	Our Report
Non-Poor	0 Unsatisfied Basic Needs
Poor	1 Unsatisfied Basic Need
	2 Unsatisfied Basic Needs
Extremely Poor	3 Unsatisfied Basic Needs
	4 Unsatisfied Basic Needs

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**Nicaragua: Poverty Comparisons Based on Relative Access to Social Services by  
Municipalities**

**by**

**Javier M Poggi**

**March 12, 1995**

## EXECUTIVE SUMMARY

The most important reason for measuring poverty is probably not the need for a single number for some place and date, but rather to make poverty comparisons. The present study, is mainly a comparative assessment of poverty in Nicaragua based on data on the access to basic services for 141 municipalities which cover over 95% of the population of Nicaragua for 1993. The Data were obtained from two sources: Social and Economic Disposable Resources Information System by Municipalities and Communities (SISCOM) and a document published by the Ministry of Social Action -MAS- (1994).

Due to the fact that the data are for municipalities rather than households, it was not possible to address poverty questions from the point of view of individuals, rather it is necessary to proceed indirectly from the side of supply of services.

The analysis of the data was divided in two parts. First, clusters of municipalities were identified for each service sector, i.e., health, education, etc, and also for a group of variables representative of all the sectors. For the clusters obtained, comparisons on the provision of basic services were undertaken. Second, factor analysis to try to identify a reduced set of factors that explain differences in access to basic services between municipalities was performed.

The major findings of this study are

- 1 The population of Nicaragua has a differentiated access to the basic services considered in this study. Differentiation is based not only on the access to a particular service, but also on the quality

of the service being accessed. This differentiation is found not only between regions of Nicaragua, but also within these regions.

2. Although there are some groups of people doing better than others, the overall access to services and the quality of services being accessed by the majority of Nicaraguans are still low and inadequate. In particular, the data show that health and water and sanitation represent the most serious problem in terms of access to and quality of the services. The fact that low population coverage and poor quality of water systems are one of the major factors in the high incidence of diarrhoeal disease- the leading cause of infant mortality- makes policies targeted to improve these sectors, of primary importance. Incrementing the number of INSSBI institutions dedicated to help children should also rank high on priorities of the government.

3. The clusters identified for different service sectors are similar in composition but they do not exactly match each other. This suggests that the deficiencies to access different services and the differences in the quality of the service being accessed are not completely uniform across services. For instance, the municipalities that form the worst group in terms of access to say, water and sanitation services, are not all going to be the ones that compose the worst group in access to education. In terms of policy recommendations, this conclusion suggests that although some coordinated effort to help specific areas in accessing or improving their access to all services is desirable, specific programs for specific needs are also required.

4. The clustering based on a selected group of variables representative of all four service sectors together suggest that people living in urban areas are more likely to do better than people in rural areas. This is true for all the services considered in this paper. The regional composition of these

clusters also suggest that poorer people are specifically more concentrated in regions 1, 5 and 6 This finding is consistent with previous poverty studies of Nicaragua such as World Bank (1994), MAS/PNUD/UNICEF (1994), etc

5 The results obtained from factor analysis suggest that the distribution of services across municipalities depends on the average level of income and size of the market of the municipalities, the degree of urbanization, and the ability and capacity of the government of providing services Quality of services is particularly tied to income and size of the market of the municipalities Also, the data shows that investments of the government are concentrated on low quality services primarily targeted to help critical situations Overall, the extent to which the government is able to provide basic help is limited Conclusion 4 along with conclusion 3 combine to show that policies oriented to improve the level of income associated with agricultural activities are the ones that would have the most impact in alleviating poverty Lack of appropriate data prevent me from being specific in terms of policies to improve the agricultural sector, however, it is reasonable to think that education, access to credit markets and feasibility of accessing and using better technologies are areas to be explored in further research

Some final remarks and other areas of further research with the data I used in this study follow Although, data are available, time limitations prevent me from exploring other areas like commercial and industrial activity, productive infrastructure and transportation infrastructure Exploration of these areas can provide some insight on where government investments are most necessary Also, data are available for the institutional and organizational sectors These data can help to evaluate the impact of government organizations, NGOs and international agencies across the

Nicaraguan territory Some basic data regarding the agricultural sector is also available and their use can shed some light on poverty in rural areas

The results of this study provide a general view of where the poor are, who the poor are and what needs are less accessible to them Since the collection of the data that were used is relatively accessible and can cover most of the population of Nicaragua, it would be desirable to improve the quality of the data and to update them permanently to be able to monitor poverty and also explore the longitudinal aspects of the issues covered in this paper

**Nicaragua: Poverty Comparisons Based on Relative Access to Social Services by  
Municipalities**

## I. Introduction

The most important reason for measuring poverty is probably not the need for a single number for some place and date, but rather to make poverty comparisons. As Ravallion (1994) pointed out, "*Comparisons of poverty, such as where or when poverty is greatest, typically matter far more for policy choices than do aggregate measures of poverty, such as how many people are deemed poor*" (p 75)

Poverty comparisons are usually made from data for individuals or households. Unfortunately that kind of data are not available for this paper. The data set I am working with provides information on the access to services like electricity, education, health, etc, for communities and municipalities for 1993. The logical question at this juncture is whether it is still possible to make meaningful poverty comparisons with the available data. I argue that, under some reasonable assumptions, the answer is positive. A discussion about this issue is developed in section 2.

Based on the previous observation, I propose two different ways in which the information could be useful for the government of Nicaragua (GON) in formulating poverty alleviation strategies. First, I will use the data to cluster municipalities based on how *close*<sup>24</sup> they are in their provision of different sets of services. A comparison of the clusters obtained can help to identify which of them are in greater need of help. Also, the characteristics of the different clusters can help the GON to formulate more specific policies to alleviate poverty. Second, I will use factor analysis to try to

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<sup>24</sup> A brief explanation of the methodology is presented in section 2.

identify a reduced set of factors that are tied to poverty, or more properly to different living standards. This can also help in the design and orientation of policy.

The organization of the paper is as follows. Section 2 provides a theoretical foundation for making valid poverty comparisons with the available data. Section 3 is divided in two parts. The first part describes the variables used for cluster analysis. The second part discusses the methodology to cluster municipalities and presents the results. Section 4 briefly discusses the basic concept and shows the results of factor analysis. Finally section 5 presents some concluding remarks as well as some preliminary policy recommendations.

## II. Theoretical Framework

There are three common ways of understanding poverty, namely (I) being below the *existence minimum*, (ii) being below the level of income and wealth a person has a *right* to and (iii) lacking the resources required for maintaining/achieving the *capabilities* perceived as being adequate. All three approaches are different in spirit<sup>25</sup>, but they share some aspects, namely they require the definition of a poverty threshold, they need to establish a poor person's relation to the poverty threshold and they all agree that monetary income is related in one way or another to a person being considered poor or non poor.

My goal in this section is to provide some theoretical foundation for the study being presented in this paper. Since the key element in achieving this goal is related to the common aspects of the

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<sup>25</sup> For an excellent discussion about the philosophical views behind these different theoretical approaches, see Janttu (1990)

theoretical approaches mentioned above, a discussion of one of them will suffice. Perhaps, the most used approach is the one that defines poverty as an existence minimum. Therefore, that is the one I will focus on.

The idea that being poor is equivalent with being below some subsistence minimum, is often called an absolute view of poverty, or it might be called a basic needs view of poverty. This implies that poverty is in some way connected with *needs*. The subsistence minimum view of poverty typically states that there is some bundle of goods that is necessary for physical survival. Thus, for a person to be poor, the income he/she receives must be less than the amount sufficient to purchase that bundle of commodities. This corresponds to the point of view that a person has a set of needs which have to be fulfilled in order to ensure the ability of that person to participate in ordinary life.

There are basically two ways in which this concept of poverty has been operationalized in empirical work, and they both involve some degree of arbitrariness. One way relies on the computation of *poverty lines*, expressed in monetary units, as the threshold for poverty. The computation of these poverty lines is based on the use of different sets of goods and services and the use of different methodologies<sup>26</sup>. Based on comparisons of poor households' income with respect to the income determined by the poverty line, different indices of incidence, depth and severity of poverty can be calculated. The alternative methodology is based on the identification of *unsatisfied basic needs* (UBN). It uses individual thresholds for each of the variables considered as *basic needs* and determine how many of them are not being satisfied for each household. Then, people are deemed

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<sup>26</sup>A discussion on the various methodologies used to calculate poverty lines and the advantages and pitfalls related to them can be found in Ravallion (1993).

as poor, extremely poor or non poor depending on how many basic needs are not being satisfied<sup>27</sup> Assessments of poverty based on UBN indexes do not require data on income, however, it is clear that the number of unsatisfied necessities is highly correlated with the level of income of the household

The points that are clear from the previous discussion are the following (I) the definition of the set of variables involved in the analysis is somewhat arbitrary, by which the definition of the poverty thresholds have also some degree of arbitrariness, (ii) income is of primary importance in determining who is the poor and (iii) data at the household level is required

The data set I am working with is basically composed of an inventory of the provision of services i e , electricity, water, education, and the like And it is organized by municipalities Therefore, it prevents me from using any of the specific methodologies previously discussed However, under plausible assumptions, it still allows me to use their underlying logic to make some poverty comparisons The reasoning goes as follows It is clear that the ease with which people have access to services do not exclusively depend on the *availability and ease of access* of the service<sup>28</sup> It also depends, and perhaps more importantly, on the *real* access people have to these services by virtue of having the monetary means to acquire them However, if we believe that the availability and ease of access of services across different regions of the country is, for the most part, tied to the level of income of the group of people living in that region, then, comparisons of access to different

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<sup>27</sup> Usually, 1 unsatisfied necessity is enough to be considered poor Two or more, would be considered as characteristic of a household being extremely poor

<sup>28</sup> By availability and ease of access of the service I refer either to the service being provided in some percentage in a particular location or the physical location of buildings through which you access a service An example of the former is the percentage of households with electricity in a given community An example of the latter is the number of health centers within the boundaries of a community

services by geographical location (e.g. group of municipalities) would be a reasonable indicator of relative living standards between groups of people<sup>29</sup>. Thus I will use a set of variables commonly used under the *basic needs* approach to attain two goals. First, to cluster municipalities based on measures of closeness or similarity, and, second, to compare these groups relative to each other. This methodology will provide some information on relative living standards of groups of people and also give some basic indication of how poor they are. I believe that the identification of clusters of municipalities and how they compare to each other is a relevant tool for the design and implementation of policies targeted to alleviate poverty conditions in Nicaragua. Factor analysis using similar sets of variables will also be conducted.

### III. Cluster Analysis

This section is divided into three parts. The first part describes the variables used in the analysis. The second part briefly discusses the methodology used to cluster municipalities. The third part presents the results.

#### III-1. The Variables

The variables used in this analysis, were classified into five sectors, namely health, education and social services for children, water and sanitation, electricity and communication, and other general characteristics. The selection of the specific variables used was guided by common practice.

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<sup>29</sup>The living standard of a group of people can be referred as low (poor) based only on common sense because there are not commonly agreed international standards when referring to a group of people identified by geographical location. In spite of this limitation, I will make references to people being poor and leave it to the readers to form their own opinion.

in constructing UBN indices I included more than one variable within each group because services are of differentiated quality, and I believe it is important to identify not only whether people have access to certain services but also to have an indication of the quality of those services. A description of the variables and the labels used in tables and graphs follows.

### Health

- Number of health posts per 3,000 hab --Health Posts
- Number of medical posts per 3,000 hab --Medical Posts
- Number of health centers per 3,000 hab --Health Centers
- Number of hospitals per 3,000 hab --Hospitals

### Education and Social Services for Children

- School enrollment rate for children aged 7-12 years--Primary School Enrollment
- Number of preschool students per preschool teacher--Preschool Student-Teacher Ratio
- Number of primary students per primary school teacher--Primary Student-Teacher Ratio
- Number of INSSBI centers per 3,000 children under 10 years of age--Social Security Institutions<sup>30</sup>
- Malnutrition rate for children in first year of primary school--Malnutrition Rate for Children<sup>31</sup>

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<sup>30</sup> INSSBI is the social security institute

<sup>31</sup> This variable was included in this group as an indicator of the extent of learning capabilities rather than just attending school. In this respect, it attempts to measure access to education in a more comprehensive way.

Water and Sanitation

- Percentage of households with domiciliary water connection--Home Water
- Number of water pits per 10 households--Wells
- Number of public posts per 10 households--water Posts
- Percentage of households with sewers connection--Home Sewers
- Percentage of households with latrines--Home Latrines

Electricity and Communications

- Percentage of households with electricity--Home Electricity
- Percentage of households with telephone--Home Telephone

Other Characteristics

- Number of inhabitants per square kilometer--Density
- Average number of people per household--Home Crowding
- Percentage of people affected by war--War

The Data were obtained from two sources Social and Economic Disposable Resources Information System by Municipalities and Communities (SISCOM) and a document published by the Ministry of Social Action -MAS- (1994) Information for all these variables were available for 141 municipalities Some basic statistics for each of the variables considered in this study can be found in the appendix (Table A-1)

### III-2 Methodology

The method employed to cluster municipalities is fairly simple. Basically, municipalities are grouped based on how close they are to each other. The distance between 2 municipalities is equal to the sum of the squared difference of each of the values of the variables considered. For instance, suppose I want to cluster municipalities based on two variables, namely X and Y. Each municipality has a value for X and Y. Then, the distance between municipality 1 and 2 is  $(X_1 - X_2)^2 + (Y_1 - Y_2)^2$ . The clustering is done in a hierarchical way until the distance between 2 municipalities or two group of municipalities is greater than a value that would indicate that the municipalities are too far apart to be considered as members of the same cluster<sup>32</sup>. For instance, if I want to cluster a total of 5 municipalities, I would proceed as follows. First, I cluster the two closest together; second, during the clustering process, the distance between the newly formed cluster and each of the other 3 municipalities, is the average of the distances between each of the two members of the cluster and the municipality being considered. Third, cluster the two closest which would result in either adding a new member to the first cluster or forming a new cluster. This process is repeated until the distance between a cluster and a municipality or to clusters of municipalities is too big to consider that they are close. Since the notion of distance as defined above depends on the units in which the variables are measured, all the variables included in the analysis were previously standardized to avoid problems of magnitudes<sup>33</sup>.

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<sup>32</sup>The critical value was approximately equal to the number of variables being used in each cluster analysis. This is equivalent to use the value of the standard deviation of each variable as the maximum distance considered close within each variable.

<sup>33</sup>The standardization used involved the difference between each observation and the mean of that class of observations and then dividing by the standard deviation for that class of observations.

### III-3 Results

A cluster analysis was done for each of the sectors previously identified health, education and social services for children, water and sanitation, electricity and communication, and other general characteristics. In addition, a cluster analysis was performed using an additional combination of variables intended to look at the four services together. The results to be presented will focus on clusters that represent 5% or more of the population of Nicaragua<sup>34</sup>. In order to get a sense of the composition of each group, cross-tabulations between the regions municipalities belong to, and the clusters, for each set of variables, are presented in tables A-2(1) through A-2(6) in the appendix. To make a proper inference about composition of a group from those tables, it is necessary to look at the percentage of regions municipalities belong to, with respect to the total number of municipalities being considered.

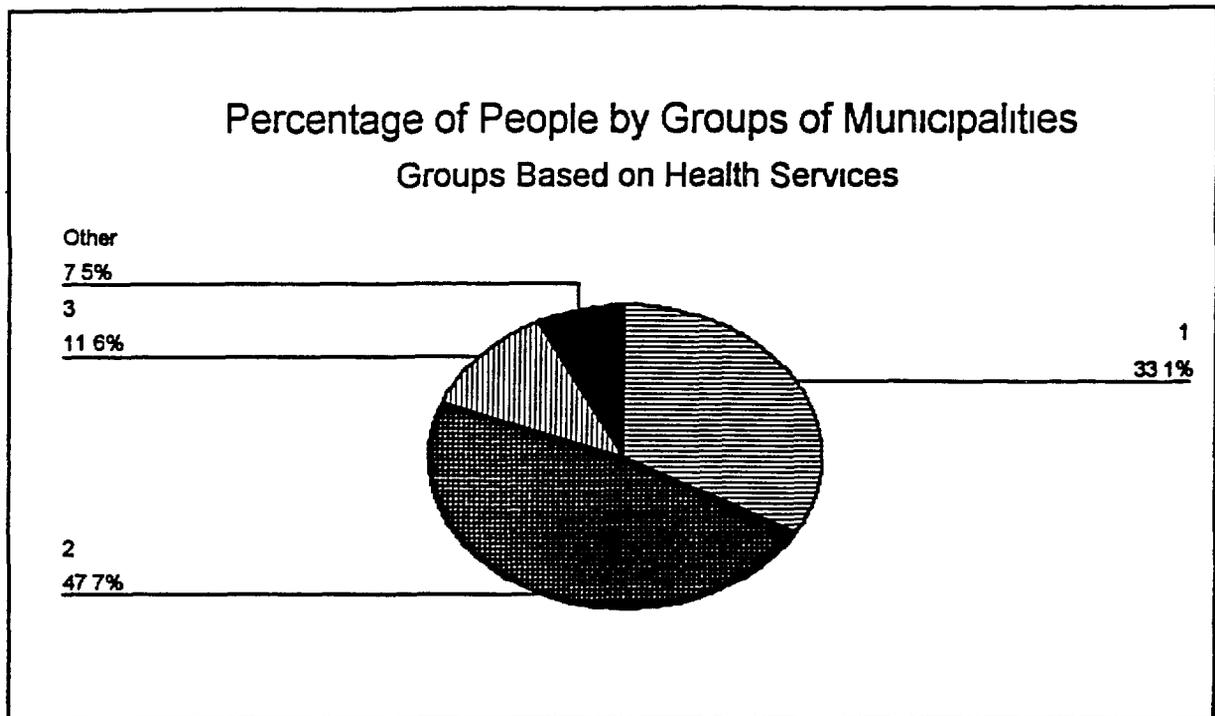
#### III-3-1 Health Services

For the health sector, 14 groups of municipalities were identified. The percentage of the total Nicaraguan population by groups is presented in graph 1. Almost half of the Nicaraguan population (47.7%) turns out to fit group 2, another 33.1% group 1 and only 11.6% group 3. These three groups represent 92.5% of the population and are the ones considered in this section.

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<sup>34</sup> A Cluster membership by municipalities for each cluster analysis can be found from tables A-3(1) through A-3(6) in the appendix.

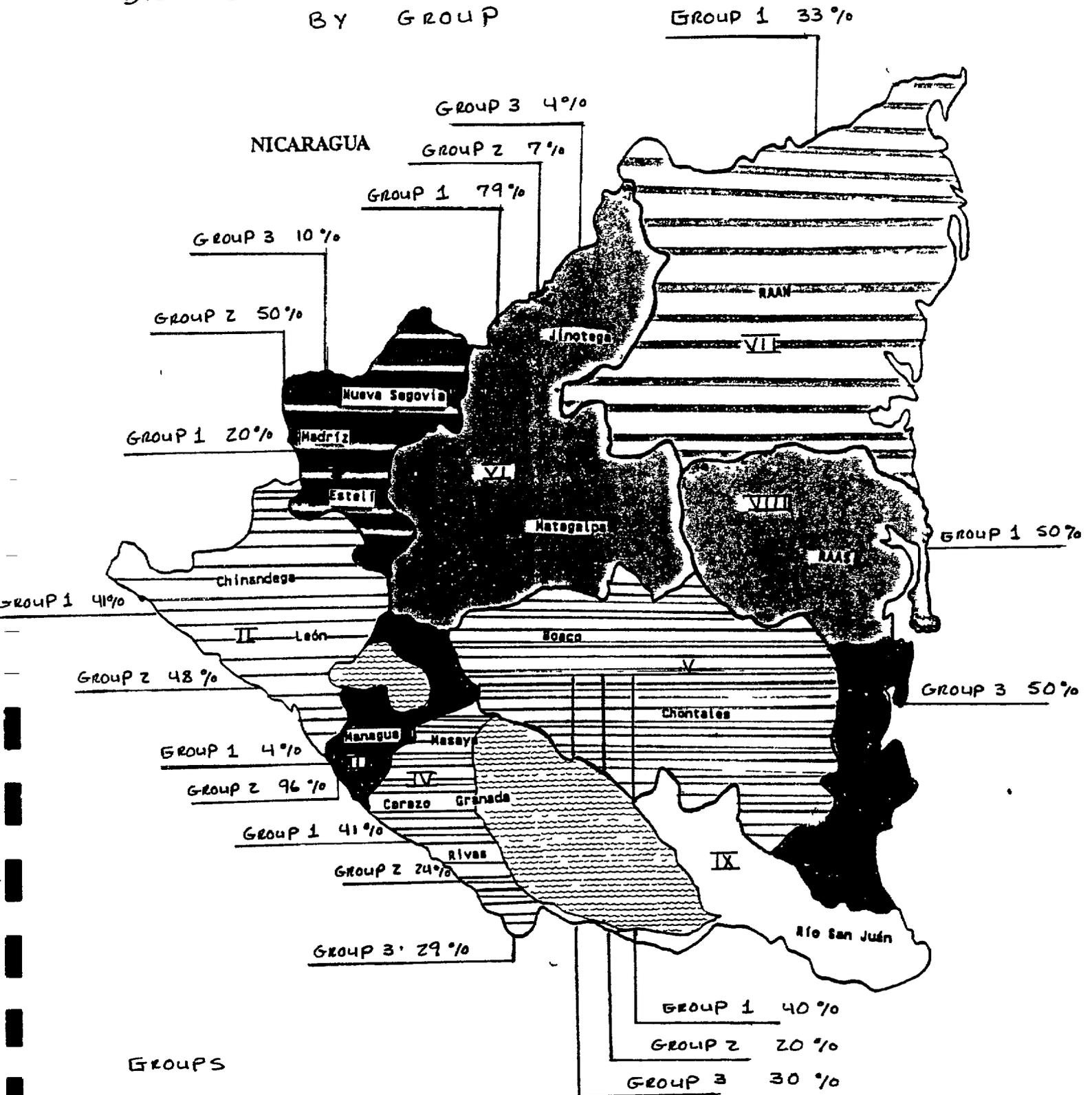
GRAPH 1



The percentage of population each group represents of the total population of each region of Nicaragua is presented in map 1. Map 1 shows that the groups are more representative of some regions than others, however, they are not specially tied to any particular region. The composition of groups 1 and 2 spread across the territory of Nicaragua with the exception of region 9. Group 2, however, is more representative of region 1 and 3, while group 1 is somewhat more representative of regions 4, 5, 6 and 8. Group 3 is composed in its majority by municipalities that belong to regions 4, 5 and 8.

Table 1 shows some descriptive statistics of the health services' variables as well as the number of municipalities by each group.

MAP 1  
 DISTRIBUTION OF EACH REGION'S POPULATION  
 BY GROUP



GROUPS

- 1
- 2
- 3

HEALTH SERVICES

Table 1

Health Services

	Health Center	Hospital	Medical Posts	Health Posts
Group 1				
Mean	.23	.00	.06	.44
StdDev	.14	.00	.09	.40
Group 2				
Mean	.09	.01	.45	.23
StdDev	.13	.02	.18	.26
Group 3				
Mean	.10	.08	.07	.34
StdDev	.06	.02	.10	.16
Grand Total				
Mean	.22	.02	.21	.52
StdDev	.26	.05	.29	.65

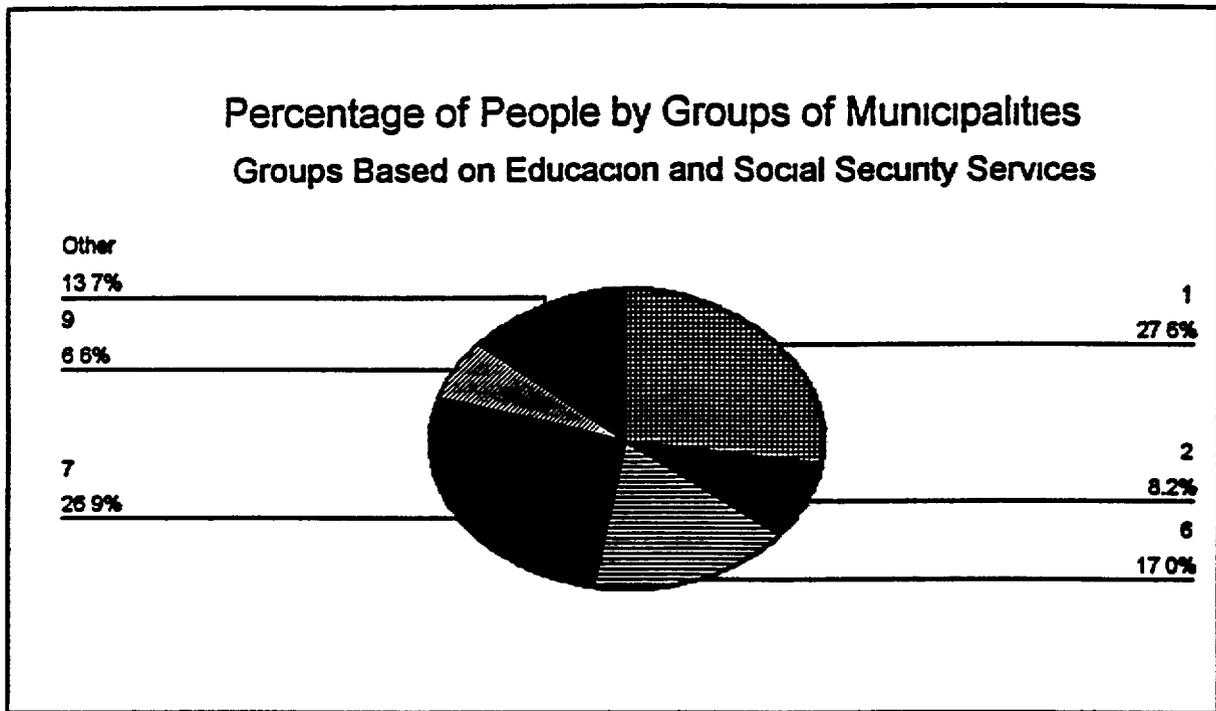
Table 1 shows that group 2 is characterized by very inadequate access to health services. For the municipalities of group 2, there are virtually no hospitals (.01 per 3,000 habs), 1 health center for every 30,000 habs (.09 per 3,000 habs) and 1 health post for approximately every 12,000 habs (.23 per 3,000 habs). Medical posts, which corresponds to the lowest quality of health services, are the ones that exist in greater quantity (.45 per 3,000 habs). Municipalities of group 1 also show inadequate access to health services, however the quality of the service is better. For group 1, health centers and health posts exist and are approximately twice as prevalent, in per capita terms, as in group 2, however medical posts are only one eighth as frequent, while even less hospital facilities exist.

Group 3 seems to have better access to health services in the sense of better quality of service. It has 1 hospital for approximately every 25,000 inhabitants which is way above the mean for all the municipalities.

**III-3-2 Education and Social Services for Children**

For this sector, 20 groups were identified. According to graph 2, groups 1, 6 and 7 represent most of the population. Also relevant are groups 2 and 9.

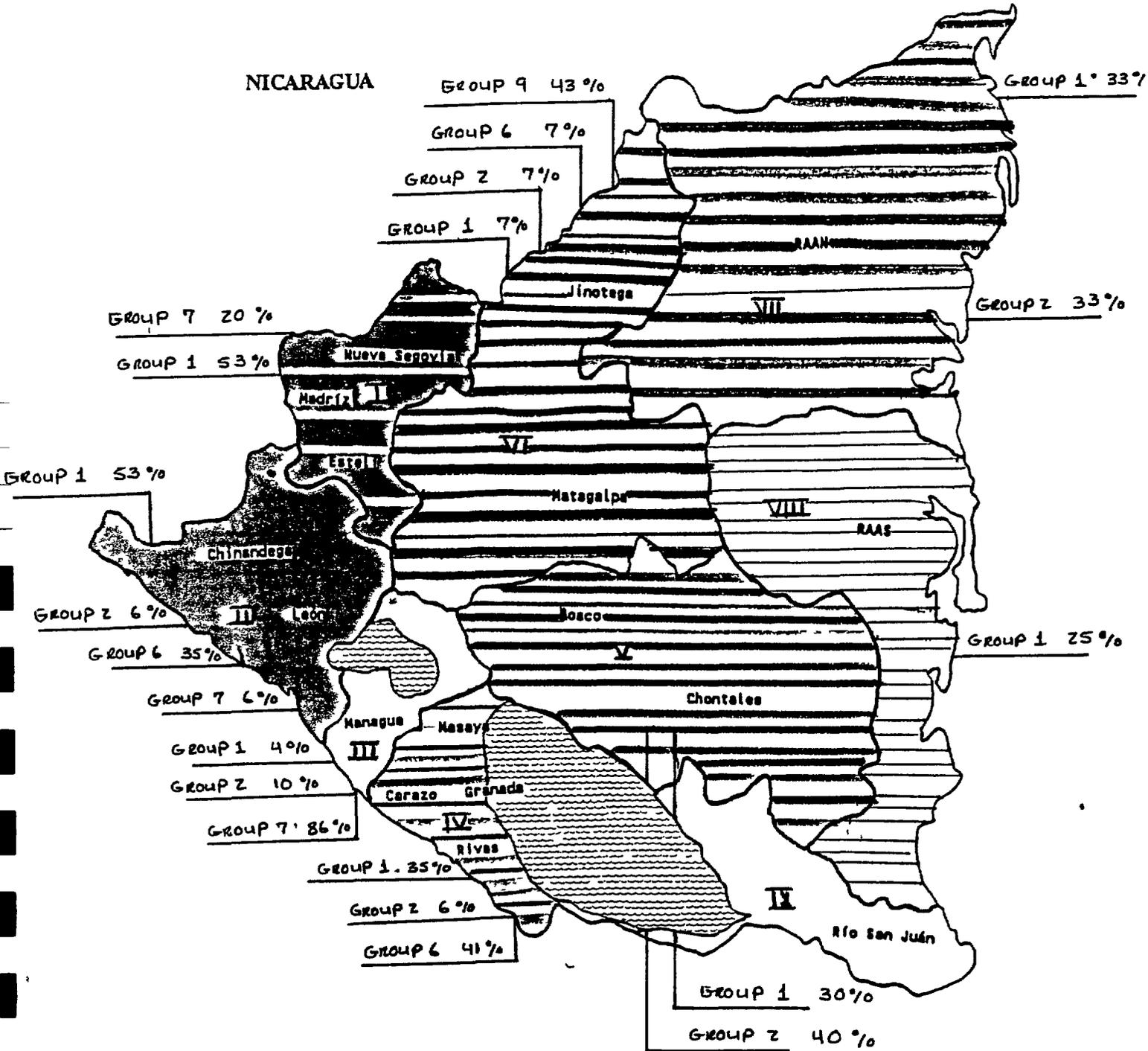
**Graph 2**



Map 2 shows that the composition of group 1 spread across all regions of Nicaragua. Groups 2 is somewhat more representative of region 5. Group 2 of regions 2 and 4, and group 9 of region 6. Group 7 includes the municipality of Managua.

# DISTRIBUTION OF EACH POPULATION BY GROUP

## NICARAGUA



### Groups

- 1
- 2
- 6
- 7
- 9

LOCATION AND SOCIAL SECURITY SERVICES

Table 2 shows the differences between groups. Group 1 has a rate of enrollment in primary school of about 90%, however the malnutrition rate is fairly high (27%). Also, help for children through the INSSBI is limited (20 versus a country wide mean of 67). The number of students per teacher, in both pre-school and primary school, seems to be within international standards. For group 1, these data suggest that most of the people have access to primary level education but that an important percentage of the people might not get a good education because of malnutrition. Groups 2 and 9 have the highest rates of malnutrition and the lowest rates of enrollment in primary school. Group 9 also has the highest rate of crowding in the classroom. On the other hand, group 9 receives much more help through INSSBI institutions than group 2. In fact help from INSSBI's institutions is greatest for group 7 which has a relatively high enrollment rate and low malnutrition rate. The highest number of students per teacher of both pre-school and primary school belongs to group 9. In general, high rates of malnutrition are paired with high number of students per teacher, which combine to decrease the quality of education. Overall, there seems to be three scenarios across the country, namely, low access and low quality, access and low quality and access and medium level of quality. In addition, Help from INSSBI is greater under scenario 3.

**Table 2**

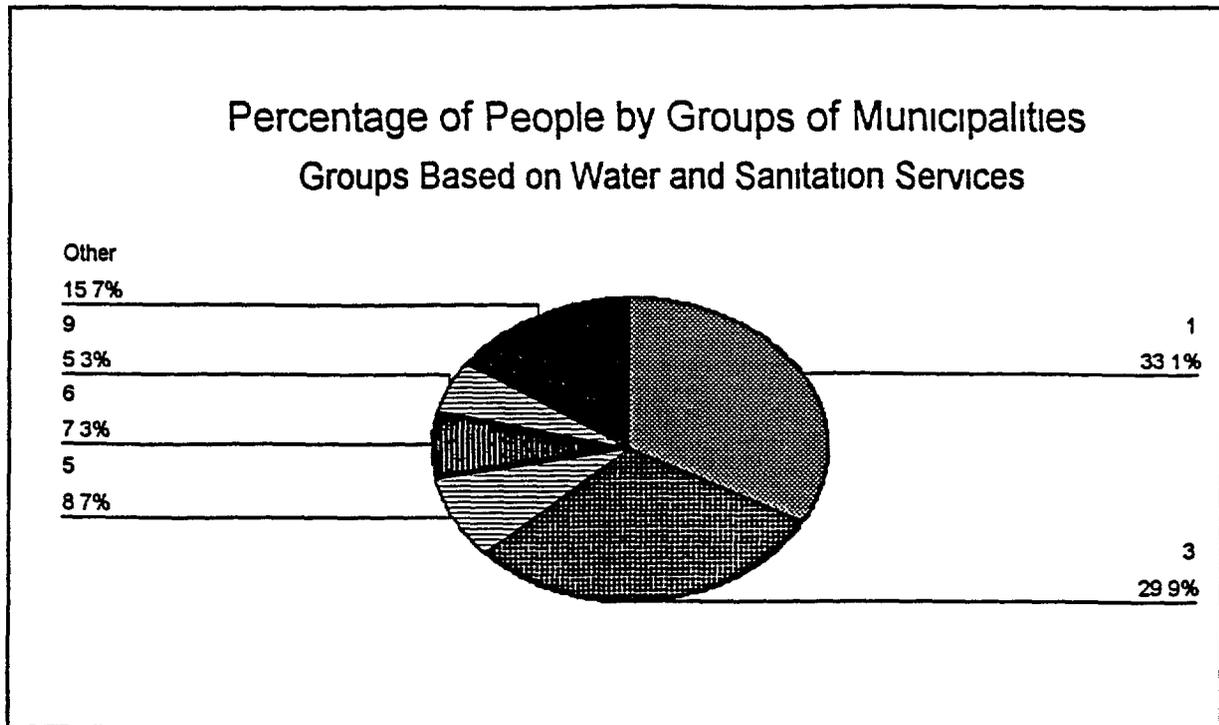
**Education and Social Security for Children**

	Preschool Stud-Teach Ratio	Primary Stud-Teach Ratio	Primary School Enroll	Children Malnut Rate	Social Security Institute
Group 1					
Mean	24 41	29 27	89	27	20
StdDev	9 87	3 90	09	08	37
Group 2					
Mean	30 02	28 09	61	32	18
StdDev	6 76	4 22	10	06	30
Group 6					
Mean	36 05	39 11	91	27	15
StdDev	6 32	2 70	07	07	25
Group 7					
Mean	29 42	31 85	86	04	1 36
StdDev	6 18	3 85	10	06	1 06
Group 9					
Mean	35 92	40 91	60	37	39
StdDev	11 13	2 12	09	08	43
Grand Total					
Mean	31 35	31 04	80	26	67
StdDev	19 47	6 03	17	14	1 47

**III-3-3 Water and Sanitation Services**

For this sector, 15 groups were identified. According to graph 3, groups 1 and 3 are the most representatives. Groups 5, 6 and 9 are also considered.

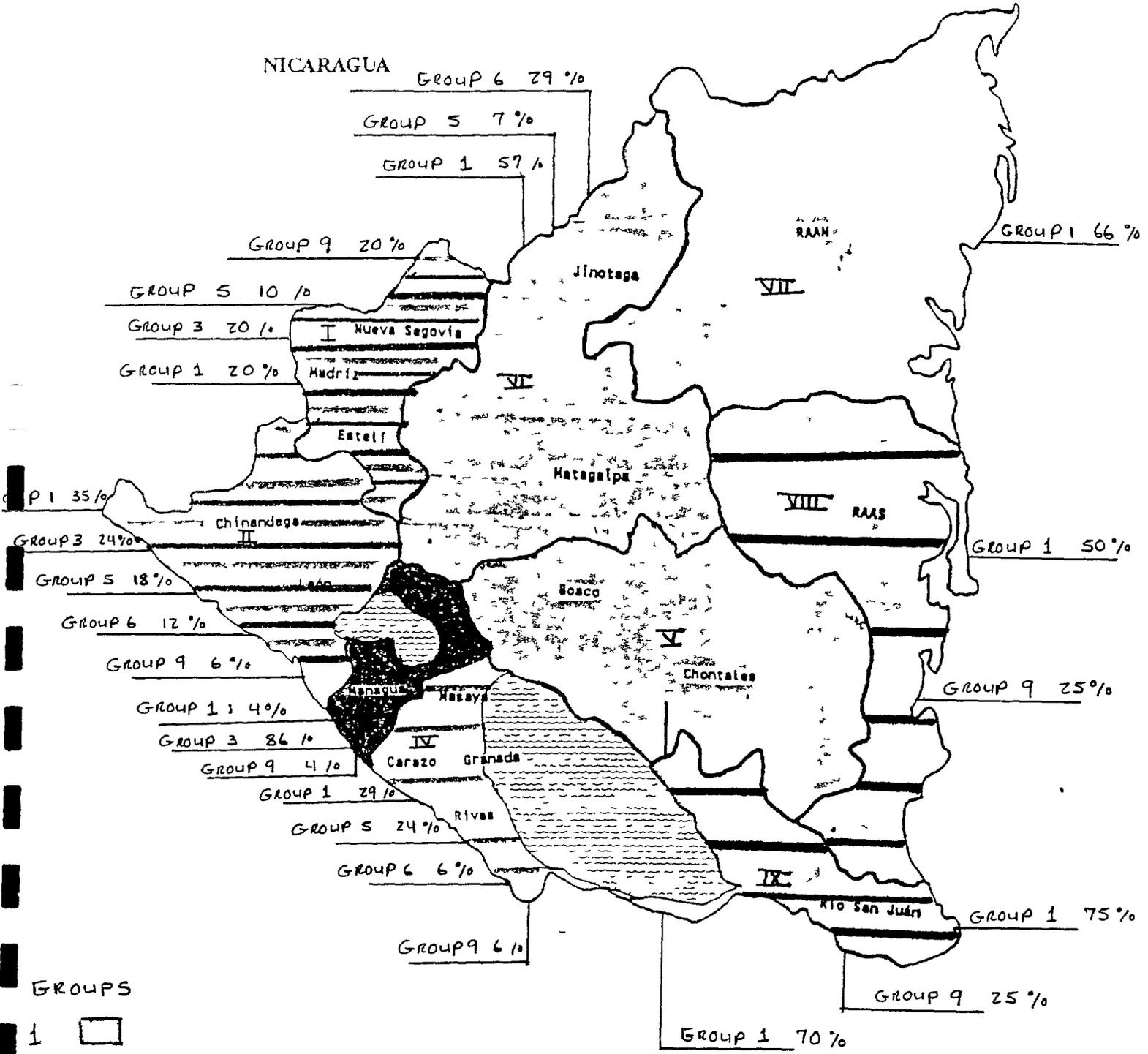
Graph 3



According to Map 3, group 1 includes municipalities from all the regions of Nicaragua. Other groups include subgroups of regions, but are not identified with any particular region except for group 3 with region 3 (Municipality of Managua)



NICARAGUA



WATER AND SANITATION SERVICES

GROUPS

- 1
- 3
- 5
- 6
- 9

**Table 3****Water and Sanitation Services**

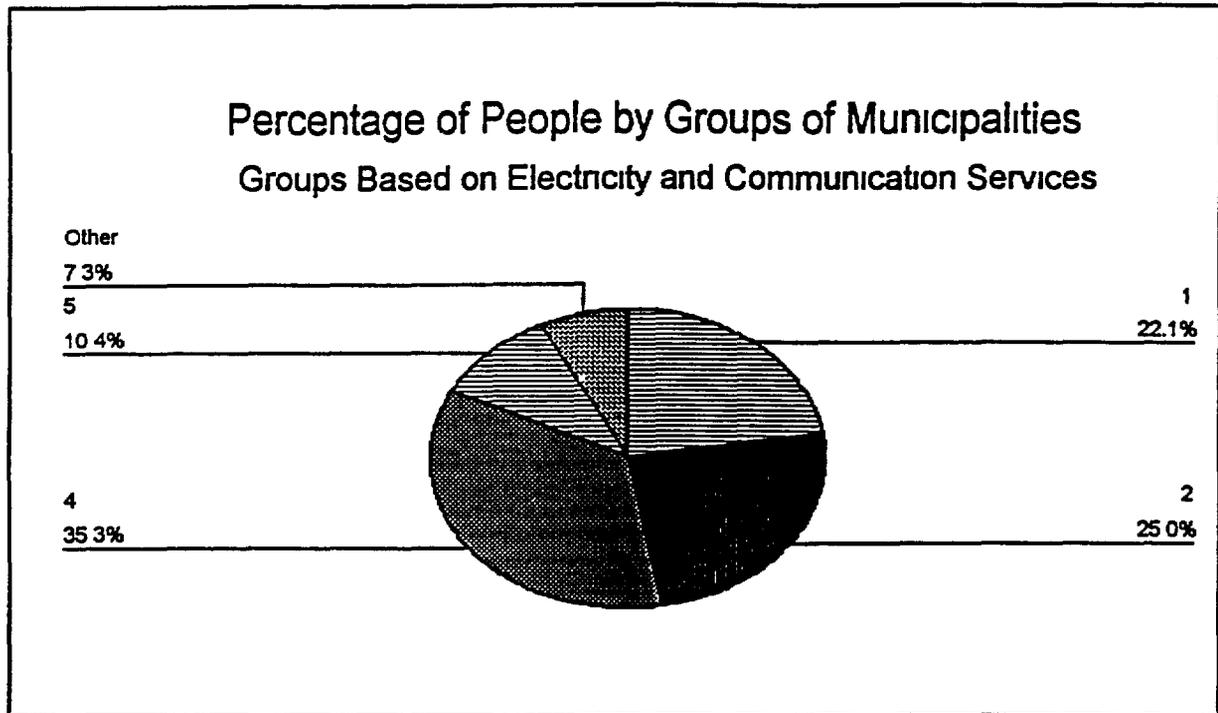
	Wells	Home Water	Water Posts	Home Sewers	Home Latrine
Group 1					
Mean	03	23	05	00	42
StdDev	04	13	06	01	25
Group 3					
Mean	02	84	03	46	17
StdDev	02	14	05	08	23
Group 5					
Mean	02	62	06	01	95
StdDev	02	17	05	02	07
Group 6					
Mean	01	48	04	22	12
StdDev	01	15	04	04	04
Group 9					
Mean	15	24	07	01	66
StdDev	04	16	08	03	19
Grand Total					
Mean	05	32	.10	03	52
StdDev	07	24	17	11	31

Table 3 shows that the two most important groups are well differentiated with respect to their access to water and sanitation services. For group 1, just 23% of households have domiciliary water connection which force the rest of people to use water pits or public posts to access water. Also, there are almost no sewer connections and less than 50% of households have latrines. Group 3, on the other hand, has, on average, about 84% of their households with domiciliary water connections. And it has also a significantly greater percentage of households with sewer connections. The other groups are in between with respect to both water and sanitation services. Except for group 3, most of the people have low access or access to a low quality of water and sanitation services.

**III-3-4 Electricity and Communications**

For these sector 7 groups were identified According to graph 4, groups 1, 2, 4 and 5 represent most of the population

**Graph 4**



According to map 4, group 1 represents mostly regions 1, 4, 7, 8 and 9 Group 2 spread across most regions of Nicaragua Group 4 includes Managua and group 5 is somewhat identified with region 4

Table 4 shows that groups 4 and 5 have a relatively high percentage of households with access to electricity services The other groups have low access to electricity with group 2 having less than 20% of households with electricity Telephone services are almost exclusive of group 4 and in general the access to this service is very low across the country (see the country wide mean of 03)

NICARAGUA



ELECTRICITY & COMMUNICATION SERVICES

**Table 4**

**Electricity and Communication Services**

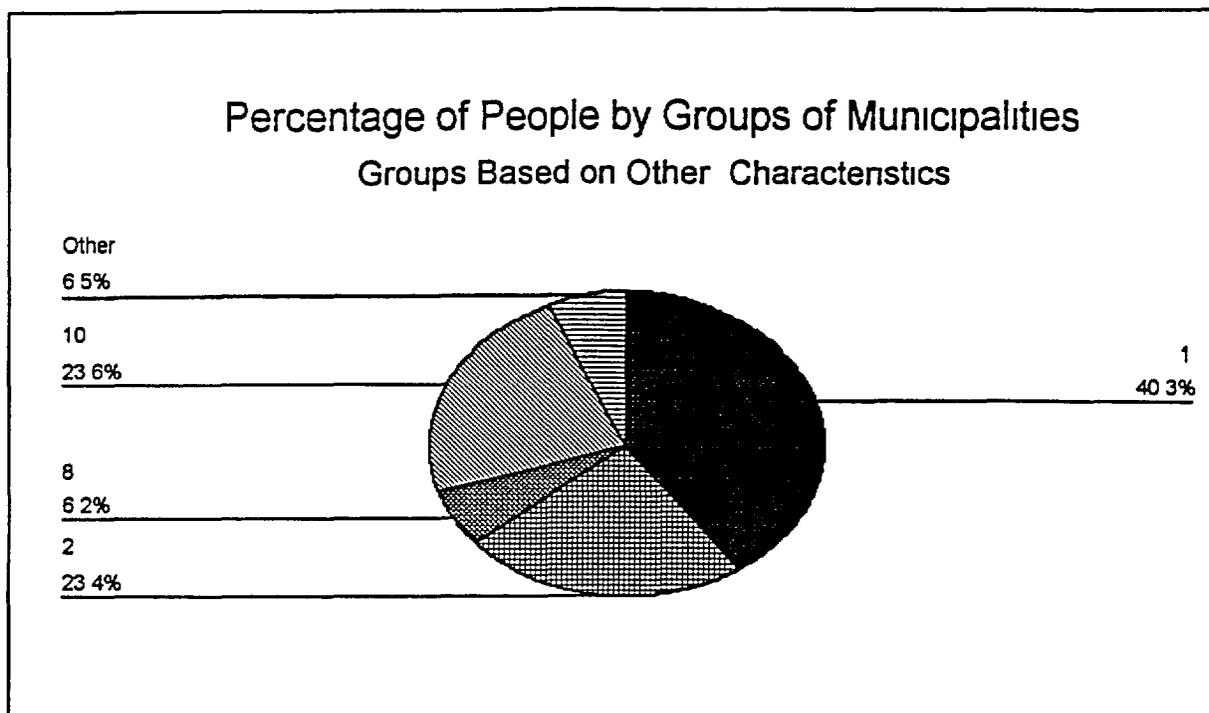
	Home Electricity	Home Telephone
Group 1		
Mean	45	02
StdDev	08	02
Group 2		
Mean	.18	01
StdDev	10	01
Group 4		
Mean	79	.12
StdDev	10	.03
Group 5		
Mean	78	02
StdDev	10	02
Grand Total		
Mean	40	03
StdDev	26	.05

**III-3-5. Population Density, War and Home Crowding**

According to graph 5, groups 1 and 2 are the ones that represents most of the population

Groups 8 and 10 are also included

Graph 5



According to map 5, group 1 represents regions 2, 4, 5, 7 and 8. Group 2 is composed exclusively by regions 1 and 6. Region 3 (municipality of Managua) is represented by group 10. The other group is somewhat associated with region 4.

Group 2 is very interesting because it is composed of the regions that are regarded as Nicaragua poorest in a recent study by World Bank (1994). Group 2 shows the highest amount of people per household. However, it has the lowest population density level. The opposite to group 2 is group 10, which is in fact composed solely of the municipality of Managua. Group 10 has the lowest amount of people per household and the highest population density. The other groups are in between and are differentiated primarily by their density levels. The variables in this sector are not a

NICARAGUA



GROUPS

- 1
- 2
- 8
- 10

OTHER CHARACTERISTICS

direct indication of living standards. However, they serve two purposes in later parts of this study. First, they will allow me to distinguish between areas defined as mainly rural and those that are more urbanized. Second, they will indirectly allow me to compare some results of relative poverty I obtain, with those obtained by World Bank (1994). In order to further explore the rural/urban distinction, two additional variables will be considered hereafter:

- Percentage of people considered agricultural producers--Agricultural Producers
- Number of livestock heads per capita --Livestock Per Capita

**Table 5**

**Population Density, War and Home Crowding**

	Density	War	Home Crowding
Group 1			
Mean	66.31	.01	6.51
StdDev	65.42	.01	.03
Group 2			
Mean	57.18	.03	6.75
StdDev	46.40	.03	.05
Group 8			
Mean	471.17	.01	6.50
StdDev	133.64	.01	.05
Group 10			
Mean	1414.19	.00	6.30
StdDev	.	.	.
Grand Total			
Mean	109.71	.02	6.60
StdDev	176.51	.04	.16

### ***III-3-6 Selected Variables***

The clusters identified for different service sectors are similar in composition but they do not exactly match each other. This suggests that the deficiencies to access different services and the differences in the quality of the service being accessed are not completely uniform across services.

Thus, in order to get a complete picture of relative living standards by groups of municipalities, a set of variables that represents well all the variables included in this study is required<sup>35</sup>. To obtain such a set of variables, I conducted a cluster analysis by variables taking as a measure of similarity the absolute value of the Pearson correlation coefficient. The results are presented in table A-4 in the appendix. The cluster of variables resulting from the analysis is the following:

- 5 Wells, Preschool student-Teacher Ratio\*, Primary Student-Teacher Ratio and Health Centers
- 6 Home Water, Home Sewers, Density, Home Electricity, Home Latrines, War\*, Agricultural Producers\* and Home Telephones
- 7 Water Posts, Home Crowding, Health Posts and Social Security Institute
- 8 Primary School Enrollment and Livestock Per Capita\*
- 9 Children Malnutrition Rate
- 10 Hospitals
- 11 Medical Posts

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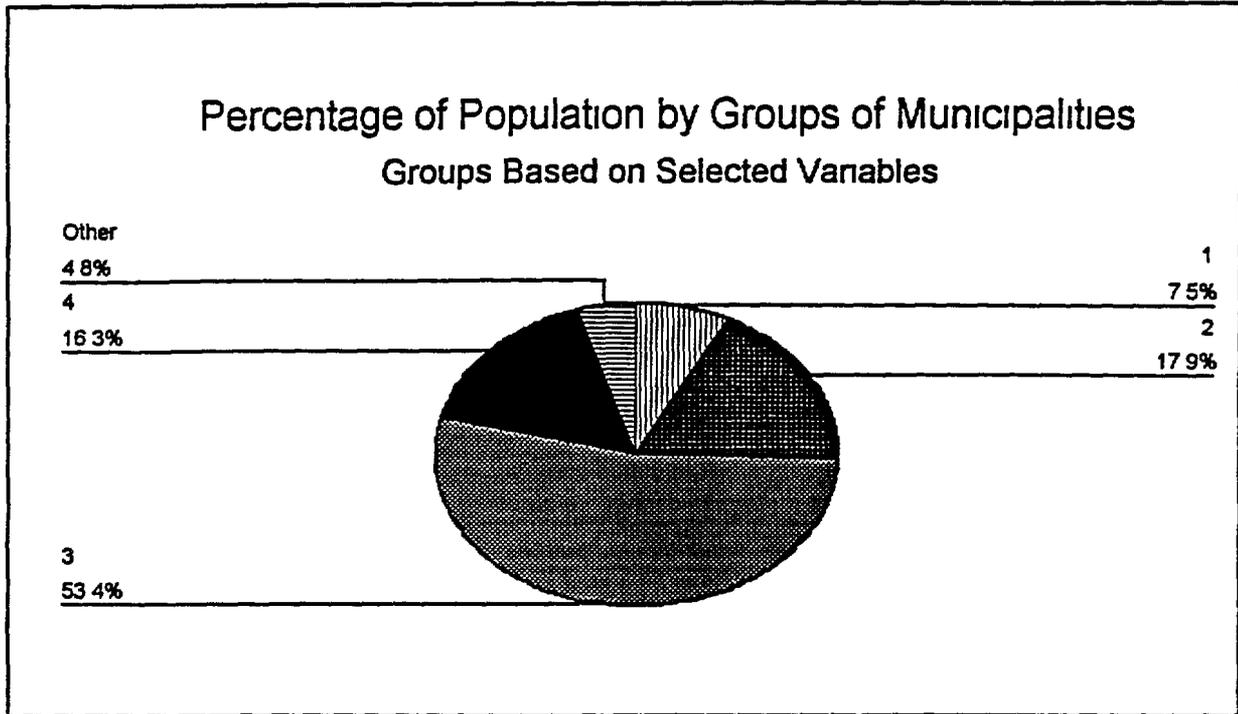
<sup>35</sup>A cluster analysis using all the variables was performed. Because of the large number of variables (21), even fairly "close" municipalities could be considered as different groups if they are relatively distant in one or two variables. Thus, using all the variables results in too many small groups that are not very informative of relative living standards.

For each cluster, the variables with an asterisk have a negative correlation with the others. The variables in group 2 indicate that access to electricity is positively correlated with access to domiciliary water connection, telephone services, sewer connection and the use of more latrines. Also, all these variables are positively correlated with the density level of the area and negatively correlated with the percentage of agricultural producers and the percentage of people affected by the war, which indicate that there is better access to these services for urban areas than for rural areas.

Variables in groups 5, 6 and 7 are not correlated with any particular variable. Therefore, they will help little in identifying the relevant cluster of municipalities. Thus, the variables selected for the analysis were Wells, Home Electricity, Health Posts and Children School Enrollment. They represent well each of the first 4 groups and also each of the service sectors previously presented.

According to graph 6, groups 1, 2, 3 and 4 represent most of the population. In fact, group 3 alone represents a little over 50%.

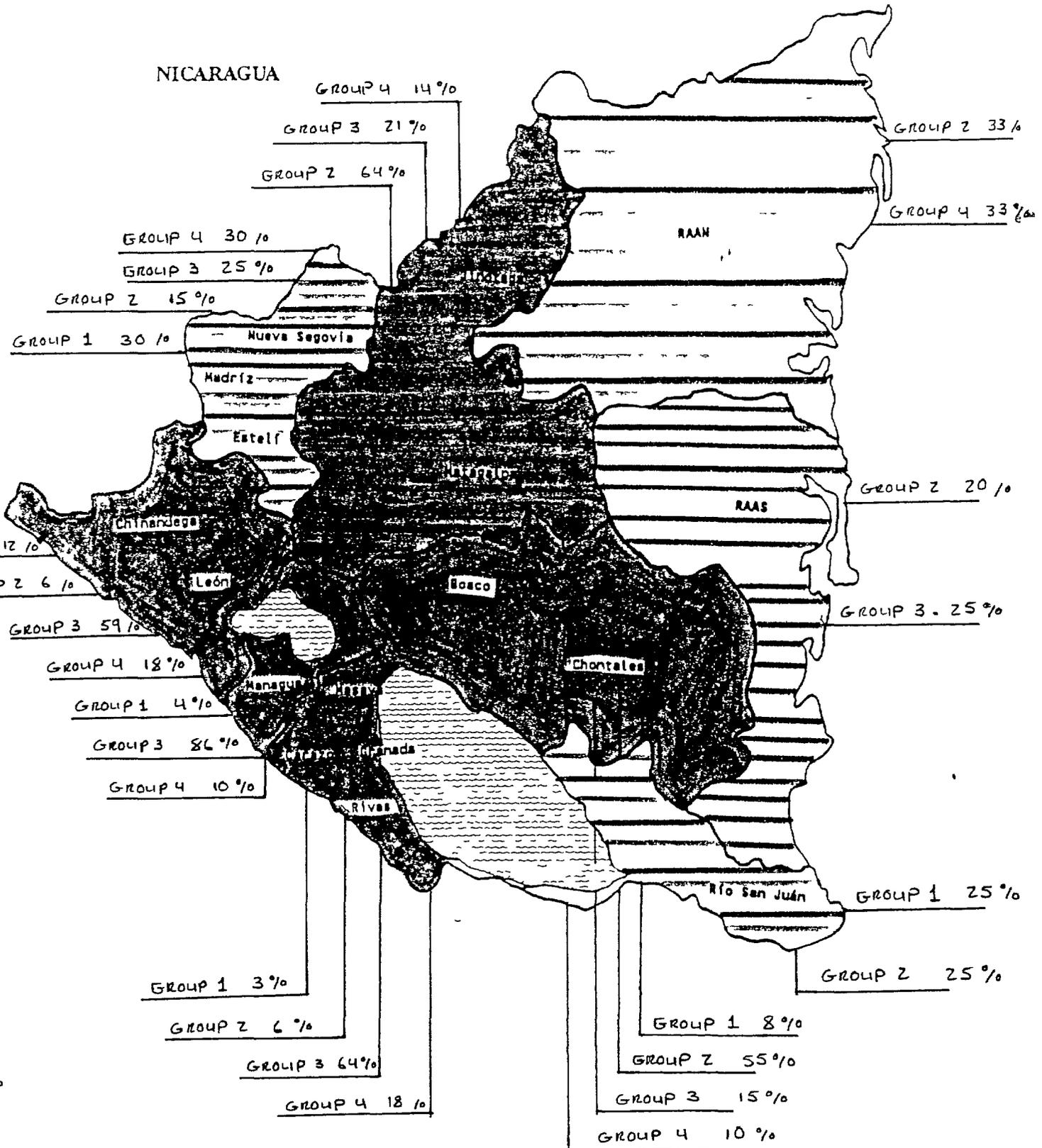
**Graph 6**



Map 6 shows the composition of the identified groups. Group 3 is identified with region 3 (Managua), 4 and region 2. Groups 1 and 2 represent part of region 1, regions 5 and 6, which are regarded as the poorest by the World Bank (1994). Also they represent part of region 2, 7, 8 and 9. Group 4 represents region 1 and parts of region 4, 6 and 7.

Table 6 shows the differences among the groups.

NICARAGUA



SELECTED VARIABLES

**Table 6**

**Selected Variables**

	Wells	Children School Enroll.	Home Electricity	Health Posts
Group 1				
Mean	.13	.87	.36	.75
StdDev	.05	.11	.10	.44
Group 2				
Mean	.02	.62	.23	.44
StdDev	.02	.11	.14	.38
Group 3				
Mean	.02	.87	.78	.18
StdDev	.02	.11	.12	.17
Group 4				
Mean	.02	.93	.34	.61
StdDev	.02	.07	.18	.52
Grand Total				
Mean	.05	.80	.40	.52
StdDev	.07	.17	.26	.65

Group 3 has the highest value for Home Electricity which indicates that municipalities in group 3 have better access to electricity and communication, and water and sanitation services than the other groups. Also it indicates that group 3 is more urbanized than the other groups. The worst value of Home Electricity corresponds to group 2, followed closely by groups 4 and 1. This result is consistent with the regions identified as poorer by the World Bank (1994).

For access to education, table 6 shows that access to primary education is relatively even across the country except for some rural areas represented by group 2. However, as I mentioned in section 3.3.2, quality of education seems to vary across the country. Although the association is not

completely clear, analysis in section 3 3 2 and the high value of Wells for group 1 suggest that quality of education tends to be better in urban areas

For access to health services, low values of Wells and Health Posts for group 3 indicates less access to lower quality health service in urban areas In section 3 2 1, it was clear that, although the location of hospitals is not highly correlated with location of other lower quality health services, more use of hospitals is tied to less use of lower quality health services therefore, hospitals are probably being used more in urban areas Also, according to World Bank (1994), urban people are more likely to use private health services that are not considered in this study Groups 2, 4 and 1, in ascending order, have better access to lower quality health services Group 1 in particular has a higher value of Wells which is correlated with higher access to health centers which are of superior quality than health posts

Notice that my previous comments are statements of relative living standards Judgement of whether the access to services is adequate or not always involve some arbitrariness My perception is that the overall level of access to good quality services seems to be low across the country with rural areas being in worse shape than urban areas Considering that inequalities of living standards exist within municipalities, the results obtained in this study are consistent with results obtained by the World Bank (1994)

## **IV Factor Analysis**

### **IV-1. Methodology**

Factor analysis is a statistical technique used to identify a relatively small number of factors that can be used to represent relationships among sets of many interrelated variables

In this section, I attempt to identify a reduced set of factors that are tied to poverty. More precisely, I try to identify a set of factors that explains the distribution of services across the country. In this case, by factors, I mean variables that are not directly observable but that are made up of other observable variables, that share high correlations. To identify the factors, I used the principal components technique. In principal component analysis, linear combinations of the observed variables are formed. The first principal component is the combination that accounts for the largest amount of variance in the sample. The second principal component accounts for the next largest amount of variance and is uncorrelated with the first. Successive components explain progressively smaller portions of the total sample variance, and all are uncorrelated with each other. Although the factor matrix extracted with principal components indicates the relationship between the factors and the individual variables, it is usually difficult to identify meaningful factors based on this matrix. Often the variables and factors do not appear correlated in any interpretable pattern. Most factors are correlated with many variables. Since one of the goals of factor analysis is to identify factors that are substantively meaningful, the rotation phase of factor analysis attempts to transform the initial matrix into one that is easier to interpret. The rotation method I used is known as the varimax technique, which allow a better identification of the set of variables. Finally, variables included in the analysis

were selected according to the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for each variable

#### IV-2 Results

Table 7 presents the four rotated factors identified, which together explain 58.6% of the variance. Also a statistic to test the sustained hypothesis necessary for a valid factor analysis and a measure of goodness of fit of the model are included in table 7.

The value of KMO shows that the model explains well the set of variables included in the analysis. Bartlett's test supports the sustained hypothesis that matrix of correlations between the variables is different from an identity matrix. The percentage of the sample variance explained by factors 1, 2, 3 and 4 are 27.7, 13.2, 9.4 and 8.3 respectively.

**Table 7**

**Rotated Factor Matrix**

	Factor 1	Factor 2	Factor 3	Factor 4
% of Variance explained	27.7	13.2	9.4	8.3
Home Elec	.78688			
Home Water	.78427			
Home Sewer	.78035			
Home Telephone	.76799			
Density	.67660			
Soc. Sec. Ins.		.78674		
Home Crowding		.74321		
Health Posts		.67643		
Health Centers			.74377	
Wells			.70996	
Prim Stud/Teach			-.61458	
War				.66726
Livestock				.62619
Agr Producer				.60964
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .73662				
Bartlett Test of Sphericity = 554.82486, Significance = 00000				

The four factors of table 7 are amenable to the following interpretation. Factor 1 is tied to services that requires people to expend money on regular basis in order to ensure access. It is also tied to the density of population of the area in consideration. In addition the provision of these services usually requires sizable investments by the government. All these things together suggest that factor 1 is tied to *effective demand and size of markets*. Factor 4 is related to *location*. It

differentiates the degree of urbanization. Factor 2 is related to help provided by government in services that are more directly related to survival like health and social services for children. The Government provides help through INSSBI institutions and low quality of health services. Investments on the provision of these services can be selective and are not as big as the ones required for services included in factor 1. Therefore, factor 2 is related to *government investments for emergency situations*. Factor 3 is similar to factor 2. It is different in that services included are of a little better quality or are in areas that do not require immediate attention for survival. An appropriate name would be *government investments for other basic services*.

Table 8 presents the regression coefficients for each variable regressed on the 4 factors. Since the factors are uncorrelated to each other, the coefficients are also the correlation between variables and factors. Non significant values are not shown in the table. Table 8 shows that the aspects of poverty that I have considered throughout this paper are relatively well explained by the 4 factors. Overall, it shows that access to different services depend on level of income, location, and the investments by the government in providing help for survival and access to low quality basic services.

**Table 8**  
**Regression Coefficients**

	Factor 1	Factor 2	Factor 3	Factor 4
Home Water	.81804			
Home Elec	.79533			
Density	.68437			
Home Telephone	.67153	.28434		
Home Sewer	.64769	38905		
Agr. Producer	-.50252			43571
Soc Sec. Ins.	-.31357	68184		-.26064
Home Crowding	-.48174	62228		
Health Posts	- 39789	45003	35027	
Health Centers	-.20748	-.28485	61267	.37791
Wells	-.30932	-.30284	60275	
Prim Stud/Teach	33024	.35017	- 44401	
Livestock				62243
War	-.46900	.37533		48326

### V. Conclusions and Policy Recommendations

The cluster analysis presented in section 3 clearly showed that the population of Nicaragua have a differentiated access to the basic services considered in this study. The differentiation is based not only on the access to a particular service, but also on the quality of the service being accessed. Although, there are some groups of people doing better than others, the overall access to services and the quality of services being accessed by the majority of Nicaraguans are still low and inadequate.

The clusters identified under the different sectors are similar in composition but they do not exactly match each other. This suggests that the deficiencies in access to different services and the differences in the quality of the service being accessed are not completely uniform across services.

In other words, the municipalities that form the worst group in terms of accessing say, water and sanitation services, are not *all* going to be the ones that compose the worst group in accessing education. This implies that although some coordinated effort to help specific areas in accessing or improving their access to all services is desirable, specific programs for specific needs are also required.

The differences in clustering across sectors also has organizational implications. The geographical division of public bodies providing the service improvement will have to be different according to the service involved. A uniform structure would not be congruent with the differentiation of deficits. Alternatively, uniform central bodies could work with different divisions within differently clustered municipalities.

The cluster based on the selected group of variables suggest that people living in urban areas are more likely to do better than people in rural areas. This is true for all the services considered in this paper. Also, poorer people are more concentrated in regions 1, 5 and 6.

Finally, factor analysis presented in section 4 showed that the distribution of services across municipalities, depends on the average level of income and size of the market of the municipalities, the degree of urbanization, and the ability and capacity of the government for providing services. The data shows that investments of the government are concentrated on low quality services primarily targeted to help critical situations. Based on results from section 3, it is observable that the extent to which the government is able to provide basic help is limited.

Policies targeted to alleviate poverty are basically of two types. One type are policies oriented to provide free or very low cost access to basic unsatisfied needs. The limits of that of course are

given by the financial resources of the government. Based on the results of this paper, improving the quality of health services, improving the access to potable water and sanitation<sup>36</sup> services and increasing the number of INSSBI institutions dedicated to help children are of primary importance.

The other type of policies are the ones oriented to improve the level of income of families. This paper suggests that being poor is tied to living in rural areas. For Nicaragua, that is the reality of a big portion of its population. Therefore, policies targeted to improve the productivity of agricultural producers are necessary and will have a big impact on alleviating poverty.

This paper did not look in detail at the reality of the agricultural sector. Lack of appropriate data prevent me from being specific in terms of policies to improve the agricultural sector, however, it is reasonable to think that education, access to credit markets and feasibility of accessing and using better technologies are areas to be explored in further research.

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<sup>36</sup>According to World Bank (1994), the low population coverage and poor quality of water systems are one of the major factors in the high incidence of diarrhoeal disease-the leading cause of infant mortality.

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Sistema de Informacion sobre Recursos Socio-Economicos Disponibles por Municipio y Comunidad

**The World Bank (1994),** Nicaragua Poverty Profile Preliminary findings of the 1993 Living Standards Measurement survey

Appendix

Table A-1

Descriptive Statistics By Variables

Variable	Mean	Std Dev	Minimum	Maximum	W Mean*
Home Sewer Wells	.03	.11	.00	.67	.21
Water Posts	.10	.17	.00	.88	.05
Home Water	.32	.24	.00	1.00	.52
Home Latrine	.52	.31	.00	1.00	.38
Hospitals	.02	.05	.00	.36	.02
Medical Posts	.21	.29	.00	1.41	.19
Health Center	.22	.26	.00	2.28	.12
Health Posts	.52	.65	.00	5.33	.35
Agr. Producers	.14	.19	.00	1.00	.08
Livestock	.63	1.36	.00	12.89	.41
Children Maln.	.26	.14	.00	.74	.20
Soc Sec. Ins.	.67	1.47	.00	10.72	.42
Prim Sch. Enr.	.80	.17	.25	1.00	.80
Prim Stud/Te	31.04	6.03	9.67	44.57	34.21
Pres Stud/Te	31.35	19.47	.00	118.75	30.24
Home Telephone	.03	.05	.00	.37	.07
Home Elec.	.40	.26	.00	1.00	.58
War	.02	.04	.00	.28	.01
Home Crowding	6.60	.16	6.30	7.10	6.51
Density	109.71	176.51	1.36	1414.19	36.10

\* WMEAN stands for weighted average where the weights are the proportion of population of each municipality. These figures are in fact, national averages.

Table A-2(1)

Crosstabulations Between Groups and Municipalities by Regions

HEALTH SERVICES

REGION	GROUPS			Row Total
	1	2	3	
1	5 25.0	13 65.0	2 10.0	20 100.0
2	14 82.4	3 17.6		17 100.0
3	2 33.3	4 66.7		6 100.0
4	18 62.1	7 24.1	4 13.8	29 100.0
5	11 64.7	3 17.6	3 17.6	17 100.0
6	19 90.5	1 4.8	1 4.8	21 100.0
7	2 100.0			2 100.0
8	3 75.0		1 25.0	4 100.0
Column Total	74 63.8	31 26.7	11 9.5	116 100.0

**Table A-2(2)**

**Crosstabulations Between Groups and Municipalities by Regions**

**EDUCATION AND SOCIAL SERVICES FOR CHILDREN**

REGION	GROUPS				Row
	1	2	6	9	Total
1	10 90.9	1 9.1			11 100.0
2	12 80.0	1 6.7	2 13.3		15 100.0
3	3 50.0		3 50.0		6 100.0
4	14 53.8	5 19.2	6 23.1	1 3.8	26 100.0
5	5 38.5	8 61.5			13 100.0
6	3 17.6	4 23.5	3 17.6	7 41.2	17 100.0
7	3 75.0	1 25.0			4 100.0
8	1 100.0				1 100.0
Column Total	51 54.8	20 21.5	14 15.1	8 8.6	93 100.0

**Table A-2(3)**

**Crosstabulations Between Groups and Municipalities by Regions**

**WATER AND SANITATION SERVICES**

REGION	GROUPS					Row Total
	1	3	5	6	9	
1	10 58 8	1 5 9	1 5 9		5 29 4	17 100 0
2	12 63 2	1 5 3	3 15 8	1 5 3	2 10 5	19 100 0
3	2 33 3	1 16 7	1 16 7		2 33 3	6 100 0
4	10 37 0		14 51 9	1 3 7	2 7 4	27 100 0
5	12 85 7				2 14 3	14 100 0
6	14 82 4		1 5 9	2 11 8		17 100 0
7	4 100 0					4 100 0
8	3 75 0				1 25 0	4 100 0
9	3 75 0				1 25 0	4 100 0
Column Total	70 62 5	3 2 7	20 17 9	4 3 6	15 13 4	112 100 0

Table A-2(4)

Crosstabulations Between Groups and Municipalities by Regions

ELECTRICITY AND COMMUNICATION SERVICES

REGION	GROUPS				Row Total
	1	2	4	5	
1	12 46.2	12 46.2	2 7.7		26 100.0
2	3 13.6	14 63.6	1 4.5	4 18.2	22 100.0
3	4 57.1	1 14.3	1 14.3	1 14.3	7 100.0
4	12 41.4	4 13.8	4 13.8	9 31.0	29 100.0
5	5 27.8	11 61.1	2 11.1		18 100.0
6	4 18.2	16 72.7	1 4.5	1 4.5	22 100.0
7	2 40.0	3 60.0			5 100.0
8	2 40.0	2 40.0		1 20.0	5 100.0
9	2 50.0	2 50.0			4 100.0
Column Total	46 33.3	65 47.1	11 8.0	16 11.6	138 100.0

Table A-2(5)

Crosstabulations Between Groups and Municipalities by Regions

OTHER CHARACTERISTICS

REGION	GROUPS				Row
	1	2	8	10	Total
1		25 100 0			25 100 0
2	20 95 2		1 4 8		21 100 0
3				1 100 0	1 100 0
4	19 63 3		11 36 7		30 100 0
5	18 100 0				18 100 0
6		21 100 0			21 100 0
7	4 100 0				4 100 0
8	4 80 0		1 20 0		5 100 0
Column Total	65 52 0	46 36 8	13 10 4	1 .8	125 100 0

**Table A-2(6)**

**Crosstabulations Between Groups and Municipalities by Regions**

**SELECTED VARIABLES**

REGION	GROUPS				Row Total
	1	2	3	4	
1	8 32.0	4 16.0	2 8.0	11 44.0	25 100.0
2	6 31.6	3 15.8	6 31.6	4 21.1	19 100.0
3	1 16.7		2 33.3	3 50.0	6 100.0
4	1 3.4	4 13.8	16 55.2	8 27.6	29 100.0
5	1 7.7	8 61.5	2 15.4	2 15.4	13 100.0
6		14 63.6	2 9.1	6 27.3	22 100.0
7		2 50.0		2 50.0	4 100.0
8		1 50.0	1 50.0		2 100.0
9	1 50.0	1 50.0			2 100.0
Column Total	18 14.8	37 30.3	31 25.4	36 29.5	122 100.0

**Explanatory Note for Tables A-3 and A-4**

Table A-3 presents a cluster membership of each municipality for each of the sectors presented in section 3.3 for a range of number of clusters. Within this range, lies the number of clusters reported in section 3.3. For instance, for health services, 14 clusters were identified. Table A-3 shows the cluster membership of each municipality for 20 through 11 clusters. In the table, municipalities corresponds to the rows and the number of clusters are at the top of each column. An example of the correct way to read these tables is the following. The municipality of Acoyapa belong to group 1 no matter the number of clusters, while the municipality of La Trinidad to group 5 if there 20 clusters, group 4 for 19 to 14 clusters, 3 for 13 clusters and 2 for 12 to 11 clusters.

Table A-4 should be read in the same way as table A-3. The only difference is that what is being clustered are variables instead of municipalities.

Table A-3

Health Services Sector

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups)

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
ACOYAPA	1	1	1	1	1	1	1	1	1	1	1
CUA-BOCAY	2	1	1	1	1	1	1	1	1	1	1
CAMOAPA	3	2	2	2	2	2	2	2	2	1	1
DARIO	4	1	1	1	1	1	1	1	1	1	1
EL ALMENDRO	5	1	1	1	1	1	1	1	1	1	1
LEON	6	2	2	2	2	2	2	2	2	1	1
EL JICARO	7	2	2	2	2	2	2	2	2	1	1
EL RAMA	8	3	3	3	3	3	3	3	1	1	1
ESQUIPULAS	9	1	1	1	1	1	1	1	1	1	1
ESTELI	10	2	2	2	2	2	2	2	2	1	1
JALAPA	11	1	1	1	1	1	1	1	1	1	1
JINOTEGA	12	2	2	2	2	2	2	2	2	1	1
JUIGALPA	13	4	2	2	2	2	2	2	2	1	1
LA CONCORDIA	14	1	1	1	1	1	1	1	1	1	1
TUMA-LA DALIA	15	1	1	1	1	1	1	1	1	1	1
LA LIBERTAD	16	1	1	1	1	1	1	1	1	1	1
LA TRINIDAD	17	5	4	4	4	4	4	4	3	2	2
MATAGALPA	18	1	1	1	1	1	1	1	1	1	1
MATIGUAS	19	3	3	3	3	3	3	3	1	1	1
MUELLE DE LOS BUEYES	20	1	1	1	1	1	1	1	1	1	1
MURRA	21	2	2	2	2	2	2	2	2	1	1
MUY MUY	22	1	1	1	1	1	1	1	1	1	1
NUEVA GUINEA	23	3	3	3	3	3	3	3	1	1	1
PANTASMA	24	1	1	1	1	1	1	1	1	1	1
RANCHO GRANDE	25	1	1	1	1	1	1	1	1	1	1
RIO BLANCO	26	1	1	1	1	1	1	1	1	1	1
SAN DIONISIO	27	1	1	1	1	1	1	1	1	1	1
SAN ISIDRO	28	1	1	1	1	1	1	1	1	1	1
SAN JUAN DE RIO COCO	29	1	1	1	1	1	1	1	1	1	1
SAN PEDRO LOVAGO	30	1	1	1	1	1	1	1	1	1	1
SAN RAFAEL NORTE	31	1	1	1	1	1	1	1	1	1	1
SAN RAMON	32	1	1	1	1	1	1	1	1	1	1
SANTA MARIA	33	4	2	2	2	2	2	2	2	1	1
SANTO DOMINGO	34	4	2	2	2	2	2	2	2	1	1
SEBACO	35	1	1	1	1	1	1	1	1	1	1
TERRABONA	36	1	1	1	1	1	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\*\*\*\*\* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \*\*\*\*\*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
VILLA SANDINO	37	1	1	1	1	1	1	1	1	1	1
WASLALA	38	5	4	4	4	4	4	4	3	2	2
WIWILLI	39	1	1	1	1	1	1	1	1	1	1
YALI	40	1	1	1	1	1	1	1	1	1	1
SAN NICOLAS	41	2	2	2	2	2	2	2	2	1	1
DIPILTO	42	6	5	5	5	5	5	5	4	3	3
SAN LUCAS	43	2	2	2	2	2	2	2	2	1	1
QUILALI	44	7	6	4	4	4	4	4	3	2	2
SOMOTO	45	3	3	3	3	3	3	3	1	1	1
PALACAGUINA	46	2	2	2	2	2	2	2	2	1	1
SAN FERNANDO	47	2	2	2	2	2	2	2	2	1	1
PUEBLO NUEVO	48	5	4	4	4	4	4	4	3	2	2
BOCANA PAIWAS	49	1	1	1	1	1	1	1	1	1	1
CONDEGA	50	1	1	1	1	1	1	1	1	1	1
TELPANECA	51	2	2	2	2	2	2	2	2	1	1
STO TOMAS	52	7	6	4	4	4	4	4	3	2	2
S J REMATES	53	1	1	1	1	1	1	1	1	1	1
MACUELIZO	54	6	5	5	5	5	5	5	4	3	3
CIUDAD ANTIGUA	55	8	7	6	6	6	6	6	5	4	4
LAS SABANAS	56	1	1	1	1	1	1	1	1	1	1
BOACO	57	3	3	3	3	3	3	3	1	1	1
STA LUCIA	58	1	1	1	1	1	1	1	1	1	1
QUEZALGUAQUE	59	1	1	1	1	1	1	1	1	1	1
TELICA	60	1	1	1	1	1	1	1	1	1	1
TEUSTEPE	61	1	1	1	1	1	1	1	1	1	1
LARREYNAGA	62	1	1	1	1	1	1	1	1	1	1
S J LIMAY	63	1	1	1	1	1	1	1	1	1	1
MOZONTE	64	4	2	2	2	2	2	2	2	1	1
YALAGUINA	65	2	2	2	2	2	2	2	2	1	1
OCOTAL	66	3	3	3	3	3	3	3	1	1	1
EL SAUCE	67	1	1	1	1	1	1	1	1	1	1
ACHUAPA	68	1	1	1	1	1	1	1	1	1	1
STA ROSA PEÑON	69	9	8	7	7	5	5	5	4	3	3
EL JICARAL	70	9	8	7	7	5	5	5	4	3	3
LA PAZ CENTRO	71	1	1	1	1	1	1	1	1	1	1
NAGAROTE	72	1	1	1	1	1	1	1	1	1	1
CHINANDEGA	73	2	2	2	2	2	2	2	2	1	1
PUERTO CABEZAS	74	10	9	8	8	7	7	7	6	5	5
WASPAN	75	11	10	9	9	8	8	8	7	6	5
ROSITA	76	1	1	1	1	1	1	1	1	1	1
BONANZA	77	12	11	10	10	9	9	9	8	7	6

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\*\*\*\*\* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \*\*\*\*\*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
EL VIEJO	78	2	2	2	2	2	2	2	2	1	1
SIUNA	79	1	1	1	1	1	1	1	1	1	1
PUERTO MORAZAN	80	1	1	1	1	1	1	1	1	1	1
SOMOTILLO	81	1	1	1	1	1	1	1	1	1	1
BLUEFIELDS	82	3	3	3	3	3	3	3	1	1	1
MORRITO	83	13	12	11	11	10	10	10	9	8	7
SAN CARLOS	84	14	13	12	12	11	11	11	10	9	8
STO TOMAS NORTE	85	8	7	6	6	6	6	6	5	4	4
CINCO PINOS	86	1	1	1	1	1	1	1	1	1	1
SN PEDRO NORTE	87	15	14	13	11	10	10	10	9	8	7
SN FRANCISCO NORTE	88	1	1	1	1	1	1	1	1	1	1
TOTOGALPA	89	2	2	2	2	2	2	2	2	1	1
S JOSE CUSMAPA	90	2	2	2	2	2	2	2	2	1	1
COMALAPA	91	1	1	1	1	1	1	1	1	1	1
SAN LORENZO	92	1	1	1	1	1	1	1	1	1	1
LA CRUZ R GRANDE	93	1	1	1	1	1	1	1	1	1	1
KUKRA HILL	94	1	1	1	1	1	1	1	1	1	1
LAGUNA DE PERLAS	95	16	15	14	13	12	12	12	11	10	9
CORN ISLAND	96	1	1	1	1	1	1	1	1	1	1
SAN MIGUELITO	97	9	8	7	7	5	5	5	4	3	3
EL CASTILLO	98	17	16	15	14	13	13	13	12	11	10
VILLANUEVA	99	1	1	1	1	1	1	1	1	1	1
EL REALEJO	100	18	17	16	15	14	6	6	5	4	4
CORINTO	101	1	1	1	1	1	1	1	1	1	1
CHICHIGALPA	102	10	9	8	8	7	7	7	6	5	5
POSOLTEGA	103	1	1	1	1	1	1	1	1	1	1
MANAGUA	104	2	2	2	2	2	2	2	2	1	1
SN FRANCISCO LIBRE	105	9	8	7	7	5	5	5	4	3	3
MATEARE	106	1	1	1	1	1	1	1	1	1	1
VILLA CARLOS FONSECA	107	4	2	2	2	2	2	2	2	1	1
SN RAFAEL DEL SUR	108	2	2	2	2	2	2	2	2	1	1
TIPITAPA	109	2	2	2	2	2	2	2	2	1	1
TICUANTEPE	110	1	1	1	1	1	1	1	1	1	1
GRANADA	111	3	3	3	3	3	3	3	1	1	1
DIRIA	112	1	1	1	1	1	1	1	1	1	1
DIRIOMO	113	1	1	1	1	1	1	1	1	1	1
NANDAIME	114	1	1	1	1	1	1	1	1	1	1
MASAYA	115	2	2	2	2	2	2	2	2	1	1
LA CONCEPCION	116	1	1	1	1	1	1	1	1	1	1
NINDIRI	117	4	2	2	2	2	2	2	2	1	1
TISMA	118	1	1	1	1	1	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

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Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
MASATEPE	119	1	1	1	1	1	1	1	1	1	1
NANDASMO	120	1	1	1	1	1	1	1	1	1	1
CATARINA	121	19	18	17	16	15	14	2	2	1	1
NIQUINOHOMO	122	1	1	1	1	1	1	1	1	1	1
SN JUAN ORIENTE	123	20	19	18	17	16	15	14	13	12	11
JINOTEPE	124	3	3	3	3	3	3	3	1	1	1
SAN MARCOS	125	1	1	1	1	1	1	1	1	1	1
DIRIAMBÁ	126	3	3	3	3	3	3	3	1	1	1
DOLORES	127	1	1	1	1	1	1	1	1	1	1
EL ROSARIO	128	4	2	2	2	2	2	2	2	1	1
LA PAZ DE CARAZO	129	1	1	1	1	1	1	1	1	1	1
SANTA TERESA	130	1	1	1	1	1	1	1	1	1	1
LA CONQUISTA	131	2	2	2	2	2	2	2	2	1	1
RIVAS	132	3	3	3	3	3	3	3	1	1	1
TOLA	133	1	1	1	1	1	1	1	1	1	1
POTOSI	134	19	18	17	16	15	14	2	2	1	1
BUENOS AIRES	135	19	18	17	16	15	14	2	2	1	1
BELEN	136	1	1	1	1	1	1	1	1	1	1
SAN JORGE	137	1	1	1	1	1	1	1	1	1	1
SN JUAN DEL SUR	138	1	1	1	1	1	1	1	1	1	1
CARDENAS	139	20	19	18	17	16	15	14	13	12	11
MOYOGALPA	140	1	1	1	1	1	1	1	1	1	1
ALTAGRACIA	141	1	1	1	1	1	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

Education and Social Services for Children

Cluster Membership of Cases using Average Linkage (Between Groups)

Label	Case	Number of Clusters									
		23	22	21	20	19	18	17	16	15	14
ACROYAPA	1	1	1	1	1	1	1	1	1	1	1
CUA-BOCAY	2	2	2	2	2	2	2	2	2	2	1
CAMOAPA	3	3	3	3	3	3	3	3	3	3	2
DARIO	4	4	4	4	4	4	4	4	4	4	3
EL ALMENDRO	5	5	5	5	5	5	5	5	5	5	4
LEON	6	6	6	6	6	6	1	1	1	1	1
EL JICARO	7	1	1	1	1	1	1	1	1	1	1
EL RAMA	8	2	2	2	2	2	2	2	2	2	1
ESQUIPULAS	9	1	1	1	1	1	1	1	1	1	1
ESTELI	10	1	1	1	1	1	1	1	1	1	1
JALAPA	11	7	7	7	7	7	6	6	6	6	5
JINOTEGA	12	8	8	8	8	2	2	2	2	2	1
JUIGALPA	13	1	1	1	1	1	1	1	1	1	1
LA CONCORDIA	14	2	2	2	2	2	2	2	2	2	1
TUMA-LA DALIA	15	9	9	9	9	8	7	7	7	7	6
LA LIBERTAD	16	2	2	2	2	2	2	2	2	2	1
LA TRINIDAD	17	1	1	1	1	1	1	1	1	1	1
MATAGALPA	18	9	9	9	9	8	7	7	7	7	6
MATIGUAS	19	9	9	9	9	8	7	7	7	7	6
MUELLE DE LOS BUEYES	20	2	2	2	2	2	2	2	2	2	1
MURRA	21	10	10	10	10	9	8	8	8	8	7
MUY MUY	22	6	6	6	6	6	1	1	1	1	1
NUEVA GUINEA	23	2	2	2	2	2	2	2	2	2	1
PANTASMA	24	6	6	6	6	6	1	1	1	1	1
RANCHO GRANDE	25	8	8	8	8	2	2	2	2	2	1
RIO BLANCO	26	9	9	9	9	8	7	7	7	7	6
SAN DIONISIO	27	9	9	9	9	8	7	7	7	7	6
SAN ISIDRO	28	1	1	1	1	1	1	1	1	1	1
SAN JUAN DE RIO COCO	29	11	11	11	11	10	9	9	9	9	8
SAN PEDRO LOVAGO	30	12	12	12	12	11	10	10	10	10	9
SAN RAFAEL NORTE	31	2	2	2	2	2	2	2	2	2	1
SAN RAMON	32	13	13	4	4	4	4	4	4	4	3
SANTA MARIA	33	7	7	7	7	7	6	6	6	6	5
SANTO DOMINGO	34	2	2	2	2	2	2	2	2	2	1
SEBACO	35	6	6	6	6	6	1	1	1	1	1
TERRABONA	36	7	7	7	7	7	6	6	6	6	5
VILLA SANDINO	37	1	1	1	1	1	1	1	1	1	1
WASLALA	38	9	9	9	9	8	7	7	7	7	6
WIWILI	39	9	9	9	9	8	7	7	7	7	6
YALI	40	1	1	1	1	1	1	1	1	1	1
SAN NICOLAS	41	2	2	2	2	2	2	2	2	2	1
DIPILTO	42	1	1	1	1	1	1	1	1	1	1
SAN LUCAS	43	11	11	11	11	10	9	9	9	9	8

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		23	22	21	20	19	18	17	16	15	14
QUILALI	44	14	14	13	13	12	11	11	11	10	9
SOMOTO	45	1	1	1	1	1	1	1	1	1	1
PALACAGUINA	46	1	1	1	1	1	1	1	1	1	1
SAN FERNANDO	47	7	7	7	7	7	6	6	6	5	5
PUEBLO NUEVO	48	1	1	1	1	1	1	1	1	1	1
BOCANA PAIWAS	49	2	2	2	2	2	2	2	2	1	1
CONDEGA	50	1	1	1	1	1	1	1	1	1	1
TELPANECA	51	5	5	5	5	5	5	5	5	4	4
STO TOMAS	52	1	1	1	1	1	1	1	1	1	1
S J REMATES	53	2	2	2	2	2	2	2	2	1	1
MACUELIZO	54	15	15	14	14	13	12	12	12	11	10
CIUDAD ANTIGUA	55	7	7	7	7	7	6	6	6	5	5
LAS SABANAS	56	14	14	13	13	12	11	11	11	10	9
BOACO	57	1	1	1	1	1	1	1	1	1	1
STA LUCIA	58	2	2	2	2	2	2	2	2	1	1
QUEZALGUAQUE	59	1	1	1	1	1	1	1	1	1	1
TELICA	60	1	1	1	1	1	1	1	1	1	1
TEUSTEPE	61	2	2	2	2	2	2	2	2	1	1
LARREYNAGA	62	1	1	1	1	1	1	1	1	1	1
S J LIMAY	63	1	1	1	1	1	1	1	1	1	1
MOZONTE	64	16	16	15	15	14	13	13	13	12	11
YALAGUINA	65	1	1	1	1	1	1	1	1	1	1
OCOTAL	66	7	7	7	7	7	6	6	6	5	5
EL SAUCE	67	1	1	1	1	1	1	1	1	1	1
ACHUAPA	68	1	1	1	1	1	1	1	1	1	1
STA ROSA PEÑON	69	1	1	1	1	1	1	1	1	1	1
EL JICARAL	70	17	17	16	16	15	14	14	1	1	1
LA PAZ CENTRO	71	1	1	1	1	1	1	1	1	1	1
NAGAROTE	72	1	1	1	1	1	1	1	1	1	1
CHINANDEGA	73	1	1	1	1	1	1	1	1	1	1
PUERTO CABEZAS	74	1	1	1	1	1	1	1	1	1	1
WASPAN	75	18	18	17	17	16	15	6	6	5	5
ROSITA	76	1	1	1	1	1	1	1	1	1	1
BONANZA	77	1	1	1	1	1	1	1	1	1	1
EL VIEJO	78	6	6	6	6	6	1	1	1	1	1
SIUNA	79	2	2	2	2	2	2	2	2	1	1
PUERTO MORAZAN	80	13	13	4	4	4	4	4	4	3	3
SOMOTILLO	81	1	1	1	1	1	1	1	1	1	1
BLUEFIELDS	82	4	4	4	4	4	4	4	4	3	3
MORRITO	83	5	5	5	5	5	5	5	5	4	4
SAN CARLOS	84	19	19	18	13	12	11	11	11	10	9

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		23	22	21	20	19	18	17	16	15	14
STO TOMAS NORTE	85	7	7	7	7	7	6	6	6	5	5
CINCO PINOS	86	7	7	7	7	7	6	6	6	5	5
SN PEDRO NORTE	87	5	5	5	5	5	5	5	5	4	4
SN FRANCISCO NORTE	88	5	5	5	5	5	5	5	5	4	4
TOTOGALPA	89	8	8	8	8	2	2	2	2	1	1
S JOSE CUSMAPA	90	20	20	19	18	17	16	15	14	13	12
COMALAPA	91	5	5	5	5	5	5	5	5	4	4
SAN LORENZO	92	17	17	16	16	15	14	14	1	1	1
LA CRUZ R GRANDE	93	21	5	5	5	5	5	5	5	4	4
KUKRA HILL	94	5	5	5	5	5	5	5	5	4	4
LAGUNA DE PERLAS	95	1	1	1	1	1	1	1	1	1	1
CORN ISLAND	96	22	21	20	19	18	17	16	15	14	13
SAN MIGUELITO	97	23	22	21	20	19	18	17	16	15	14
EL CASTILLO	98	19	19	18	13	12	11	11	11	10	9
VILLANUEVA	99	7	7	7	7	7	6	6	6	5	5
EL REALEJO	100	1	1	1	1	1	1	1	1	1	1
CORINTO	101	2	2	2	2	2	2	2	2	1	1
CHICHIGALPA	102	1	1	1	1	1	1	1	1	1	1
POSOLTEGA	103	7	7	7	7	7	6	6	6	5	5
MANAGUA	104	7	7	7	7	7	6	6	6	5	5
SN FRANCISCO LIBRE	105	1	1	1	1	1	1	1	1	1	1
MATEARE	106	1	1	1	1	1	1	1	1	1	1
VILLA CARLOS FONSECA	107	1	1	1	1	1	1	1	1	1	1
SN RAFAEL DEL SUR	108	6	6	6	6	6	1	1	1	1	1
TIPITAPA	109	6	6	6	6	6	1	1	1	1	1
TICUANTEPE	110	6	6	6	6	6	1	1	1	1	1
GRANADA	111	6	6	6	6	6	1	1	1	1	1
DIRIA	112	9	9	9	9	8	7	7	7	6	2
DIRICOMO	113	6	6	6	6	6	1	1	1	1	1
NANDAIME	114	6	6	6	6	6	1	1	1	1	1
MASAYA	115	6	6	6	6	6	1	1	1	1	1
LA CONCEPCION	116	1	1	1	1	1	1	1	1	1	1
NINDIRI	117	1	1	1	1	1	1	1	1	1	1
TISMA	118	1	1	1	1	1	1	1	1	1	1
MASATEPE	119	1	1	1	1	1	1	1	1	1	1
NANDASMO	120	2	2	2	2	2	2	2	2	1	1
CATARINA	121	1	1	1	1	1	1	1	1	1	1
NIQUINHOMO	122	1	1	1	1	1	1	1	1	1	1
SN JUAN ORIENTE	123	1	1	1	1	1	1	1	1	1	1
JINOTEPE	124	1	1	1	1	1	1	1	1	1	1
SAN MARCOS	125	6	6	6	6	6	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

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Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		23	22	21	20	19	18	17	16	15	14
DIRIAMBÁ	126	3	3	3	3	3	3	3	3	2	2
DOLORES	127	6	6	6	6	6	1	1	1	1	1
EL ROSARIO	128	20	20	19	18	17	16	15	14	13	12
LA PAZ DE CARAZO	129	2	2	2	2	2	2	2	2	1	1
SANTA TERESA	130	1	1	1	1	1	1	1	1	1	1
LA CONQUISTA	131	2	2	2	2	2	2	2	2	1	1
RIVAS	132	1	1	1	1	1	1	1	1	1	1
TOLA	133	17	17	16	16	15	14	14	1	1	1
POTOSI	134	13	13	4	4	4	4	4	4	3	3
BUENOS AIRES	135	2	2	2	2	2	2	2	2	1	1
BELEN	136	2	2	2	2	2	2	2	2	1	1
SAN JORGE	137	1	1	1	1	1	1	1	1	1	1
SN JUAN DEL SUR	138	1	1	1	1	1	1	1	1	1	1
CARDENAS	139	8	8	8	8	2	2	2	2	1	1
MOYOGALPA	140	1	1	1	1	1	1	1	1	1	1
ALTAGRACIA	141	1	1	1	1	1	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

Water and Sanitation Services

Cluster Membership of Cases using Average Linkage (Between Groups)

Label	Case	Number of Clusters									
		23	22	21	20	19	18	17	16	15	14
ACOYAPA	1	1	1	1	1	1	1	1	1	1	1
CUA-BOCAY	2	1	1	1	1	1	1	1	1	1	1
CAMOAPA	3	1	1	1	1	1	1	1	1	1	1
DARIO	4	1	1	1	1	1	1	1	1	1	1
EL ALMENDRO	5	2	2	2	2	2	2	2	2	2	2
LEON	6	3	3	3	3	3	3	3	3	3	3
EL JICARO	7	4	4	4	4	4	4	4	4	4	4
EL RAMA	8	1	1	1	1	1	1	1	1	1	1
ESQUIPULAS	9	5	5	5	5	1	1	1	1	1	1
ESTELI	10	6	6	6	6	5	5	3	3	3	3
JALAPA	11	7	7	7	7	6	6	5	5	5	5
JINOTEGA	12	8	8	8	8	7	7	6	6	6	6
JUIGALPA	13	9	9	9	9	8	8	7	7	7	7
LA CONCORDIA	14	10	10	10	10	9	9	8	8	8	8
TUMA-LA DALIA	15	1	1	1	1	1	1	1	1	1	1
LA LIBERTAD	16	5	5	5	5	1	1	1	1	1	1
LA TRINIDAD	17	11	11	11	11	10	10	9	9	9	9
MATAGALPA	18	8	8	8	8	7	7	6	6	6	6
MATIGUAS	19	5	5	5	5	1	1	1	1	1	1
MUELLE DE LOS BUEYES	20	1	1	1	1	1	1	1	1	1	1
MURRA	21	1	1	1	1	1	1	1	1	1	1
MUY MUY	22	5	5	5	5	1	1	1	1	1	1
NUEVA GUINEA	23	5	5	5	5	1	1	1	1	1	1
PANTASMA	24	1	1	1	1	1	1	1	1	1	1
RANCHO GRANDE	25	1	1	1	1	1	1	1	1	1	1
RIO BLANCO	26	1	1	1	1	1	1	1	1	1	1
SAN DIONISIO	27	12	12	12	12	11	11	10	10	10	5
SAN ISIDRO	28	12	12	12	12	11	11	10	10	10	5
SAN JUAN DE RIO COCO	29	12	12	12	12	11	11	10	10	10	5
SAN PEDRO LOVAGO	30	1	1	1	1	1	1	1	1	1	1
SAN RAFAEL NORTE	31	5	5	5	5	1	1	1	1	1	1
SAN RAMON	32	10	10	10	10	9	9	8	8	8	8
SANTA MARIA	33	13	13	2	2	2	2	2	2	2	2
SANTO DOMINGO	34	1	1	1	1	1	1	1	1	1	1
SEBACO	35	7	7	7	7	6	6	5	5	5	5
TERRABONA	36	5	5	5	5	1	1	1	1	1	1
VILLA SANDINO	37	5	5	5	5	1	1	1	1	1	1
WASLALA	38	1	1	1	1	1	1	1	1	1	1
WIWILI	39	1	1	1	1	1	1	1	1	1	1
YALI	40	13	13	2	2	2	2	2	2	2	2
SAN NICOLAS	41	4	4	4	4	4	4	4	4	4	4
DIPILTO	42	10	10	10	10	9	9	8	8	8	8

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\*\*\*\*\* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \*\*\*\*\*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		23	22	21	20	19	18	17	16	15	14
SAN LUCAS	43	14	14	13	13	12	12	11	9	9	9
QUILALI	44	5	5	5	5	1	1	1	1	1	1
SOMOTO	45	11	11	11	11	10	10	9	9	9	9
PALACAGUINA	46	5	5	5	5	1	1	1	1	1	1
SAN FERNANDO	47	5	5	5	5	1	1	1	1	1	1
PUEBLO NUEVO	48	14	14	13	13	12	12	11	9	9	9
BOCANA PAIWAS	49	1	1	1	1	1	1	1	1	1	1
CONDEGA	50	15	15	14	14	13	13	12	11	11	10
TELPANECA	51	1	1	1	1	1	1	1	1	1	1
STO TOMAS	52	12	12	12	12	11	11	10	10	10	5
S J REMATES	53	14	14	13	13	12	12	11	9	9	9
MACUELIZO	54	16	16	15	2	2	2	2	2	2	2
CIUDAD ANTIGUA	55	1	1	1	1	1	1	1	1	1	1
LAS SABANAS	56	10	10	10	10	9	9	8	8	8	8
BOACO	57	5	5	5	5	1	1	1	1	1	1
STA LUCIA	58	14	14	13	13	12	12	11	9	9	9
QUEZALGUAQUE	59	5	5	5	5	1	1	1	1	1	1
TELICA	60	5	5	5	5	1	1	1	1	1	1
TEUSTEPE	61	17	17	16	15	14	14	13	12	4	4
LARREYNAGA	62	5	5	5	5	1	1	1	1	1	1
S J LIMAY	63	1	1	1	1	1	1	1	1	1	1
MOZONTE	64	1	1	1	1	1	1	1	1	1	1
YALAGUINA	65	14	14	13	13	12	12	11	9	9	9
OCOTAL	66	18	18	17	16	15	15	14	13	12	11
EL SAUCE	67	1	1	1	1	1	1	1	1	1	1
ACHUAPA	68	1	1	1	1	1	1	1	1	1	1
STA ROSA PEÑON	69	1	1	1	1	1	1	1	1	1	1
EL JICARAL	70	1	1	1	1	1	1	1	1	1	1
LA PAZ CENTRO	71	7	7	7	7	6	6	5	5	5	5
NAGAROTE	72	7	7	7	7	6	6	5	5	5	5
CHINANDEGA	73	8	8	8	8	7	7	6	6	6	6
PUERTO CABEZAS	74	5	5	5	5	1	1	1	1	1	1
WASPAN	75	1	1	1	1	1	1	1	1	1	1
ROSITA	76	2	2	2	2	2	2	2	2	2	2
BONANZA	77	5	5	5	5	1	1	1	1	1	1
EL VIEJO	78	5	5	5	5	1	1	1	1	1	1
SIUNA	79	1	1	1	1	1	1	1	1	1	1
PUERTO MORAZAN	80	14	14	13	13	12	12	11	9	9	9
SOMOTILLO	81	14	14	13	13	12	12	11	9	9	9
BLUEFIELDS	82	1	1	1	1	1	1	1	1	1	1
MORRITO	83	1	1	1	1	1	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		23	22	21	20	19	18	17	16	15	14
SAN CARLOS	84	11	11	11	11	10	10	9	9	9	9
STO TOMAS NORTE	85	17	17	16	15	14	14	13	12	4	4
CINCO PINOS	86	19	17	16	15	14	14	13	12	4	4
SN PEDRO NORTE	87	1	1	1	1	1	1	1	1	1	1
SN FRANCISCO NORTE	88	17	17	16	15	14	14	13	12	4	4
TOTOGALEPA	89	1	1	1	1	1	1	1	1	1	1
S JOSE CUSMAPA	90	1	1	1	1	1	1	1	1	1	1
COMALAPA	91	1	1	1	1	1	1	1	1	1	1
SAN LORENZO	92	1	1	1	1	1	1	1	1	1	1
LA CRUZ R GRANDE	93	5	5	5	5	1	1	1	1	1	1
KUKRA HILL	94	1	1	1	1	1	1	1	1	1	1
LAGUNA DE PERLAS	95	17	17	16	15	14	14	13	12	4	4
CORN ISLAND	96	20	19	18	17	16	12	11	9	9	9
SAN MIGUELITO	97	1	1	1	1	1	1	1	1	1	1
EL CASTILLO	98	1	1	1	1	1	1	1	1	1	1
VILLANUEVA	99	1	1	1	1	1	1	1	1	1	1
EL REALEJO	100	5	5	5	5	1	1	1	1	1	1
CORINTO	101	21	20	19	18	17	16	15	14	13	12
CHICHIGALPA	102	7	7	7	7	6	6	5	5	5	5
POSOLTEGA	103	5	5	5	5	1	1	1	1	1	1
MANAGUA	104	6	6	6	6	5	5	3	3	3	3
SN FRANCISCO LIBRE	105	14	14	13	13	12	12	11	9	9	9
MATEARE	106	5	5	5	5	1	1	1	1	1	1
VILLA CARLOS FONSECA	107	14	14	13	13	12	12	11	9	9	9
SN RAFAEL DEL SUR	108	5	5	5	5	1	1	1	1	1	1
TIPITAPA	109	9	9	9	9	8	8	7	7	7	7
TICUANTEPE	110	7	7	7	7	6	6	5	5	5	5
GRANADA	111	18	18	17	16	15	15	14	13	12	11
DIRIA	112	5	5	5	5	1	1	1	1	1	1
DIRIOMO	113	5	5	5	5	1	1	1	1	1	1
NANDAIME	114	5	5	5	5	1	1	1	1	1	1
MASAYA	115	22	21	20	19	18	17	16	15	14	13
LA CONCEPCION	116	7	7	7	7	6	6	5	5	5	5
NINDIRI	117	7	7	7	7	6	6	5	5	5	5
TISMA	118	7	7	7	7	6	6	5	5	5	5
MASATEPE	119	7	7	7	7	6	6	5	5	5	5
NANDASMO	120	7	7	7	7	6	6	5	5	5	5
CATARINA	121	7	7	7	7	6	6	5	5	5	5
NIQUINOHOMO	122	7	7	7	7	6	6	5	5	5	5
SN JUAN ORIENTE	123	7	7	7	7	6	6	5	5	5	5
JINOTEPE	124	9	9	9	9	8	8	7	7	7	7

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		23	22	21	20	19	18	17	16	15	14
SAN MARCOS	125	7	7	7	7	6	6	5	5	5	5
DIRIAMBÁ	126	5	5	5	5	1	1	1	1	1	1
DOLORES	127	7	7	7	7	6	6	5	5	5	5
EL ROSARIO	128	7	7	7	7	6	6	5	5	5	5
LA PAZ DE CARAZO	129	5	5	5	5	1	1	1	1	1	1
SANTA TERESA	130	11	11	11	11	10	10	9	9	9	9
LA CONQUISTA	131	14	14	13	13	12	12	11	9	9	9
RIVAS	132	8	8	8	8	7	7	6	6	6	6
TOLA	133	1	1	1	1	1	1	1	1	1	1
POTOSI	134	7	7	7	7	6	6	5	5	5	5
BUENOS AIRES	135	23	22	21	20	19	18	17	16	15	14
BELEN	136	5	5	5	5	1	1	1	1	1	1
SAN JORGE	137	7	7	7	7	6	6	5	5	5	5
SN JUAN DEL SUR	138	5	5	5	5	1	1	1	1	1	1
CARDENAS	139	5	5	5	5	1	1	1	1	1	1
MOYOGALPA	140	7	7	7	7	6	6	5	5	5	5
ALTAGRACIA	141	5	5	5	5	1	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

Electricity and Communication Services

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups)

Label	Case	Number of Clusters									
		15	14	13	12	11	10	9	8	7	6
ACOYAPA	1	1	1	1	1	1	1	1	1	1	1
MOYOGALPA	2	2	2	2	2	2	2	2	2	2	1
RIVAS	3	3	3	3	3	3	3	3	3	3	2
STO TOMAS	4	4	4	4	4	4	4	4	4	4	3
ESQUIPULAS	5	5	5	5	5	5	1	1	1	1	1
CONDEGA	6	1	1	1	1	1	1	1	1	1	1
QUEZALGUAQUE	7	6	6	6	2	2	2	2	2	2	1
TELICA	8	6	6	6	2	2	2	2	2	2	1
LARREYNAGA	9	6	6	6	2	2	2	2	2	2	1
S J LIMAY	10	6	6	6	2	2	2	2	2	2	1
EL SAUCE	11	6	6	6	2	2	2	2	2	2	1
ACHUAPA	12	6	6	6	2	2	2	2	2	2	1
LA PAZ CENTRO	13	1	1	1	1	1	1	1	1	1	1
ROSITA	14	2	2	2	2	2	2	2	2	2	1
SOMOTILLO	15	6	6	6	2	2	2	2	2	2	1
LA CONCEPCION	16	5	5	5	5	5	1	1	1	1	1
TISMA	17	7	7	7	6	6	5	5	5	5	4
NIQUINHOMO	18	8	8	8	7	6	5	5	5	5	4
SANTA TERESA	19	5	5	5	5	5	1	1	1	1	1
SN JUAN DEL SUR	20	9	9	9	8	7	6	4	4	4	3
EL JICARO	21	5	5	5	5	5	1	1	1	1	1
ESTELI	22	4	4	4	4	4	4	4	4	4	3
PALACAGUINA	23	5	5	5	5	5	1	1	1	1	1
CHINANDEGA	24	7	7	7	6	6	5	5	5	5	4
VILLA CARLOS FONSECA	25	5	5	5	5	5	1	1	1	1	1
NINDIRI	26	7	7	7	6	6	5	5	5	5	4
CATARINA	27	7	7	7	6	6	5	5	5	5	4
SOMOTO	28	1	1	1	1	1	1	1	1	1	1
BOACO	29	10	10	1	1	1	1	1	1	1	1
PUEBLO NUEVO	30	1	1	1	1	1	1	1	1	1	1
SN FRANCISCO LIBRE	31	6	6	6	2	2	2	2	2	2	1
EL REALEJO	32	7	7	7	6	6	5	5	5	5	4
PUERTO CABEZAS	33	5	5	5	5	5	1	1	1	1	1
CHICHIGALPA	34	8	8	8	7	6	5	5	5	5	4
BONANZA	35	5	5	5	5	5	1	1	1	1	1
SN JUAN ORIENTE	36	5	5	5	5	5	1	1	1	1	1
NAGAROTE	37	8	8	8	7	6	5	5	5	5	4
JUIGALPA	38	4	4	4	4	4	4	4	4	4	3
JINOTEPE	39	11	11	10	9	8	7	6	4	4	3
YALAGUINA	40	5	5	5	5	5	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\*\*\*\*\* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \*\*\*\*\*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		15	14	13	12	11	10	9	8	7	6
SAN ISIDRO	41	5	5	5	5	5	1	1	1	1	1
VILLA SANDINO	42	1	1	1	1	1	1	1	1	1	1
YALI	43	6	6	6	2	2	2	2	2	2	1
MATEARE	44	5	5	5	5	5	1	1	1	1	1
MASATEPE	45	8	8	8	7	6	5	5	5	5	4
DIPILTO	46	5	5	5	5	5	1	1	1	1	1
SAN JORGE	47	12	12	11	10	9	8	7	6	5	4
ALTAGRACIA	48	5	5	5	5	5	1	1	1	1	1
LA TRINIDAD	49	10	10	1	1	1	1	1	1	1	1
STA ROSA PEÑON	50	6	6	6	2	2	2	2	2	2	1
LAGUNA DE PERLAS	51	5	5	5	5	5	1	1	1	1	1
MUY MUY	52	6	6	6	2	2	2	2	2	2	1
SEBACO	53	7	7	7	6	6	5	5	5	5	4
PANTASMA	54	2	2	2	2	2	2	2	2	2	1
TICUANTEPE	55	7	7	7	6	6	5	5	5	5	4
DIRIOMO	56	5	5	5	5	5	1	1	1	1	1
SAN MARCOS	57	4	4	4	4	4	4	4	4	4	3
DOLORES	58	5	5	5	5	5	1	1	1	1	1
EL VIEJO	59	5	5	5	5	5	1	1	1	1	1
SN RAFAEL DEL SUR	60	5	5	5	5	5	1	1	1	1	1
TIPITAPA	61	5	5	5	5	5	1	1	1	1	1
MASAYA	62	11	11	10	9	8	7	6	4	4	3
GRANADA	63	13	13	12	11	10	9	8	7	6	5
NANDAIME	64	1	1	1	1	1	1	1	1	1	1
LEON	65	14	14	13	12	11	10	9	8	7	6
SAN MIGUELITO	66	5	5	5	5	5	1	1	1	1	1
CUA-BOCAY	67	2	2	2	2	2	2	2	2	2	1
LA LIBERTAD	68	1	1	1	1	1	1	1	1	1	1
MUELLE DE LOS BUEYES	69	6	6	6	2	2	2	2	2	2	1
S J REMATES	70	6	6	6	2	2	2	2	2	2	1
STA LUCIA	71	6	6	6	2	2	2	2	2	2	1
TEUSTEPE	72	6	6	6	2	2	2	2	2	2	1
CORINTO	73	15	11	10	9	8	7	6	4	4	3
NANDASMO	74	7	7	7	6	6	5	5	5	5	4
LA PAZ DE CARAZO	75	6	6	6	2	2	2	2	2	2	1
BELEN	76	5	5	5	5	5	1	1	1	1	1
SANTO DOMINGO	77	6	6	6	2	2	2	2	2	2	1
SAN NICOLAS	78	2	2	2	2	2	2	2	2	2	1
LA CONQUISTA	79	6	6	6	2	2	2	2	2	2	1
BUENOS AIRES	80	5	5	5	5	5	1	1	1	1	1
EL RAMA	81	6	6	6	2	2	2	2	2	2	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		15	14	13	12	11	10	9	8	7	6
NUEVA GUINEA	82	6	6	6	2	2	2	2	2	2	1
LA CONCORDIA	83	6	6	6	2	2	2	2	2	2	1
SAN RAFAEL NORTE	84	6	6	6	2	2	2	2	2	2	1
SIUNA	85	6	6	6	2	2	2	2	2	2	1
BOCANA PAIWAS	86	2	2	2	2	2	2	2	2	2	1
DARIO	87	6	6	6	2	2	2	2	2	2	1
SAN RAMON	88	6	6	6	2	2	2	2	2	2	1
PUERTO MORAZAN	89	5	5	5	5	5	1	1	1	1	1
POTOSI	90	7	7	7	6	6	5	5	5	5	4
BLUEFIELDS	91	7	7	7	6	6	5	5	5	5	4
EL ALMENDRO	92	2	2	2	2	2	2	2	2	2	1
SN FRANCISCO NORTE	93	6	6	6	2	2	2	2	2	2	1
COMALAPA	94	6	6	6	2	2	2	2	2	2	1
LA CRUZ R GRANDE	95	2	2	2	2	2	2	2	2	2	1
KUKRA HILL	96	2	2	2	2	2	2	2	2	2	1
TELPANECA	97	6	6	6	2	2	2	2	2	2	1
MORRITO	98	6	6	6	2	2	2	2	2	2	1
SN PEDRO NORTE	99	6	6	6	2	2	2	2	2	2	1
TUMA-LA DALIA	100	6	6	6	2	2	2	2	2	2	1
MATAGALPA	101	4	4	4	4	4	4	4	4	4	3
RIO BLANCO	102	6	6	6	2	2	2	2	2	2	1
SAN DIONISIO	103	6	6	6	2	2	2	2	2	2	1
WIWILI	104	2	2	2	2	2	2	2	2	2	1
DIRIA	105	5	5	5	5	5	1	1	1	1	1
WASIALA	106	6	6	6	2	2	2	2	2	2	1
MATIGUAS	107	6	6	6	2	2	2	2	2	2	1
RANCHO GRANDE	108	2	2	2	2	2	2	2	2	2	1
JINOTEGA	109	1	1	1	1	1	1	1	1	1	1
TOTOGALPA	110	6	6	6	2	2	2	2	2	2	1
CARDENAS	111	1	1	1	1	1	1	1	1	1	1
LAS SABANAS	112	5	5	5	5	5	1	1	1	1	1
QUILALI	113	6	6	6	2	2	2	2	2	2	1
SAN CARLOS	114	10	10	1	1	1	1	1	1	1	1
EL CASTILLO	115	6	6	6	2	2	2	2	2	2	1
CINCO PINOS	116	6	6	6	2	2	2	2	2	2	1
VILLANUEVA	117	6	6	6	2	2	2	2	2	2	1
POSOLTEGA	118	6	6	6	2	2	2	2	2	2	1
MANAGUA	119	11	11	10	9	8	7	6	4	4	3
OCOTAL	120	4	4	4	4	4	4	4	4	4	3
CIUDAD ANTIGUA	121	6	6	6	2	2	2	2	2	2	1
STO TOMAS NORTE	122	6	6	6	2	2	2	2	2	2	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\*\*\*\*\* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \*\*\*\*\*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		15	14	13	12	11	10	9	8	7	6
JALAPA	123	5	5	5	5	5	1	1	1	1	1
SANTA MARIA	124	6	6	6	2	2	2	2	2	2	1
TERRABONA	125	5	5	5	5	5	1	1	1	1	1
SAN FERNANDO	126	5	5	5	5	5	1	1	1	1	1
SAN LORENZO	127	6	6	6	2	2	2	2	2	2	1
TOLA	128	2	2	2	2	2	2	2	2	2	1
EL JICARAL	129	2	2	2	2	2	2	2	2	2	1
MURRA	130	2	2	2	2	2	2	2	2	2	1
SAN LUCAS	131	6	6	6	2	2	2	2	2	2	1
SAN JUAN DE RIO COCO	132	5	5	5	5	5	1	1	1	1	1
MOZONTE	133	6	6	6	2	2	2	2	2	2	1
EL ROSARIO	134	5	5	5	5	5	1	1	1	1	1
S JOSE CUSMAPA	135	6	6	6	2	2	2	2	2	2	1
DIRIAMBÁ	136	8	8	8	7	6	5	5	5	5	4
CAMOAPA	137	1	1	1	1	1	1	1	1	1	1
WASPAN	138	2	2	2	2	2	2	2	2	2	1
CORN ISLAND	139	5	5	5	5	5	1	1	1	1	1
SAN PEDRO LOVAGO	140	6	6	6	2	2	2	2	2	2	1
MACUELIZO	141	6	6	6	2	2	2	2	2	2	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

Other Characteristics

Cluster Membership of Cases using Average Linkage (Between Groups)

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
ACOYAPA	1	1	1	1	1	1	1	1	1	1	1
CUA-BOCAY	2	2	2	2	2	2	2	2	2	2	2
CAMOAPA	3	1	1	1	1	1	1	1	1	1	1
DARIO	4	3	3	3	3	3	3	3	3	2	2
EL ALMENDRO	5	1	1	1	1	1	1	1	1	1	1
LEON	6	1	1	1	1	1	1	1	1	1	1
EL JICARO	7	2	2	2	2	2	2	2	2	2	2
EL RAMA	8	4	4	4	4	4	1	1	1	1	1
ESQUIPULAS	9	3	3	3	3	3	3	3	3	2	2
ESTELI	10	3	3	3	3	3	3	3	3	2	2
JALAPA	11	2	2	2	2	2	2	2	2	2	2
JINOTEGA	12	3	3	3	3	3	3	3	3	2	2
JUIGALPA	13	1	1	1	1	1	1	1	1	1	1
LA CONCORDIA	14	3	3	3	3	3	3	3	3	2	2
TUMA-LA DALIA	15	3	3	3	3	3	3	3	3	2	2
LA LIBERTAD	16	1	1	1	1	1	1	1	1	1	1
LA TRINIDAD	17	3	3	3	3	3	3	3	3	2	2
MATAGALPA	18	3	3	3	3	3	3	3	3	2	2
MATIGUAS	19	2	2	2	2	2	2	2	2	2	2
MUELLE DE LOS BUEYES	20	1	1	1	1	1	1	1	1	1	1
MURRA	21	5	5	5	5	5	4	4	4	3	3
MUY MUY	22	2	2	2	2	2	2	2	2	2	2
NUEVA GUINEA	23	1	1	1	1	1	1	1	1	1	1
PANTASMA	24	2	2	2	2	2	2	2	2	2	2
RANCHO GRANDE	25	3	3	3	3	3	3	3	3	2	2
RIO BLANCO	26	2	2	2	2	2	2	2	2	2	2
SAN DIONISIO	27	3	3	3	3	3	3	3	3	2	2
SAN ISIDRO	28	3	3	3	3	3	3	3	3	2	2
SAN JUAN DE RIO COCO	29	3	3	3	3	3	3	3	3	2	2
SAN PEDRO LOVAGO	30	1	1	1	1	1	1	1	1	1	1
SAN RAFAEL NORTE	31	3	3	3	3	3	3	3	3	2	2
SAN RAMON	32	3	3	3	3	3	3	3	3	2	2
SANTA MARIA	33	2	2	2	2	2	2	2	2	2	2
SANTO DOMINGO	34	4	4	4	4	4	1	1	1	1	1
SEBACO	35	3	3	3	3	3	3	3	3	2	2
TERRABONA	36	3	3	3	3	3	3	3	3	2	2
VILLA SANDINO	37	4	4	4	4	4	1	1	1	1	1
WASLALA	38	2	2	2	2	2	2	2	2	2	2
WIWILLI	39	3	3	3	3	3	3	3	3	2	2
YALI	40	3	3	3	3	3	3	3	3	2	2
SAN NICOLAS	41	3	3	3	3	3	3	3	3	2	2
DIPILTO	42	2	2	2	2	2	2	2	2	2	2

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
SAN LUCAS	43	3	3	3	3	3	3	3	3	2	2
QUILALI	44	2	2	2	2	2	2	2	2	2	2
SOMOTO	45	3	3	3	3	3	3	3	3	2	2
PALACAGUINA	46	3	3	3	3	3	3	3	3	2	2
SAN FERNANDO	47	2	2	2	2	2	2	2	2	2	2
PUEBLO NUEVO	48	2	2	2	2	2	2	2	2	2	2
BOCANA PAIWAS	49	6	6	6	6	6	5	5	5	4	4
CONDEGA	50	3	3	3	3	3	3	3	3	2	2
TELPANECA	51	3	3	3	3	3	3	3	3	2	2
STO TOMAS	52	4	4	4	4	4	1	1	1	1	1
S J REMATES	53	1	1	1	1	1	1	1	1	1	1
MACUELIZO	54	3	3	3	3	3	3	3	3	2	2
CIUDAD ANTIGUA	55	2	2	2	2	2	2	2	2	2	2
LAS SABANAS	56	3	3	3	3	3	3	3	3	2	2
BOACO	57	1	1	1	1	1	1	1	1	1	1
STA LUCIA	58	1	1	1	1	1	1	1	1	1	1
QUEZALGUAQUE	59	1	1	1	1	1	1	1	1	1	1
TELICA	60	1	1	1	1	1	1	1	1	1	1
TEUSTEPE	61	1	1	1	1	1	1	1	1	1	1
LARREYNAGA	62	1	1	1	1	1	1	1	1	1	1
S J LIMAY	63	2	2	2	2	2	2	2	2	2	2
MOZONTE	64	2	2	2	2	2	2	2	2	2	2
YALAGUINA	65	3	3	3	3	3	3	3	3	2	2
OCOTAL	66	7	7	7	7	7	6	6	3	2	2
EL SAUCE	67	1	1	1	1	1	1	1	1	1	1
ACHUAPA	68	1	1	1	1	1	1	1	1	1	1
STA ROSA PEÑON	69	1	1	1	1	1	1	1	1	1	1
EL JICARAL	70	1	1	1	1	1	1	1	1	1	1
LA PAZ CENTRO	71	1	1	1	1	1	1	1	1	1	1
NAGAROTE	72	1	1	1	1	1	1	1	1	1	1
CHINANDEGA	73	1	1	1	1	1	1	1	1	1	1
PUERTO CABEZAS	74	1	1	1	1	1	1	1	1	1	1
WASPAN	75	6	6	6	6	6	5	5	5	4	4
ROSITA	76	1	1	1	1	1	1	1	1	1	1
BONANZA	77	1	1	1	1	1	1	1	1	1	1
EL VIEJO	78	1	1	1	1	1	1	1	1	1	1
SIUNA	79	1	1	1	1	1	1	1	1	1	1
PUERTO MORAZAN	80	1	1	1	1	1	1	1	1	1	1
SOMOTILLO	81	1	1	1	1	1	1	1	1	1	1
BLUEFIELDS	82	1	1	1	1	1	1	1	1	1	1
MORRITO	83	8	8	8	8	8	7	7	6	5	5

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
SAN CARLOS	84	9	8	8	8	8	7	7	6	5	5
STO TOMAS NORTE	85	10	9	9	9	9	8	8	7	6	6
CINCO PINOS	86	4	4	4	4	4	1	1	1	1	1
SN PEDRO NORTE	87	11	10	10	10	10	9	9	8	7	7
SN FRANCISCO NORTE	88	1	1	1	1	1	1	1	1	1	1
TOTOGALPA	89	3	3	3	3	3	3	3	3	2	2
S JOSE CUSMAPA	90	2	2	2	2	2	2	2	2	2	2
COMALAPA	91	1	1	1	1	1	1	1	1	1	1
SAN LORENZO	92	1	1	1	1	1	1	1	1	1	1
LA CRUZ R GRANDE	93	1	1	1	1	1	1	1	1	1	1
KUKRA HILL	94	1	1	1	1	1	1	1	1	1	1
LAGUNA DE PERLAS	95	1	1	1	1	1	1	1	1	1	1
CORN ISLAND	96	12	11	11	11	11	10	10	9	8	8
SAN MIGUELITO	97	13	12	12	12	12	11	11	10	9	9
EL CASTILLO	98	8	8	8	8	8	7	7	6	5	5
VILLANUEVA	99	1	1	1	1	1	1	1	1	1	1
EL REALEJO	100	1	1	1	1	1	1	1	1	1	1
CORINTO	101	14	13	11	11	11	10	10	9	8	8
CHICHIGALPA	102	1	1	1	1	1	1	1	1	1	1
POSOLTEGA	103	1	1	1	1	1	1	1	1	1	1
MANAGUA	104	15	14	13	13	13	12	12	11	10	10
SN FRANCISCO LIBRE	105	16	15	14	14	14	13	13	12	11	11
MATEARE	106	16	15	14	14	14	13	13	12	11	11
VILLA CARLOS FONSECA	107	16	15	14	14	14	13	13	12	11	11
SN RAFAEL DEL SUR	108	16	15	14	14	14	13	13	12	11	11
TIPITAPA	109	16	15	14	14	14	13	13	12	11	11
TICUANTEPE	110	17	16	15	14	14	13	13	12	11	11
GRANADA	111	1	1	1	1	1	1	1	1	1	1
DIRIA	112	14	13	11	11	11	10	10	9	8	8
DIRIOMO	113	14	13	11	11	11	10	10	9	8	8
NANDAIME	114	1	1	1	1	1	1	1	1	1	1
MASAYA	115	12	11	11	11	11	10	10	9	8	8
LA CONCEPCION	116	18	17	16	15	15	14	14	13	12	8
NINDIRI	117	1	1	1	1	1	1	1	1	1	1
TISMA	118	1	1	1	1	1	1	1	1	1	1
MASATEPE	119	18	17	16	15	15	14	14	13	12	8
NANDASMO	120	14	13	11	11	11	10	10	9	8	8
CATARINA	121	19	18	17	16	16	15	14	13	12	8
NIQUINHOMO	122	18	17	16	15	15	14	14	13	12	8
SN JUAN ORIENTE	123	1	1	1	1	1	1	1	1	1	1
JINOTEPE	124	1	1	1	1	1	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\*\*\*\*\* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \*\*\*\*\*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
SAN MARCOS	125	1	1	1	1	1	1	1	1	1	1
DIRIAMBA	126	1	1	1	1	1	1	1	1	1	1
DOLORES	127	20	19	18	17	9	8	8	7	6	6
EL ROSARIO	128	18	17	16	15	15	14	14	13	12	8
LA PAZ DE CARAZO	129	18	17	16	15	15	14	14	13	12	8
SANTA TERESA	130	1	1	1	1	1	1	1	1	1	1
LA CONQUISTA	131	1	1	1	1	1	1	1	1	1	1
RIVAS	132	1	1	1	1	1	1	1	1	1	1
TOLA	133	1	1	1	1	1	1	1	1	1	1
POTOSI	134	1	1	1	1	1	1	1	1	1	1
BUENOS AIRES	135	1	1	1	1	1	1	1	1	1	1
BELEN	136	1	1	1	1	1	1	1	1	1	1
SAN JORGE	137	18	17	16	15	15	14	14	13	12	8
SN JUAN DEL SUR	138	1	1	1	1	1	1	1	1	1	1
CARDENAS	139	1	1	1	1	1	1	1	1	1	1
MOYOGALPA	140	1	1	1	1	1	1	1	1	1	1
ALTAGRACIA	141	1	1	1	1	1	1	1	1	1	1

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

Selected Variables

Cluster Membership of Cases using Average Linkage (Between Groups)

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
ACOYAPA	1	1	1	1	1	1	1	1	1	1	1
CUA-BOCAY	2	2	2	2	2	2	2	2	2	2	2
CAMOAPA	3	2	2	2	2	2	2	2	2	2	2
DARIO	4	3	3	2	2	2	2	2	2	2	2
EL ALMENDRO	5	2	2	2	2	2	2	2	2	2	2
LEON	6	4	4	3	3	3	3	3	3	3	3
EL JICARO	7	5	5	4	4	4	4	4	1	1	1
EL RAMA	8	2	2	2	2	2	2	2	2	2	2
ESQUIPULAS	9	6	6	5	5	5	5	5	4	4	4
ESTELI	10	4	4	3	3	3	3	3	3	3	3
JALAPA	11	7	7	6	6	6	6	5	4	4	4
JINOTEGA	12	3	3	2	2	2	2	2	2	2	2
JUIGALPA	13	4	4	3	3	3	3	3	3	3	3
LA CONCORDIA	14	3	3	2	2	2	2	2	2	2	2
TUMA-LA DALIA	15	2	2	2	2	2	2	2	2	2	2
LA LIBERTAD	16	2	2	2	2	2	2	2	2	2	2
LA TRINIDAD	17	5	5	4	4	4	4	4	1	1	1
MATAGALPA	18	4	4	3	3	3	3	3	3	3	3
MATIGUAS	19	2	2	2	2	2	2	2	2	2	2
MUELLE DE LOS BUEYES	20	2	2	2	2	2	2	2	2	2	2
MURRA	21	8	8	7	7	7	7	7	2	2	2
MUY MUY	22	6	6	5	5	5	5	5	4	4	4
NUEVA GUINEA	23	3	3	2	2	2	2	2	2	2	2
PANTASMA	24	9	6	5	5	5	5	5	4	4	4
RANCHO GRANDE	25	2	2	2	2	2	2	2	2	2	2
RIO BLANCO	26	2	2	2	2	2	2	2	2	2	2
SAN DIONISIO	27	2	2	2	2	2	2	2	2	2	2
SAN ISIDRO	28	6	6	5	5	5	5	5	4	4	4
SAN JUAN DE RIO COCO	29	7	7	6	6	6	6	5	4	4	4
SAN PEDRO LOVAGO	30	10	9	8	8	8	7	6	5	5	5
SAN RAFAEL NORTE	31	2	2	2	2	2	2	2	2	2	2
SAN RAMON	32	6	6	5	5	5	5	5	4	4	4
SANTA MARIA	33	6	6	5	5	5	5	5	4	4	4
SANTO DOMINGO	34	2	2	2	2	2	2	2	2	2	2
SEBACO	35	4	4	3	3	3	3	3	3	3	3
TERRABONA	36	3	3	2	2	2	2	2	2	2	2
VILLA SANDINO	37	3	3	2	2	2	2	2	2	2	2
WASLALA	38	8	8	7	7	7	7	2	2	2	2
WIWILI	39	8	8	7	7	7	7	2	2	2	2
YALI	40	9	6	5	5	5	5	5	4	4	4
SAN NICOLAS	41	11	10	9	9	9	8	7	6	6	1
DIPILTO	42	7	7	6	6	6	6	5	4	4	4

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\*\*\*\*\* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \*\*\*\*\*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
SAN LUCAS	43	5	5	4	4	4	4	4	1	1	1
QUILALI	44	9	6	5	5	5	5	5	4	4	4
SOMOTO	45	5	5	4	4	4	4	4	1	1	1
PALACAGUINA	46	6	6	5	5	5	5	5	4	4	4
SAN FERNANDO	47	3	3	2	2	2	2	2	2	2	2
PUEBLO NUEVO	48	5	5	4	4	4	4	4	1	1	1
BOCANA PAJWAS	49	2	2	2	2	2	2	2	2	2	2
CONDEGA	50	5	5	4	4	4	4	4	1	1	1
TELPANECA	51	3	3	2	2	2	2	2	2	2	2
STO TOMAS	52	4	4	3	3	3	3	3	3	3	3
S J REMATES	53	11	10	9	9	9	8	7	6	6	1
MACUELIZO	54	12	11	10	10	6	6	5	4	4	4
CIUDAD ANTIGUA	55	6	6	5	5	5	5	5	4	4	4
LAS SABANAS	56	7	7	6	6	6	6	5	4	4	4
BOACO	57	6	6	5	5	5	5	5	4	4	4
STA. LUCIA	58	11	10	9	9	9	8	7	6	6	1
QUEZALGUAQUE	59	3	3	2	2	2	2	2	2	2	2
TELICA	60	6	6	5	5	5	5	5	4	4	4
TEUSTEPE	61	13	12	11	11	10	9	8	7	7	6
LARREYNAGA	62	3	3	2	2	2	2	2	2	2	2
S.J LIMAY	63	1	1	1	1	1	1	1	1	1	1
MOZONTE	64	6	6	5	5	5	5	5	4	4	4
YALAGUINA	65	5	5	4	4	4	4	4	1	1	1
OCOTAL	66	4	4	3	3	3	3	3	3	3	3
EL SAUCE	67	1	1	1	1	1	1	1	1	1	1
ACHUAPA	68	11	10	9	9	9	8	7	6	6	1
STA ROSA PEÑON	69	1	1	1	1	1	1	1	1	1	1
EL JICARAL	70	12	11	10	10	6	6	5	4	4	4
LA PAZ CENTRO	71	7	7	6	6	6	6	5	4	4	4
NAGAROTE	72	4	4	3	3	3	3	3	3	3	3
CHINANDEGA	73	4	4	3	3	3	3	3	3	3	3
PUERTO CABEZAS	74	7	7	6	6	6	6	5	4	4	4
WASPAN	75	14	13	12	12	11	10	9	8	8	7
ROSITA	76	3	3	2	2	2	2	2	2	2	2
BONANZA	77	7	7	6	6	6	6	5	4	4	4
EL VIEJO	78	4	4	3	3	3	3	3	3	3	3
SIUNA	79	8	8	7	7	7	2	2	2	2	2
PUERTO MORAZAN	80	5	5	4	4	4	4	4	1	1	1
SCMOTILLO	81	1	1	1	1	1	1	1	1	1	1
BLUEFIELDS	82	4	4	3	3	3	3	3	3	3	3
MORRITO	83	8	8	7	7	7	2	2	2	2	2

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
SAN CARLOS	84	15	14	13	13	12	11	10	9	9	8
STO TOMAS NORTE	85	16	15	14	11	10	9	8	7	7	6
CINCO PINOS	86	16	15	14	11	10	9	8	7	7	6
SN PEDRO NORTE	87	1	1	1	1	1	1	1	1	1	1
SN FRANCISCO NORTE	88	13	12	11	11	10	9	8	7	7	6
TOTOGALPA	89	3	3	2	2	2	2	2	2	2	2
S JOSE CUSMAPA	90	6	6	5	5	5	5	5	4	4	4
COMALAPA	91	11	10	9	9	9	8	7	6	6	1
SAN LORENZO	92	6	6	5	5	5	5	5	4	4	4
LA CRUZ R GRANDE	93	10	9	8	8	8	7	6	5	5	5
KUKRA HILL	94	2	2	2	2	2	2	2	2	2	2
LAGUNA DE PERLAS	95	17	16	15	14	13	12	11	10	10	9
CORN ISLAND	96	18	17	16	15	14	13	12	11	11	10
SAN MIGUELITO	97	1	1	1	1	1	1	1	1	1	1
EL CASTILLO	98	19	18	17	16	15	14	13	12	12	11
VILLANUEVA	99	1	1	1	1	1	1	1	1	1	1
EL REALEJO	100	4	4	3	3	3	3	3	3	3	3
CORINTO	101	4	4	3	3	3	3	3	3	3	3
CHICHIGALPA	102	7	7	6	6	6	6	5	4	4	4
POSOLTEGA	103	3	3	2	2	2	2	2	2	2	2
MANAGUA	104	4	4	3	3	3	3	3	3	3	3
SN FRANCISCO LIBRE	105	20	19	18	17	16	15	14	13	9	8
MATEARE	106	7	7	6	6	6	6	5	4	4	4
VILLA CARLOS FONSECA	107	5	5	4	4	4	4	4	1	1	1
SN RAFAEL DEL SUR	108	6	6	5	5	5	5	5	4	4	4
TIPITAPA	109	6	6	5	5	5	5	5	4	4	4
TICUANTEPE	110	4	4	3	3	3	3	3	3	3	3
GRANADA	111	4	4	3	3	3	3	3	3	3	3
DIRIA	112	3	3	2	2	2	2	2	2	2	2
DIRIOMO	113	7	7	6	6	6	6	5	4	4	4
NANDAIME	114	6	6	5	5	5	5	5	4	4	4
MASAYA	115	4	4	3	3	3	3	3	3	3	3
LA CONCEPCION	116	6	6	5	5	5	5	5	4	4	4
NINDIRI	117	4	4	3	3	3	3	3	3	3	3
TISMA	118	4	4	3	3	3	3	3	3	3	3
MASATEPE	119	4	4	3	3	3	3	3	3	3	3
NANDASMO	120	7	7	6	6	6	6	5	4	4	4
CATARINA	121	4	4	3	3	3	3	3	3	3	3
NIQUINHOMO	122	4	4	3	3	3	3	3	3	3	3
SN JUAN ORIENTE	123	6	6	5	5	5	5	5	4	4	4
JINOTEPE	124	4	4	3	3	3	3	3	3	3	3

Nicaragua Poverty Comparisons Based on Relative Access to Social Services by Municipalities

\* \* \* \* \* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \* \* \* \* \*

Cluster Membership of Cases using Average Linkage (Between Groups) (CONT )

Label	Case	Number of Clusters									
		20	19	18	17	16	15	14	13	12	11
SAN MARCOS	125	4	4	3	3	3	3	3	3	3	3
DIRIAMBÁ	126	4	4	3	3	3	3	3	3	3	3
DOLORES	127	4	4	3	3	3	3	3	3	3	3
EL ROSARIO	128	4	4	3	3	3	3	3	3	3	3
LA PAZ DE CARAZO	129	2	2	2	2	2	2	2	2	2	2
SANTA TERESA	130	1	1	1	1	1	1	1	1	1	1
LA CONQUISTA	131	11	10	9	9	9	8	7	6	6	1
RIVAS	132	4	4	3	3	3	3	3	3	3	3
TOLA	133	9	6	5	5	5	5	5	4	4	4
POTOSI	134	4	4	3	3	3	3	3	3	3	3
BUENOS AIRES	135	11	10	9	9	9	8	7	6	6	1
BELEN	136	3	3	2	2	2	2	2	2	2	2
SAN JORGE	137	4	4	3	3	3	3	3	3	3	3
SN JUAN DEL SUR	138	4	4	3	3	3	3	3	3	3	3
CARDENAS	139	3	3	2	2	2	2	2	2	2	2
MOYOGALPA	140	9	6	5	5	5	5	5	4	4	4
ALTAGRACIA	141	7	7	6	6	6	6	5	4	4	4

TABLE A-4

\*\*\*\*\* H I E R A R C H I C A L C L U S T E R A N A L Y S I S \*\*\*\*\*

Cluster Membership of Cases using Average Linkage (Between Groups)

Label	Number of Clusters									
	12	11	10	9	8	7	6	5	4	3
Wells	1	1	1	1	1	1	1	1	1	1
Home Water	2	2	2	2	2	2	2	2	2	2
Home sewer	2	2	2	2	2	2	2	2	2	2
Pres.Stud/Teach	3	3	3	3	3	1	1	1	1	1
Water Posts	4	4	4	4	4	3	2	2	2	2
Prim Stud/Teach	3	3	3	3	3	1	1	1	1	1
Prim. School Enrol	5	5	5	5	5	4	3	3	2	2
Health Center	6	6	1	1	1	1	1	1	1	1
Density	2	2	2	2	2	2	2	2	2	2
Child Malnut	7	7	6	6	6	5	4	4	3	1
Home Electricity	2	2	2	2	2	2	2	2	2	2
Livestock	5	5	5	5	5	4	3	3	2	2
War	8	8	7	2	2	2	2	2	2	2
Home Ceowding	9	9	8	7	4	3	2	2	2	2
Hospitals	10	10	9	8	7	6	5	5	4	3
Home Latrines	11	8	7	2	2	2	2	2	2	2
Medical Posts	12	11	10	9	8	7	6	5	4	3
Agr. Producers	8	8	7	2	2	2	2	2	2	2
Health Posts	9	9	8	7	4	3	2	2	2	2
Soc Sec. Ins	9	9	8	7	4	3	2	2	2	2
Home Telephone	2	2	2	2	2	2	2	2	2	2