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PLANNED LAND USE CONTRIBUTIONS TO POPULATION REDISTRIBUTION AND COMMUNITY DEVELOPMENT: THE APPLICATION OF A MID-MICHIGAN MODEL TO LAND DEVELOPMENT POLICY IN EGYPT

By

Salama Ahmed El-Shawaf

A DISSERTATION

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Resource Development

ABSTRACT

PLANNED LAND USE CONTRIBUTIONS TO POPULATION REDISTRIBUTION AND COMMUNITY DEVELOPMENT: THE APPLICATION OF A MID-MICHIGAN MODEL TO LAND DEVELOPMENT POLICY IN EGYPT

By

Salama Ahmed El-Shawaf

Problems of population growth and mobility are among the major issues that confront the developing nations and the developed ones as well. They adversely affect economic and social development, and they underline problems of economic stagnation and social unrest.

Land is the basic resource for the support of human settlements. The uses of land represent a fundamental allocation of resources among differing groups and communities within a society. Patterns of land usage can constrain or facilitate the adoption of community structure to changing human requirements. This study examines the relationships of land use patterns to population redistribution and community change so as to elucidate the potential roles for land use planning as a tool for guiding community development.

The study begins with a wide ranging review of the literature relating to land use planning, population redistribution, community change, and the maintenance of a desired quality of life for community members. Special emphasis was placed upon theories and empirical studies that might suggest how developing countries can achieve a better balance between scarce land resources and growing populations.

An empirical model was developed to examine how land use factors were related to population redistribution in Mid-Michigan between 1960 and 1970. The sample selected was a purposive sample of 21 counties clustered around a new north-south highway, US 27 and Interstate 75. Six dependant variables were examined: total population changes, net migration of older persons, changes in permanent housing, changes in total 1970 seasonal housing, rent values, and man-land ratios. The independant variables employed included: presence of major highways, recreational facilities, land area in transportation, forest, and water uses, distance from metropolitan areas, and the presence of industrial establishments in the study cluster.

Both bivariate correlations and multiple regression analysis models were employed. The principle findings were that planned land use factors were extreemly helpful in explaining differential population redistribution within the study cluster. Population changes were strongly related to the joint contribution of the mentioned land use factors (multiple R^2 greater than 80 percent). Older migrants moved selectively to places that provide higher quality of life far from larger communities and industrial disturbance, close to major highways and recreational facilities with access to public water sites and open space. The increase in houses built was associated with these land use features. Seasonal houses were found more in counties that have access to public waters and recreational facilities.

The Mid-Michigan model made the point that within a particular cultural and geographic setting, there are dependable relationships between land use and population redistribution. Planners and researchers could use this knowledge in order to facilitate control of development in the service of explict goals for population redistribution, and community change.

Using the insights of the literature review and the Mid-Michigan model, the study moved to a critical review of land use developments in Egypt since the building of the High Dam. This evaluative review pointed out the major deficiences and strengths in programs for the agricultural lands and the reclaimed lands. The resettlement efforts are reviewed as examplified in a case study of the Abis sector. It was concluded that the potential land use contribution to resettlement in Egypt would be similar to those described in Michigan if careful intention was given to improved roads, recreational facilities, infrastructure, and balanced distribution of the utilities and services. The differences in land use interests and concerns were obvious in both locations.

A number of recommendations were then made to foster land use planning and development in Egypt. These include: (a) adoption of a sound land use development policy in the short and long term plans, (b) more attention to family planning efforts, (c) provision of an efficient network of major roads, and (d) adoption of urban policies that encourage population and urban controls. It was also recommended that Egypt develops new areas in the deserts, implement a program for rural housing, and find a regional development approach for the Arab States.

This can reduce waste, promote efficient and economic utilization of facilities and foster the conservation of natural resources for a longer span of time.

DEDICATION

- I dedicate this effort with affection and gratitude to:-
 - 1. The tolerance and forbearance of my wife Fatma, and my children: Iman, Inas, and Islam, who during my period of study sacrified life under a unified family roof, and divided their emotions among their home land, <u>Egypt</u>, where their relatives were left behind; <u>Saudi Arabia</u>, where parents were employed, and the <u>United States of</u> <u>America</u>, where I sought new knowledge. With the completion of this project, we shall return to the happiness of living as an integrated family again.
 - My parents who triggered in me the flame of challenge and self-independence since the very beginning years of my age.
 - 3. Egypt, my beloved country, which has been the source of so many new developmental practices among the Arab States.

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Dr. Peter Gladhart, my dissertation director, gave my work substantial time and profound thought from the beginning till the last line. I really appreciate his methodological expertise, his sensitive directions, and his willingness and support during the dissertation: research, writing, and reviewing. The extended time contribution of Dr. Gladhart at personal cost enabled me to fulfil my goals as early as possible. I will remain indebted to him.

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Professor William Kimball provided me with essential publications, enabled me to join special training courses, conferences, and field trips in my area of interest. Dr. James Zuiches, and Professor Keith Honey were of great kindness and help as instructors and minor fields supervisors.

This study is developed from the Michigan Ag. Exp. St. Research Project No. 1161 titled "Impacts of Rapid Population Growth on Housing and Public Services in a Rural Community." The analysis was facilitated by an assistantship in the Department of Family Ecology. I am grateful for this support and guidance.

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CHAPTER I

PROBLEM PERSPECTIVE

INTRODUCTION

Problems of population growth and residential mobility are among the major issues that confront the developing nations and the developed ones as well. They adversely affect economic and social development, and they underlie the problems of economic stagnation, massive unemployment, hunger, disease, and political unrest.

A key issue in formulating residential policies is how to arrive at rates of growth that are optimal for the needs and limitations of local communities, and at the same time, avoid undesired methods which result in personal hardships and the loss of individual freedom.

Recent experience has shown that reliance on familyplanning alone is not adequate to counter rapid gr' wth trends, inspite of its significant advantages.

One feels that along with intensive efforts to develop resources and curb the rapid growth of population--we greatly need workable land use planning and utilization policies that would control the growth, lessen mobility and increase urban-rural stability.

This study is intended to introduce, describe, and analyze the relation between a set of selected predicting

variables that represent some patterns of planned land uses-and some dependent variables that express residential redistribution and mobility in terms of: population increases; mobility of old people; housing construction for permanent and seasonal uses and changes of man-land ratios during the 1960-1970 period. The analysis is based on a rectangular cluster of counties within Mid-Michigan. Using the Michigan model as a frame of reference, the results are extended (in a form of evaluative analysis) to the new settlements established on the land reclaimed after the building of the High Dam in Egypt to see how she might benefit from Michigan's experience.

The central area of Michigan's Lower Peninsula has changed, grown and prospered during the last decade. "The once forested and rural environment was invaded by intensive urban development, accelerated population growth, expanding industrialization, and concentration of urban patterns. It is also noticed that many counties with a long history of out-migration had in-migration during the 1960's."⁽¹⁾ The selected area of study is an example: of the 21 counties in this cluster, 20 gained and one lost population through natural increases and 17 gained and four lost through migration in the 1960's.

⁽¹⁾ J. Allen Beegle, <u>Population Growth and Redistribution</u> (Michigan Agr. Exper. Sta., Research Report 150, E. Lansing 1971).

Recent data from the Bureau of Census (July 1972) shows that population growth is 3.1 percent in nonmetro areas and 2.2 percent in metro areas. That is to say, more rapid growth in metro than nonmetro areas is no longer the case, as it was before. Employment data shows a similar growth trend: from March 1970 to March 1973, an increase of 7.8 percent in nonmetro-politan area jobs and 3.6 percent in metropolitan areas has occurred.⁽²⁾

Evidence of accelerated population growth and inmigration to rural areas alerts us to the questionable validity of the classical doctrines of economies of scale and advantages of concentration of metropolitan growth. It also alerts us to investigate the reasons behind that residential change.

There are at least two alternative explanations for these new trends:

- The fear of urban problems and their costs (push factors) such as: crime; pollution; traffic; cost of living; labor rigidities; etc. may be behind this mobility trend.
- This trend of residential migration could also be the result of other <u>factors of planned land uses</u>

⁽²⁾ Calvin Beale, "Rural Development, Population, and Settlement" Journal of Soil & Water Conservation, Jan. 1974 (article)

(pull factors) such as: the extension of highways and improved roads; the recreational potentialities; the environmental attraction of open spaces, the housing and rental values; the distance of growing communities from metro areas; the presence of industrial and commercial locations as dynamicurban economic centers; etc. To the extent that this second explanation is valid, then, the information may be used as a tool which serves both to encourage and discourage the development of local communities and to direct and control mobility and growth.

Since, in the judgment of the author, the first explanation has been the object of a sufficient number of deliberate studies, our interest should therefore now be directed to investigate further the second explanation.

Despite the complexity, uncertainty, and interdependence surrounding the use of resources on various levels, one is convinced that there is an increase in the amount of citizen involvement in the land use planning process in Michigan. The evidences can be seen through the nature and extent of citizen participation and review, the permits required for public and private actions, and the opportunity to challenge actions taken by public agencies and groups in court and appeals mechanisms. Also on the increase are program and performance evaluations and reporting.

As Vlasin put it⁽³⁾ "we are seeing the growth of single and multiple-purpose planning bodies at the local and substate regional level covering a variety of different land uses--recreation sites, waste disposal sites, urban expansion areas, highway and utility corridors, shorelands, flood plains and much more. We are seeing demands for local participation run the gamut from decisions about soil and water planning and stream management to comprehensive community and regional decisions about the quality of life. There is an increase in the public and private agencies and groups that are interested in some form of development-residential, commercial, industrial, recreational or speculative developments, community and regional development, rural development, and public services all of which require or influence land use."

All these considerations strengthen the assumption that the aspects of land use involved in this study receive much care and undergo thoughtful measures of planning, which facilitate access to their use and ease their influence in the field of residential development.

The following data provide a clear proof of the attitude toward planning before and during the study period:

⁽³⁾ Raymond Vlasin, "Future Dimensions of Resource Data," (Paper presented to State Conservationists Meeting, Kansas City, Missouri Sept. 12, 1976).

1).	County Planning Organizations in Michigan, Jul	у
	1969 were as follows:- ⁽⁴⁾	
	- C.P. Commissions pursuant	<u>No.</u>
	to Act 282, P.A. 1945	63
	- Regional P.C. pursuant	
	to Act 281, P.A. 1945	7
	- C.P. Commissions pursuant	
	to Act 285, P.A. 1931	1
2).	Township Planning Organizations in Michigan,	
	July 1969 were:-(5)	
	- Rural Twnp. Planning Act,	
	Act 168, P.A. 1959	197
	- Municipal Planning Com. Act,	
	Act 285, P.A. 1931	11
3).	State Planning and Development Regions were	
	13 regions untill 1970 (one more region was	
	added later to bring the total regions into	
	14). ⁽⁶⁾	
4).	Planning studies since 1963 as reported in	
	July 1969 were as shown in Table 1. ⁽⁷⁾	

⁽⁴⁾Michigan State, Bureau of Policies & Programs, <u>State-</u> wide Inventory of Community & Area Planning in Michigan, 1970, Techn. Report A-332, p. 5.

(5)_{Ibid., p. 7.}

(6) Resource Development Department and State of Michigan Planning Division, <u>Michigan Planning & Zoning</u> <u>Survey</u> 1972, Appendix A.

(7) Michigan State, <u>Statewide</u>, op. cit., p. 13.

	Number by Unit of Local Government			
Study Category	County	Township	Cities	Villages
Population	49	127	134	40
Economic Base	46	114	119	37
Existing Land Use	52	169	145	34
Transportation Circulation	35	93	122	37
Public Facilities Utilities	34	125	120	33
Housing	25	66	110	23
Education Schools	32	59	82	18
Recreation	44	85	106	21
Future Land Use	33	109	129	23
Water Quality	22	42	58	22
Zoning	33	171	150	48
Subdivision Control	19	74	105	26
Building Control	9	83	80	29
Capital Improvement	12	42	103	21

Table 1.Summary of Planning Studies Initiated or
Completed Since 1963 July, 1969. (in Michigan)

During the period 1960-1970, these factors of planned land use were behind the in-migrant growth within and between Mid-Michigan's counties, and they may continue to shape and direct the development in the study cluster. Therefore acceptable policies and standards should take these aspects into consideration to keep the equilibrium between available resources and the demands of growth.

The land use factors that could influence mobility are many, and it is difficult to investigate all of them in a single research effort. The purpose of this study is to examine some of the various factors that contribute to the vast urban-rural, and rural-urban mobility in the central counties of Northern Lower Michigan.

The issue then - is <u>urgent</u> and important when we see the increasing consumption of resources, it is <u>pervasive</u> in its dimension, and it is <u>complex</u>.

STATEMENT OF THE PROBLEM

The boundaries of this study statement can be summarized to determine if planned land use factors, in terms of highways and improved roads, the recreational facilities, the environmental attraction of the inland water and open space, the acceptable land rent values, the desired distance from cities and civil units, the presence of moderate sized industrial establishments, and other planned land use features (collectively or individually) contribute much to the massive change in population taking place within the Mid-Michigan Counties. In addition, these factors can be used to exert pressure in the distribution and reallocation of residents through planning, administrative, and guidance processes (these processes can take the form of zoning,

carrying capacity standards, municipal controls, or influence by local leaders). Land development programs in Egypt, in order to counter the rapid trends of population growth and offer optimum stability among local communities should realize and adopt land-use planning measures.

Keeping in mind the differences in cultural, locational, and potential considerations, yet the Mid-Michigan experience in this respect can benefit and enrich the land development efforts taking place in Egypt and provide a practical and complementary solution for such a heavily-populated country.

It is apparent, in short, that such planned land use measures and determinants are useful tools that man can apply to direct and control the socio-economic changes in local communities, they are also very important tools with which to evaluate community resources (natural, man-made, and human) and to map or prepare information about the various uses of land and the characteristics of its occupants.

Land use factors, therefore, work to graphically portray existing developments at a given time and represent a static view of what already exists.

Using some determinant of the land uses, we can act to:

- influence the residential mobility,
- distribute services,
- apply development plans,
- foresee the shape of the future in the light of the

previous and present situations,

- direct and control changes as desirable.

STUDY OBJECTIVES

One of the important aims of this study is to develop a general model of the land use factors that are essential to the development of local communities in a given period of time. Such a model must be scientifically pursued regardless of its ability or disability to counter the problem under consideration. As Ackoff put it "the method is to develop more effective procedures for answering questions and solving problems. It concentrates on the process which generates knowledge rather than on the knowledge itself."⁽⁸⁾

In addition to this overall objective that goes with every research study and involves description, explanation, and exploration of the topic in order not to overlook any of its components, the primary and secondary (or specific and general) objectives are to provide useful and organized principles for the design. Therefore, we can deal with two sets of specific and general objectives:

- 1). The primary objectives are to:
 - a. Test the positive and negative effects of some land use factors on the population and residential mobility.

⁽⁸⁾Russell Ackoff, et al Scientific Method (New York: John Wiley, 1962) p. 1.

- b. Determine which of the land use factors are more directly related than others to the residential mobility and growth of the population.
- c. Discover the limitations that hinder the optimum utilization of such factors over time and space for the benefit of the development process.
- d. Develop a modified model or frame of reference that may benefit other less developed nations.
- e. Generate interest--in this area of emphasis-among local citizens, immediate officials, and specialists concerned with planning and decisionmaking.
- 2). The secondary objectives are to:
 - Acknowledge the role of various land use factors that affect relationships in different sectors of the community and bind them together.
 - b. Develop a conceptual model process from the overall situation as a test of the integration approach.
 - c. Estimate the situational potentialities of land use interests on a different level of development.
 - d. Develop alternative procedures that may curb the undesired growth.
 - e. Develop a record file of the situation as it was during the 1960-1970 period.

f. Reach a kind of evaluative index or frame of reference that can help the cross-cultural comparison in similar situations and future developments.

HYPOTHESES OF THE STUDY

The local developments, accelerated growth of population, and rapid residential mobility in the Mid-Michigan Counties may be due to one or more of the following aspects:

- 1). Improved transportation system (in terms of road construction).
- 2). Development of recreational facilities and potentialities (with respect to water resources).
- Open space as an environmental attraction to older people.
- 4). Locational preferences between metro and non-metropolitan areas and the presence of moderate-sized civil units in the area.
- 5). Establishment of manufacturing plants that create jobs on a moderate scale.
- 6). Access to housing, and their current prevailing rental values.
- 7). Availability of land resources in terms of low man-land ratios.
- 8). An overall hypothesis that could be derived from the above assumptions is that the control over these aspects would result in the rationalization and guidance

of the local developments and growth to the extent that they could serve the interest of resource conservation and environmental protection and quality. This overall assumption will act as the corner stone in the last portion of this research when we deal with the new developments taking place on the land reclaimed after the building of the High Dam on the Nile River. Inasmuch as it is difficult to completely investigate all the components implied by these hypotheses, therefore the analysis of one or more specific aspects of each assumption may serve our purpose.

SOME DEFINITIONS

Mobility of residents

This is a complex phenomenon that takes into consideration the past geographic or spatial mobility and movement of the people, temporary relocation for work, desires to move, plans to move, mobility of particular groups (related to social background and status), distance moved, number of times moved, place of origin and destination, local population density, geography, rural-urban localities, reasons of moves, mobility rates from one place to another, etc.⁽⁹⁾

⁽⁹⁾ John Lansing and Eva Mueller, <u>The Geographic</u> <u>Mobility of Labor</u> (Ann Arbor, Mich.: Institute for Social Research, 1967) p. 11.

Labor market boundaries, migration boundaries, and political boundaries

A labor market is an area with indistinct geographical and occupational limits within which certain workers customarily offer their services and certain employers purchase them.⁽¹⁰⁾ Fixed boundaries may not coincide exactly with economic reality. Improved transportation and highways tend to extend these boundaries. Migration includes all moves across county lines (political boundaries) and even moves between counties in the same metropolitan area. This may be a mere change in location of residence without a change in place of employment. Political boundaries are the administrative lines. The county is the political unit employed in this study.

Major determinants of land use

Those determinants are the economic values, the social and institutional values, the public interest and the physical nature of land. The pattern of use in any given situation is a resultant of all these in context. Once a pattern of use is developed it can be labeled under a suitable category and hence can be identified as agriculture, residential, open space, etc.. These developed patterns of use can--in turn--determine, encourage, or discourage the

(10) Ibid., p. 12.

migration, growth, and settlement, as we will see in this study.⁽¹¹⁾

Definition of land and inland water

There are situations where it is difficult to determine if a particular area is land or water (i.e., swamps, tidal flats, marshes, etc.) There is no clear line, but a gradation, between land and water areas depending on runoff in a particular season, and the changing character of the area. (12)

Water bodies of less than 40 acres and/or less than 1/8 mile wide are considered as land areas. Larger bodies are defined as inland waters. Land includes all attributes of a site such as climate, topography, etc., at a defined point in time.

Man's activities on, under, or over land

This means activities that make use of land. The land activities that are most often used and accepted are: agricultural, residential, recreation, manufacturing, forestry and trade.⁽¹³⁾

The combination of uses makes classification complex, but the dominant uses and the obvious activities on the

⁽¹³⁾Ibid., p. 12-16.

⁽¹¹⁾ F. Stuart Chapin, <u>Urban Land Use Planning</u> (Chicago: Univ. of Illinois Press, 1972), pp. 7-68.

⁽¹²⁾ Marion Clawson and Charles Stewart, <u>Land Use</u> <u>Information</u> (Baltimore, Md.: The Johns Hopkins Press, 1965) pp. 12-16.

surface are more important. Some below ground activities (water, sewer, telephone, electric and other lines) generate greater values in the land. Some activities are not equally apparent or obvious. We may include in the classification of land the current observable results and not the basic causal factors of such results.

We should note that "activity on land is a common ground for many interests. The relevant natural qualities of land depend almost entirely upon the activity to be carried out upon the land, improvement of land likewise depends very largely upon the kind of activity, the measure of intensity depends also upon the activity."⁽¹⁴⁾ Zoning:

Zoning implies the authority to classify land according to its suitability, to enforce a permitted classification, and to restrict development to suitable purposes.

Zoning in rural areas has been more in terms of preventing use of certain kinds. It would prevent the uses (such as excessive urban sprawl) that create burdens for schools, roads, local administration and services, and would interfere with the use of the region as a whole.⁽¹⁵⁾

(14) Ibid., p. 4. (15) Ibid., p. 65.

Migration

Migration is a form of geographic or spatial mobility involving change of usual residence between clearly defined geographic units.⁽¹⁶⁾ The sociologist is concerned with the social effects on the migrant and on the population of the receiving and sending areas and their acculturation and adjustment. The economist is concerned with business activities, labor supply and industrial growth. On the international level there is immigration (movement into a country) and emigration (movement out of a country), when this occurs on the intra-national level we determine inmigrant and out-migrant with respect to area of destination and area of origin.⁽¹⁷⁾

Settlement

This is a social process that follows migration and aims at improving the conditions of the migrant's life. The natural qualities of land:

These may be independent of man or man influenced. Natural land, without improvements, has limited value to modern man. The improvement leads to an intensity of land use. Land without intensive use may be vacant land. Other definitions with computation are reserved to chapter IV.

⁽¹⁶⁾USDC; The Methods and Materials of Demography, V. 2, Gov't Printing Office, Washington, D.C., 1975, p. 579. (17)Ibid., p. 618.

CHAPTER II

PLAN AND METHODOLOGY

TYPE OF THE STUDY DESIGN

The basic design of a survey, as Babbie mentioned, "can be modified in a variety of ways to meet the particular requirements of a given study....that means, different research problems call for different designs. Whenever the research problem involves an examination of individual change over time a <u>panel</u> survey would be the most appropriate design... If the process of change occurs during a relatively short period, the researcher will be forced to rely on <u>cross-sectional</u> data to make his inferences."⁽¹⁾ Or we may be interested in the overall changes and find that already gathered information <u>fitting to the study</u> can provide the needs of the design.

The best studies are often those that "combine more than one design to provide a different perspective on the subject without complexity."⁽²⁾ That is to say this research will involve the <u>pure</u> and <u>applied</u> qualities. It will take the pure approach when it tries to answer some

⁽¹⁾Earl Babbie, <u>Survey Research Methods</u> (Belmont, Calif.: Wadsworth Com., 1973) pp. 66-70. (2)Ibid., p. 70.

theoretical questions, and the applied (evaluative and developmental) approach when it attempts to give solutions to some aspects of the practical problem.

The design of this study will involve the best compromise possible and, according to its final objective, it can be classified as an <u>exploratory</u>, <u>panel</u>, <u>comparative</u> <u>cross</u>-<u>sectional</u>, <u>applied</u>, <u>evaluative</u>, and <u>developmental study</u>.

The study is also multi-disciplinary in its approach, in that its simultaneous collection of data and investigation are needed to facilitate the job in other fields, and, in this sense, it can work as a pilot study for interested researchers in other disciplines.

TOOLS AND TECHNIQUES

This study deals with one or more of the following tools and techniques:

a. Maps and secondary data interpretation.

b. Records analysis.

Procedures insuring accuracy and careful gathering of information are given major consideration.

SAMPLE DESIGN

Since complete surveys are costly and require much time and effort, sample design technique <u>is</u> important. Depending on the survey situation, objectives, and resources, one must choose the optimal suitable sampling technique from among the various sampling methods known, such as: stratified, systematic, cluster, or multi-stage sampling methods. The proper sampling units were first defined, then a purposive sample was selected.

The basic assumption behind this purposive sample is that with good judgment and an appropriate strategy one can hand-pick the cases to be included and thus develop samples that are satisfactory in relation to one's needs. Errors of judgment in the selection will tend to counterbalance each other. There must be an objective basis for making our selection in order to enable an external check.⁽³⁾

Since this study is related more to stabilized resources over a period of time than to resources of a rapidly changing nature and since it does not greatly stress behavioral aspects, a cluster purposive sample may enable us to look at this somewhat stable, naturally occuring and humanly altered resource during the 1960-1970 period.

The cluster sample therefore, is not a random one; it is intended, purposive, and restricted in its selection and controlled by these considerations:

- It is a roughly rectangular shaped cluster of 21 counties in the Northern Lower Michigan.

(3) Claire Selltiz, <u>et al</u>. <u>Research Methods in Social</u> <u>Relations</u> (New York: Holt, Rinehart & Winston, 1959) p. 520. U.S. 27 and its modern compliment Interstate 75 freeway (beginning in southern Crawford County), is the major determinant of our choice of counties, and by this choice we shall have:
8 counties that have the major highway cross their lands as a first stratum.

7 counties that have boundaries that are adjacent to that highway as a second stratum. (Some are located east or west of the first category, depending on their nearness to the mentioned highway). 6 counties that have boundaries that are less adjacent to that highway, as a third category. These are located east or west of the first category depending on their relative distance from the highway). (See following map, Figure 1).

The study cluster uses the county as a basic unit of observation, and it is limited more by microlocational (small region) rather than macrolocational (large region) effects.

The cluster sample is not a completely regular one, and it still has some defects or irregulatities such as:

- Some counties, while treated in the sample as having a major highway, have in fact more than one major highway. (See for instance: Roscommon County in the first category).
- Some counties, while considered as more or less



Figure 1. The study area in Michigan.
adjacent to the major highway, have other highways serving them. (Such as Ogemaw County).

The effects of these irregularities will be considered later on when treating the analysis of data.

Another notable item regarding the sampling procedure is that we might eliminate the three upper counties and the three lower counties respectively during the analysis stage. Reasons behind this are that:

- 1). Interstate 75 goes jointly through the boundaries of the upper portion of two counties, therefore, we can eliminate some confusion by eliminating the northern three county tier.
- 2). The northern counties have lake shores, and we did not consider the effects of lake-shore in our study assumptions.
- 3). The lower southern counties have Saginaw County which is larger in size and more urban oriented.
- 4). This elimination can serve as a test of our study: by reducing a part of the study cluster, we may be able to judge how the rest is affected by presence or absence of that part.

Attention of other interested researchers should be directed to the construction of other similar sample clusters around highways (say from east to west) or consider another cluster to see how it works to interpret mobility and growth among other counties of Michigan. ANALYTICAL MODELS

Theoretically, the model for this study is a system of thought which, through logical, verbal or mathematical constructs, supplies an explanation of residential mobilities: why they exist, how their increases and change occur, what the basic structural components are in the area, and what the rationale for prediction is.

The use of models in planning analysis may produce some complaints which stem from misunderstandings or which are due to obsolescence in the data. To avoid such complaints three requirements are needed when selecting the model:⁽⁴⁾

- It must grow out of a logical, consistent, and organized concept.
- It must have some relation to the process as it actually occurs in reality.
- It must have a dynamic quality (recursive and capable of taking into account feedback effects).

With these requirements in mind, land use models can be organized around the market concept, around transportation, etc. Our general analytical model will be the Multiple Regression model. The <u>simple regression form</u> is one in which values of the dependent variable are predicted from a linear function of the form: Y' = A + BX

(4) Chapin, op. cit., pp. 475-7.

Where the Y is the estimated value of the dependent variable Y. The B is a constant by which all values of the independent variable X are multiplied, and A is also a constant which is added to each case. (The difference between the actual value of Y and its estimated value Y for each case is called the residual or the error in prediction).

The <u>general form</u> of regression that will be used in our analysis is:⁽⁵⁾ $Y = A + B_1 X_1 + B_2 X_2 + \dots + B_K X_K$. In this model A stands for the intercept of Y, and B_1 , $B_2 \dots + B_K$ are regression coefficients. A and B_1 , $B_2 \dots$ are selected in a way that the sum of squared residuals $\geq (Y-Y')^2$ is minimized.

This general model will be dealing with a set of dependent variables and a set of predicting variables as shown in the following figure (No. 2). Other statistical and mathematical models will be used as needed. The ones we shall use in addition to that general model are: ratios, percentages, means, standard deviations, correlation coefficients, variance, F-ratio (as a test of significance), and some population techniques.

All these techniques and models are available through the Statistical Package for the Social Sciences (SPSS).

⁽⁵⁾Norman Nie, <u>et al Statistical Package for the</u> <u>Social Sciences</u> (New York: McGraw-Hill, 1975) pp. 323-8.

(Y)) Dependent Variables			<pre>(X) Predicting Variables (Independent Variable) <u>Transportation System</u> X₁₁ proximity of major</pre>		
Residential mobility X ₁ in terms of:			x ₁			
1)	¥ ₁	Population changes 1960/70		X ₁₂ total transp. lands (acres		
2)	¥2	Net aged mi- grants (age 60- 69) during 1960/70	x ₂	Recreation Potentials X ₂₁ inland water area X ₂₂ public recreation areas X No public parks		
3)	^ү з	Increases of new built permanent housing units 1960/70		X_{23} No. public pairs X_{24} No. campgrounds X_{25} No. miles of water stream X_{26} No. water bodies		
4)	¥4	Increases of seasonal housing units 1960/70	x 3	Environ, Attraction to Migrant X ₃₁ Commercial forests		
5)	¥5	Rent values	x ₄	Location to Urbanized Centers X_{μ_1} distance from SMSA (scale)		
6)	^Ү 6	Changes in Man/ Land ratio by acreage		X ₄₂ No. of moderate civil units of 4 thousand and more		
			х ₅	Presence of Manufacturing Establishments X ₅₁ No. plants of 20 employee: (+) X ₅₂ net younger migrants (20-29 old)		
			х ₆	<u>Changes in Housing Structure</u> X ₆₁ changes in permanent houses X ₆₂ changes in rent values		
				X ₆₃ changes in Seasonal houses		
		X	x ₇	Man-Land Ratio (by acre) X ₇₁ available land resources (distrib. of essential lands) X ₇₂ total acreage of the		

Figure 2. Dependent and Fredicting Variables in the Multipleregression Model

CHAPTER III

THEORY AND LITERATURE REVIEW

INTRODUCTION

Theory and literature review play a basic role in man's quest for understanding and knowledge. Their components often pass into operational use long before any full system can be made to work in practice.

These components can be extended to cover a wide area of information, but only the issues most pertinent to our study should be considered carefully as they supply the guidelines, the rationale, the causes, the explanation, and the prediction of events. The review should also be within a frame of theory that is dynamic (not abstract or far from reality), tangible (can be tested), and has an internal consistency and logic (relative to reality).

We should recall that if the traditional social science disciplines lean toward the explanatory type of theory, it is the nature of a practical professional to favor theory with a normative emphasis that provides explanations for consequences, and how plans can alter results.

This introductory discussion with this approach in mind would be incomplete without reference to these related issues:

- 1). FORMULATION OF LAND USE DETERMINANTS
- 2). LEGAL PUBLIC DIRECTIONS OF LAND USE
- 3). METRO AND NON-METRO PREFERENCES
- 4). CONTROLLING GROWTH THEORIES
- 5). IMPLICATION AND FIELD STUDIES

The purpose of this review is to:

- Find materials related to the topic and highlight their contributions.
- Review these materials with a focus on the topic.
- Search for examples of activities or functions important in leading our investigation.
- 1). FORMULATION OF LAND USE DETERMINANTS

Chapin outlines the frame of land use perspective within a set of three major determinants: The economic, the social, and the public interest.⁽¹⁾

The economic perspectives of land uses stem from land value. There may be variations in the value of land due to changes in economic conditions or conditions of particular locations.

The social perspectives, though frequently confused with the economic motivations of people, stem from social values and ideals as reflected in social institutions such as the family, and the economic, religious, and political organizations.

Two major social origin factors contribute in explaining land use effects. These are: ecological processes and organizational processes (in terms of social behavior).⁽²⁾ The major elements of the organizational processes are: human behavior, values, and goals.

(1)_{Chapin, op. cit. p. 10} (2)_{Ibid., p. 21.} The public interest or perspectives in land use stem from our needs to consider "the health, safety, and the general welfare"⁽³⁾ in order to maximize livability and insure sound future development for communities. Measures to accomplish this objective include controls over population density, hazards, and exposure to adverse environmental influences. Other factors that can be viewed under this classification are: convenience, economy, and amenity. In the public interest these controls can be employed to:⁽⁴⁾

- guide the use and reuse to promote development,
- curb the misuse to avoid injurious effects,
- prevent the abuse, and
- regulate the nonuse.

Financial capabilities, jurisdictional considerations, and political climate are taken into account in determining public interest in land use.

The model that best illustrates the relationships among these three basic determinants is that presented by Chapin as shown in the following figure No. 3.⁽⁵⁾

The model suggests how economic, social, and public aspects interact to produce a pattern of land use.

As mentioned previously, this study will not be dealing

(3)Ibid.. p 39. (4)Ibid.. p.56. (5)Ibid.. p.64.

Figure 3. Interrelationships among land use determinants.



Source: Chapin, Urban, op. cit., p. 64.

with all these aspects. Instead, we will select a set of land use factors and try to examine their effects - collectively and individually--on the process of residential development in terms of population growth and mobility by land use measures.

2). LEGAL PUBLIC DIRECTIONS OF LAND USE

Since man's dependence on land is so basic a fact of life, more controls over land use, to protect its vital resources and the well-being of all those who depend on it, become a must. Responsibility for protecting the land and its resources goes along with the right to own land.

To limit and guide the use of land is necessarily to infringe on private property rights; but where should the line be drawn between private rights in land and the public interest? Should the official's intervention be practiced to control the geographical land area itself or to control the uses that owners make of the land they own?

As Barlowe mentioned: "Property in land resources should be dealt with as an exclusive not absolute right, it involves rights to the use of material things not personal rights. This presupposes a sovereign power that can sanction and protect these property rights vested in individuals or groups. These rights are limited by public opinion and by various reservations of public economic and social policy."⁽⁶⁾

⁽⁶⁾ Raleigh Barlowe, <u>Land Resource Economics</u> (New Jersey: Prentice-Hall, 1972) p. 376.

What concerns us here should be the legal and constitutional limitations and measures applied to the use of land for essential purposes. Various measures can be used. The following diagram illustrates a number of these measures or limitations:



Because the formal governmental measures touch people directly, some explanations are given here:

1). An overall plan by the government is essential to determine how goals are to be achieved over time. This plan must be based on sufficient information and studies of the resources, needs, and potentials of each region.

- 2). Taxation is also an essential legal and constitutional limitation; good tax policy should relate to the ability to pay, reflect benefits, have a reliable and uniform yield, be easy and economical to administer, and be appropriate to the purpose. One thinks that growth costs in terms of cash outlays for sewage, roads, schools, etc., should not exceed tax revenue in new developments.
- 3). Proprietary power is used to emphasize public rather than private objectives, provide examples of best use and give direction to the future use of private land. It also may mean the threat of nationalization to influence use.
- 4). Spending power is the power to spend public monies to provide or extend services, subsidize private activities and locate major installations.
- 5). Eminent domain, or the "taking" power, enables the government to purchase private lands for public purposes (such as highways, open spaces, urban renewal, extension purposes, etc.). Determination of just compensation must be secured, and justification of excess condemnation must be presented.
- 6). The police power is exercised to maintain reasonable control over persons and property in the interest of the general security, health, safety, and welfare. When a government regulates private land without

monetary compensation--by zoning, health and building codes, for example--it is exercising its police power.

Issuing a national land use policy can be a justification for the public direction of land use. Local governments can use such general policy to:

- designate areas of critical environmental concern,
- locate key facilities,
- approve large scale developments,
- approve public facilities of regional impact,
- control lands which are basically second home sites, and
- encourage the wise and best use of land.

Important objectives such as the following that warrant the adoption of a legal land use planning go far beyond the scope of our topic but, nonetheless, relate to it:

- protection of agricultural lands that provide food and fiber,
- control of pollution of the environment, (esp. of air and water),
- imposition of energy and food consumption standards,
- imposition of limits to growth (urban and population segregation),
- imposition of use patterns to protect remnants of historic, cultural, and natural beauty (also shore-lands),
- imposition of procedures to protect public health,
- preservation of open space and greenery places for recreational opportunities,
- provision of necessary public services,
- provision of easy linkage between job, home, and services, and

- provision of quality in construction.

Shifting in property values related to good neighborhoods, nearness to transportation, access to utilities and facilities, all increase competition among community residences. Control over this competition by means of planning can help to assure optimal use of land. Such means of planning should satisfy the qualitative approach (i.e. the interest of the design experts), and the quantitative approach (i.e. the interest of the economists).

These legal features should not be weak or unable to compel changes in behavior. They should be backed by penalties to stop harmful activities and be able to stop them <u>before</u> they result in damage and not only <u>after</u> the fact.⁽⁷⁾

The impact of legislation on residential growth and mobility cannot be ignored. Examples of its valuable and viable outputs can be seen in a number of successful applications on the national and local levels, as in the following practices:

a. Public Act 116 in Michigan, for the preservation of farmland and open space. This act was aimed at helping farmers stay in agriculture. It guaranteed certain tax credits to help landowners keep their land in agricultural production for a minimum of 10 years. It has worked better in areas where land is

⁽⁷⁾ Jonathan Turner, <u>American Society Problems of</u> <u>Structure</u> (New York: Harper & Row, 1972) pp. 237-54.

near growing urban areas (where pressure from development and urban sprawl is most intense) and where land values have increased to the point where farmers no longer can afford to pay high property taxes and stay in farming.

Results of such a program can be seen by measuring its effect on farm community, non-farm, and local governments, the degree of popular support for environmental quality, the role and responsibility of government in finance, and administration.⁽⁸⁾

b. Rural Development Act 1972: More attention is given to local communities to enhance their attractiveness in terms of business convenience and quality of life.

When farm people were forced to move to urban centers for employment or for other reasons, the ties with their communities and families were seriously weakened. A lot of harm occured to both the regions of departure and destination alike. Tax loads descended on fewer shoulders, and costs of facilities, activities, and services per tax payer went up.

The Rural Development Act slowed migration of farmers and provided guidelines and assistance to local areas to achieve balance with the national growth. Pressure for this balance was augmented by the fact that the US population

⁽⁸⁾ Coop. Ext. Ser., Michigan State University, and Extension Committee on Land & Water, <u>CLAW Report</u>, No.17, May 1976.

is expected to increase another 50-75 million by 2000. Where will these people put down their roots? And if indicators show that the population growth tends to be rooted in the countryside and local communities, how shall we confront it?⁽⁹⁾

- Shall we guide these developments so as to add quality to the lives of residents?
- Shall we permit unguided and haphazard development to bring more eyesores, pollution, and undesirable results?

We should remember that once developmental damage is done, it is difficult to correct. Thus, the act is necessary to avoid damage and provide for development, in terms of loans and technical know-how.

c. Zoning enabling acts: Consideration is given in these acts resolving high priority problems and granting essential power to local units of government for zoning. Concurrent efforts to revise these acts to work effectively at the city, township, county, and village levels of government are under consideration.

Sound zoning seeks to protect, maintain, regulate, and provide desirable standards of public improvements and services. It can stabilize property values and help

⁽⁹⁾ Soil Conservation Society of America, <u>Rural Develop-</u> <u>ment in a Land Use Perspective</u>, (Ankeny, Iowa: Booklet: Its articles appeared first in the Journal of Soil & Water Conserv., V. 29, 1974) p. 2.

residents plan for their own and the public interest within the framework of this legal and mandatory pattern.

Benefits of zoning can be seen in its reduction of haphazard urban growth and density; reduction of the costs of providing public services; protection of investment in farms, homes, businesses, etc.; protection from negative environmental externalities; and provision of safety.

- Architectural Barriers Act (1968): outlined
 certain design features that would ensure access
 to recreational facilities to physically handicapped
 persons for projects involving Federal funds.
- e. Municipalities' right to control growth by limiting housing construction to slow population increase: This adds to the quality of development and eases the burden on public facilities such as schools and sewer systems. Many court decisions--depending on the concept of public welfare--ruled that this concept is sufficient to allow a town to preserve its character, its open spaces and low density of population, and to grow at an orderly and deliberate pace. Other decisions ruled that growth-limitation plans are not valid, i.e. if the land conforms to the usual regulations and requirements, the city cannot deny services to limit growth.

Other possible municipality procedures could be to: - Limit hookups to water and sewer.

- Limit growth to a total number of housing units in a

community.

- Limit occupancy to family unit uses only.
- Not allowing dwelling unit capacity to exceed a fixed number under the policy of "use it or leave it."
- Excercise freedom to stay within a plan limit or zoning ordinance.

We should note here that those who move earlier may act to prevent newcomers from sharing their privileges, but objective and acceptable policies could avoid such occurances.

These are some examples showing the impact of public direction of the use of land. It seems wise to refer to some criticisms and remarks by Philip Raup about prime agricultural land and urban sprawl before moving to the next issue.

Raup⁽¹⁰⁾ found that the key test of the value of any land is the "with or without" test, within a frame of technical possibilities, institutional barriers, and the costs of the trade patterns required to replace such land's products or services.

He sees that distortion of agricultural land values is one consequence of increasing urban sprawl and that, today, no part of rural America is far from the zone of urban influence of land values. Therefore, he suggested a number of functional programs to achieve goals of preserving

⁽¹⁰⁾ Philip Raup, "Policies for Protection of Prime Agricultural Lands," <u>Options in Land Use Policy for Michi-</u> <u>gan</u>, Conference, E. Lansing: Mich. State University (April 1974) pp. 13-22.

agricultural land.

Among the issues he discussed to avoid loss of agricultural land are: state laws, market value as a substitution test to imports or exports, soil surveys and ranking land systems, energy conservation, and differential taxation.

Raup also says that we have created an incentive package that insures the rapid expansion of urban areas onto prime agricultural lands. Among the incentives he criticizes are:

- the manner in which we raise the money for roads and highways and determine where they will be built. These subsidies concentrate the land value-increasing forces in the suburban areas
- housing policies exercise a powerful stimulus to the demand for units that require substantial areas of land
- income tax policy added purchasing power to some groups, and this will lead to land value increase at a higher rate than will the structure on it.
- issuing tax free municipal bonds encouraged borrowing to be invested in the new developments.

However, one can see that if subsidizing road construction will lead to these consequences in the suburban areas, we should not ignore its role in activating the function of the other socio-economic elements.

Controlling undesired consequences can serve the planning purpose instead of reducing those incentives which are essential for improving the quality of life in such areas.

Road and housing construction is more than a must in many locations at the national and international level. As Elinor Guggenheimer stated: "Governmental grants-in-aid have had tremendous local impacts on open space, beautification, neighborhood facilities, model cities programs, land and water conservation. But the problem is how to allocate funds between urban and suburban areas without socio-economic inequities."⁽¹¹⁾

3). METRO AND NON-METRO PREFERENCES

"Freedom to move" is one of the essential rights that guide the movement of people. Development planners are convinced of this guiding factor and therefore, are trying to set a balance between repelling and attractive factors in their plans.

Since most developments were not guided by planning in the past, the residential movement process among metro and non-metro areas appeared to take place on an individual comparative basis. Natural endowment, favorable activity, transportation consideration, and amenity factors were thought to be the major incentives behind mobility.

The United States in the last three decades (1940-72) observed a drop in persons employed primarily in the production phases of agriculture (62% drop). All net growth in

⁽¹¹⁾ Elinor Guggenheimer, <u>Planning for Parks and Recrea-</u> tion Needs in Urban Areas (New York: Center for New York City Affairs, Twayne, 1969) Forward.

population was in urban locations, so, many medium-sized places developed into larger, and the total rural population (open country and places of less than 2500 people beyond the metro-urban fringe) remained stationary.

This rural variation can be shown from the areas of internal gain and decline shown in Table 2.

Table 2. Decline and growth in rural areas. (12)

	_		
% Change 1940-1970			
-31.8	-		
-22.6			
-36.0			
-24.6			
-30.0			
% Change 1940-1970			
45.0			
40.4			
56.4			
21.0			
134.3			
44.2			
	<pre>% Change 1940-1970 -31.8 -22.6 -36.0 -24.6 -30.0 % Change 1940-1970 45.0 40.4 56.4 21.0 134.3 44.2</pre>		

"Recent estimates enable one to classify total United States population growth as more rapid in non-metro areas than metro ones. This reversal does not appear in all regions.

⁽¹²⁾ Source: Table 1. Rural population change in selected areas of substantial decline or growth, 1940-70. Cited in Soil Conservation Society, <u>Rural Development</u>, op. cit. p. 24 (900 counties out of the nation's 3100 counties experienced declines during the three decades).

"The non-farm rural growth has nearly doubled in 30 This has had an upward impact on land values and vears. taxation rates which may further influence land use. The doctrine of economies of scale and advantages of concentration in the long run are not sufficient premises to continue the pace of metro growth when countered by the costs and fears of urban tensions of life. This does not mean that rural areas and small cities are no longer susceptible to economic depression and renewed outmigration. Most will remain comparatively dependent on a few types of work and employers, and these industries, like others, seem to have internal dynamics of change that place some locations in jeopardy, whether from foreign competition, technological change, resource substitution or exhaustion, and/or shifts in market demand."(13)

Fuel shortage in the short run may threaten rural areas more than urban ones. That is because: "Rural workers typically drive longer distances for work or services; many recreational and second-home areas are useable only with relatively unrestricted fuel availability; and certain manufacturing industries related to these activities have been among the most rapidly growing in non-metro areas, such as mobile homes, power boats, and snowmobiles manufactures."⁽¹⁴⁾ In addition, farming machines and rural extractive

(13)_{Ibid}.

⁽¹⁴⁾Ibid., p. 27.

industries (extraction of nitrate fertilizer needs oil) appear to be booming again as the hunt for oil and gas is revived, as coal is substituted for other fuel, as farm production is pushed for the export market, and as the market for timber thrives.

Also, with continuing advances in labor-saving techniques, the increase in extractive production will far exceed employment increases and will not reverse the basic dependence of rural areas on secondary and tertiary sources of work. That is to say, energy resources must be considered as one of the top priorities in land use planning to achieve equilibrium or desired balance in growth and mobility.

Though this may not cause a radical shift in population distribution of the non-metro areas, which contain about a fourth of the total population "every current trend, in residential preferences, business location decisions, land use effects of affluence, closure of comparative differences in facilities and amenities of rural and urban areas, and the end of major adjustments in extractive industries, supports additional rural and small city growth."⁽¹⁵⁾

The commission on Population Growth and the American Future supported this tendency of decided preference for living in rural areas and small towns.⁽¹⁶⁾ In Michigan this conclusion is also valid, as shown in Table 3.

⁽¹⁵⁾ Ibid.

⁽¹⁶⁾ James Zuiches and Glenn Fuguitt, "Residential Freferences," <u>Commission on Population Growth and the Amer-</u> <u>ican Future</u>, Vol. V, Edited by Sara Mazie (n.d.) pp. 621-29.

		Upper Feninsula	Northern Lower Michigan	Southern Lower Michigan	Non-SMSA Total
Number of places	1969	211	179	308	698
	1962	211	177	292	670
	1952	249	164	273	686
	1942	243	157	263	663
Total Fopulation	1969	44,605	27,610	58,300	130,515
	1962	39,851	22,232	46,025	108,108
	1952	59,522	24,724	41,303	125,549
	1942	66,233	20,597	35,362	122,192
Fercentage Change in Population	1962-69 1952-62 1942-52 1942-69	11.9 -33.0 -10.1 -32.7	24.2 -10.1 20.0 34.0	26.7 11.4 16.8 64.9	20.7 -13.9 2.7 6.8
Average Population	1969	211	154	189	189
	1962	189	126	158	161
	1952	239	151	151	183
	1942	273	131	134	184

Table 3. Number and population of unincorporated places in non-SMSA counties, by Region: 1940-1969.(17)

(17) L. Perkinson; <u>Population Distribution in Non-Metropolitan Michigan</u>, Research Report 145, Michigan State Univ. and Agr. Exp. Station 1971, p. 8. "The percentage of urban population in Michigan has reached almost 74 percent in 1970, an increase from less than 71 percent in 1950. If one takes into account all places where people live in settlements i.e., all incorporated places and all unincorporated places (UIP) under 1,000 population, dispersion of population (not concentration) characterizes the non-SMSA areas of the state. . .

"It appears that polar forces may have affected the internal distribution of Michigan's population. With a growing population, the state averages indicate that the population is becoming more concentrated. And yet, the growing non-SMSA population went through a period of dispersal, since the population settlements did not retain their "fairshare" of the population growth. . . Thus, the data indicates a trend toward open-country living.

"The trend toward dispersal of the non-metropolitan population at the same time that the population is increasing has many possible implications for rural governments and their function. Many incorporated communities and unincorporated places - but definitely not all - will find that they will be providing services to more people.

"If a community requires certain basic facilities, there is little reason to assume these requirements vary by the legalistic difference of incorporation versus unincorporation. The only difference is that the township or county may be supplying a needed sewage treatment plant or central water system instead of an incorporated village. Providing

services such as sewage treatment or a central water system to a small settlement, though expensive, might be done with little difficulty, but providing them to a scattered population would be more expensive and more difficult."⁽¹⁸⁾

In exposing the problem of growth and mobility--on the national and local levels--from diverse view points, we should introduce two other factors; (19)

1). Sequence of moves in the housing units.

2). Roles of age and education in mobility.

In the period from March 1966 to March 1967 about 18 percent of all families moved i.e. of about 58,000,000 families in the country about 10,400,000 of them moved. Sequences of moves which begin with new construction may well be somewhat longer on the average than other sequences since they tend to begin with expensive units. The estimate from this study of an average of 3.5 moves for sequences beginning with new construction, however, is reasonably consistent with what is known about the total volume of moving.⁽²⁰⁾

The second general element associated with mobility is two-fold and is important in all investigations, this being both age and education. For some elements in the population mobility rates are much higher or lower than the average for the whole population. The peak years for mobility is the

(19) John Lansing, <u>et al</u>. <u>New Homes and Foor People</u> (Ann Arbor, Mich.: Institute for Social Research, 1969) p. 59. (20) Ibid., p. 63.

^{(18)&}lt;sub>Ibid.</sub>, p. 11.

age bracket 22-24. Michigan rates for population mobility by age during 1965 show that the average was 6.8 percent. But it was 9.9 percent, 17.8 percent, 8.8 percent, 3.2 percent, and 3.0 percent for the age brackets 18-19, 22-24, 30-34, 45-64, and 65-74, respectively.⁽²¹⁾

Census data show also that mobility rates tend to rise with education. Mobility was 4.0 percent and 8.8 percent for the elementary and college educated, respectively. Trained persons tend to go greater distances, and the skill gaps were more important in determining mobility than the distance gaps. Those investing in human capital have to consider these important elements.

As for the elderly, it is obvious that the technological advancements in industry and medicine have changed both life span and the life style in this group. In 1900 there were 3 million older persons i.e. one American in 25.⁽²²⁾ That means the oldest group (65 years plus) is six and half times larger than it was in 1900. All other groups are only two and half times as large. Elderly people depend to a large extent on what the community in which they reside offers them. Due to economic considerations and physical constraints, this group is more dependent on access design, location, cost, etc., than any other age group.

(21) Lansing, <u>Geog. Mobility</u>, op. cit. p. 39.

(22) USDC, Bureau of Census, <u>Outdoor Recreation</u>, p. 9.

Policies that aim at achieving a balance between metropolitan and non-metropolitan demographic and economic growth, thereby slowing the process of concentration and decentralization within metro areas, should be implemented soor.

Various strategies have been suggested to guide the redistribution of population away from metropolitan areas and retain the population in non-metropolitan areas. Among these strategies are: the creation of new towns, the promotion of growth in smaller centers, and the dispersal of population into rural areas.⁽²³⁾

The importance of what residential growth does in a period of time has an increasingly important role in determining what the social quality of life is, or will be in the future. Given technological advancements and population growth, more people live longer and time spent working is decreasing. Residents with more leisure time, more capital to spend, and fewer expenditures on transportation, are likely to move faster to locations where the quality of life exists-to the safer and cheaper locational opportunities that are open to them now (and were limited in the past).

Development in these areas faces the problems of unlimited demands for public services (schools, water, sewage, police, etc.), based on limited resources, and confusion

^{(23)&}lt;sub>Zuiches, op. cit, p. 621.</sub>

among top priorities. Does the community, for instance, increase its police force to reduce the crime rate or does it put more resources into summer playground programs?

For policy-makers, the interested public, and those who utilize the services offered, it is essential to realize that most factors which caused outmigration in the past decades have lost most of their force, and that we need to investigate and understand the new forces that affect residential growth and mobility.

It is my assumption that improved planning and utilization of land use indicators might have been a major voice behind this new trend of growth and mobility. On the other hand the provision of planning for public services in land use needed to stimulate development in the local areas is not an easy task. It requires coordination and communication among those who provide services to rural areas; it requires effective means to involve the consumers of these services; and it requires more imaginative forms of organization to provide services.

The developing nations are confronted with the costs and fears of these impacts and will continue feeding this trend unconsciously unless land use planning is accomplished (at least for future developments) to curb the undesired growth.

4). THEORIES OF GROWTH CONTROL

In detailing the developmental pattern of both land use and social groups, we need to determine on what level and

base we should set our plans: (24)

- Should they be based on the idea of land ownership by the private sector, the governmental sector, or on a type of communal ownership, and how can taxes be levied in each case: on the land itself or on its improvements? Who will own industry, transportation and other key economic elements in the area; how can the public choice of actions take place? To make such a developmental plan we must make our improvements step by step, i.e. practical adoption over time because of differences in values over time.
- Should it be aiming at agricultural areas, in terms of land reform programs, to allow more landowners to increase production? And what about technology in cases that require large parcels of land? Is it true that we could make a developmental plan if we only owned the land and could decide where to put the variables of development? What about the problems of redistributing population on the land and the relationship between workers and production?
- Should we have an industrial base? How can we set priorities among industrial aspects: should we start with large or small scale, heavy or light, basic or complementary, dispersed, regional, etc.?

⁽²⁴⁾ Ideas drived here are based on class discussion and notes. Urban planning (810) Michigan State University, 1975.

Is it sufficient to specialize in one type of production?

- Should a city be a developmental unit in itself? If the city can create its own means of transportation, industry, etc., and put these things together, it will be in need of a market, and competition with other cities to reach efficiency.
- Should it be on a resources base? How can we balance resources and population? Is it better to locate plants near the minerals or raw materials? What will be the costs of transportation, production, and distribution. Where should the labor residential units, services, etc. be located?
- Should plans be based on the energy sources? Do people really move to places of energy abundance, or can we convert ubiquitous resources, like water, air, etc., to power instead of having to moving people to power sources? What about side effects, externalities, and disposal problems of alternate energy systems?

These different theories of land use patterns as related to social groups assume a dynamic and not a stable situation. Some of their principles exist in the planner's mind as proposed explanations or hypotheses. Others come about by experiment or observation. To see how extensively such theories are workable, we can measure the following aspects of progress and developments:

- 1). Total population growth.
- 2). Extent of urbanization.
- 3). Degree of industrialization.
- 4). Per capita income or rate of growth.

We should realize that capital, labor force, size of location, transportation, administration, and available natural resources are among the prominent factors that motivate evolution and change.

The decision about land use patterns for social groups of an urban complex will lead, inevitably, to a social policy through which planners have to fill the gap between the kind of life most people seek and the real situations of the existing land use pattern. While keeping in mind that there are people's pleasures, interests, desires, freedom of movement, individuality, choice, scales of association, social emphasis, and the problems of constant change--planners are trying their best to discover a satisfactory treatment that enables them to fill the gap between people's desires, real situations, and changing conditions. To fulfill the demands of this task, alterative approaches, theories, and philosophies arose in the planners minds. It is useful to review here some of these approaches and theories: (25) The theory of communication in the behavioral sciences a). helped planners to assess urban development. The theoretical elements of it are: the sender, the message, the

⁽²⁵⁾ Some of these theories are explained in Chapin, op. cit pp. 76-99.

channel, the receiver, the attention span, the common language, the time for processing, and the purpose to be served. These coherent elements are needed for a sound and balanced development in the land use planning field, as well as in other fields.

ъ). The concept of human interaction is also a basic element in serving equilibrium development. To understand the spatial linkages in terms of the flows of information, money, people, and goods within communities, this conceptual tool should be invoked to facilitate understanding planning purposes and determining the location of activities. c). The conceptual approach of accessibility assumes that the structure of a community is organized to set balance between activities and distance, that is, if the transportation is poor, the workplaces, trade centers, and community services tend to assume a pattern of distributed facilities. If transportation is good, activities may be concentrated within the community (undistributed facilities). That means urban spatial structure is intimately tied up with aggregate effort in the community to overcome distance, i.e. the transportation system holds the key to the mode of growth. This approach is also helpful to the analysis of the growth of residential areas and activities.

d). The economic analytic approach to planning looks to the link between the labor force and production. Demand for movement equals the number of trips required to support the production (total employment of an area times frequency of

trips to work). The supply is the capacity of movement system (its ability to accommodate movements between home and work). The cost of transportation is based on time spent and money paid for movements. "Time is more crucial in the choices people make of their places of residence."⁽²⁶⁾ e). The location-decision analysis approach considers two groups of decisions--the primary, which is of strategic actions, and the secondary, which is stimulated by and follows from the primary actions. Under this system, land development is viewed as the consequence first of certain strategic decisions which structure the pattern of growth and development and then of the myriad household, business, and governmental decisions which follow from the first key decision.

f). The threshold theories that deal with urban growth control might be considered under these assumptions:

- 1. A smaller city offers a better quality of living.
- 2. The economic theory of diminishing returns is balanced by the theory of economies of scale.
- 3. Constant value of property theory is off-set by that of the reality of cyclical life that produces decay, changes of function, size, etc.

Under this theory, some considerations should be taken and decided upon, such as the:

⁽²⁶⁾John Lansing, <u>Automobile Ownership and Residential</u> Density (Ann Arbor, Mich.: Institute for Social Research, 1967) p. 145.

- minimum population within the area proposed for incorporation, density of development in relation to numbers of people, dominant center (in an administrative sense, at least):
- index of urbanization (as measured by density ratios, housing units, land coverage, traffic generation, air pollution or other measures); and the
- functional performance and what constitutes the major land use pattern of a city.

Thresholds need to be identified and related to particular functions such as land and water use, service delivery, and environmental quality.⁽²⁸⁾

This concept of threshold can work as a ramification of growth, of feasible or unfeasible control mechanisms:

- As ramifications of Growth on: immigration; income distribution--at urban, provincial and national scales; upward socio-economic mobility; ecology; housing prices and supply; ethnic and racial mix; demographic cohorts; urbanity; and municipal finance.
- As a feasible control mechanism, it can be used to: limit employment creation; limit housing, or serviced land; vary taxation according to regional location; and to impose higher prices for goods/services.

⁽²⁸⁾ David Godschalk, (ed.), <u>Planning in America</u>, (Wash., D.C.: Amer. Inst. of Planners, 1974) several articles. See also: Kozlowski J., article in: Town Planning Review, vol. 39, July 1968 pp. 100-116.

- As unfeasible controls, it can be used to: control private mobility; and to force a static land use plan.

g). Land Use Plans (under Police Power theory) can be framed into issues such as:

- 1. Principle of police power versus those of land confiscation, eminent domain and public purchase.
- Use of planning land use for projection of public utilities and services.
- 3. Desire to control private land development in accordance with a government plan.*
- 4. A present issue of controlling growth of an urban area--horizontal growth and vertical growth.
- 5. Environmental planning in terms of conservation, site planning (for building), erosion control, human wellbeing or pollution of air and water.
- 6. Aesthetics.
- 7. Land Use Plans at varying government levels.

(*)_{Measures such as:}

Zoning for <u>types</u> of land use. i.e. Grouping of compatable uses;

- Development of special permits such as planned unit, etc.
- Public interest in quality, character of development and density; or

Present interest in suitability for development (subdividing flood plain, draining marsh, irrigation, use of slopes, etc.). h). Minimal Disturbance Concept or Technique: ⁽²⁸⁾ The urban system has been considered as the imposition of man and his sub-systems for settlement on the natural systems of the region. This super-position causes the natural systems to be disturbed. Generally two expenditures are involved, first, in initially disturbing the system by new developments, and, second, in attempting to correct this disturbance and to provide stability at a new equilibrium point. Disturbance and necessary correction are strongly correlated, and the greater the disturbance, the greater the correction required. This leads to the concept that natural systems in equilibrium, if minimally disturbed, require minimal correction to restore equilibrium.

i). Concept of the Natural Environment as a Control System: The environment provides natural air and water conditioning, scale, and setting, as well as recreational facilities. Its functions include a variety of practices such as:

- 1. regulation of the run-off and drainage system,
- 2. capture of water supply,
- 3. purification of urban effluents,
- 4. generation of oxygen and cleansing of air,
- 5. control on microclimate, and others.

⁽²⁸⁾ Planners Notebook, Vol. 3, No. 4, 1973, (different places).
j). The administrative approach can be summarized in these three major issues:

- The determination of priorities on short and longrun:
 - a. Capital improvements or physical improvements --roads, dams, water and sewer systems, etc.
 - b. Social improvements--schools, libraries, better housing, etc.
 - c. Economic production--building and equipping plants which can be used to create wealth-cement plants, power generation, steel plants, etc.
 - d. Agriculture production--food and fiber for manufacturing
 - e. Service goods
- 2. Governmental level for development and coordination of efforts, if several levels are involved.
- 3. Planning for economic development to balance opportunities, personal income, and living conditions in all parts of a nation.

k). Carrying Capacity Theory or sometimes "holding capacity," refers to the capacity of the physical and social environments to absorb all forms of new growth. It has a special appeal for areas identified as critical eco-systems of the coastal zone, vulnerable habitats, areas suited for intensive development or recreational use, etc. Carrying capacity must be based on availability of natural resources such as: air, soils, water, and space; but it may vary further, depending on available energy, technology, means of water, financial, and even consideration of pollution and air quality.

In application--given a technology, economic system, and life style--the concept can work in the following ways:

- 1. Environmental capacity can be set (administratively) at the level which can accommodate any significant alteration. That is the limit at which human activity will lead to undesirable changes in the environment.
- 2. Cases where change per se is acceptable.
- 3. With resource management, it can deal with the capacity of the environment to accept a new activity before this activity becomes self-limiting through its own action on the environment.

The carrying capacity theory has some weaknesses, such as:

- Its definition is not clear because it includes environmental, threshold, and perceptual definitions.
- It is concerned with surface indicators and ignores the bearing capacity of soils.
- Because of the differences in rural-urban land use intensity, and in land value systems, the concept faces valuation difficulties.
- The natural environment, (also the technology and life style) may expand or decrease because of natural or man-made causes, and therefore influence its functions.
- It may be considered as an infringement on the right

to move.

In spite of these limitations, it has strong points and can be used as a valuable tool for the planner because:

- This system could greatly aid in decision making since the data should be made available prior to the time land use control decisions are made. In such a case, controls would be more rational and responsive to the limits of the environment and give power to the community to control the character of its development.
- It allows for the allocation of available resources and finds ways to insure that new growth will occur within the limits of available capacity and gives a greater percentage of that capacity to future developments.
- It helps the balance of tax base, and lessens the pressure for real estate tax increases by classifying and ranking each area according to its capacity.
- It handles the new growth on the basis of: "use it or lose it," that is, you are welcome to stay and move in as long as you accept the standards and requirements of the plan.
- If paired with major public investments or new institutional arrangements, it can show the limits beyond which growth can be tolerated.
- If costs justify the action and its benefits, we can overcome the weak points by added public investments,

increased regulation, or new institutional arrangements.

Since we are assuming that efforts toward planning and improvements of land use are permissable and consequently have significant effects on the residential growth and mobility, these theoretical concepts--along with other planning practices--should be considered as important guidelines. They certainly serve our purposes in understanding: the linkages, interactions, feedback, alternatives, modifications, and the evaluations. They also offer useful insights into the efforts of controlling growth and migration in order to enhance the "quality of community life" and put a halt to hazard and unchecked sprawl and its unpleasant side effects.⁽²⁹⁾

A synthetic theory drawing together a number of these sources has emerged recently in the form of guidance theory at the societal, community level, (30) for land use and environmental planning.(31)

5). IMPLICATION AND FIELD STUDIES

Whatever the physical appearance, sprawled or not, on a plain, mountain, or overlooking a moving river; communities as places vary according to their sufficiency and type.

(29) Godschalk, Planning, op. cit. p. 152.

(30) Ibid., p. 144.

(31) Edward Kaiser <u>et al</u>. (ed.), <u>New Community Develop</u>-<u>ment</u>, Vol. 1 (Chapel Hill, N. Carolina Univ., 1971).

They may be: (32)

- 1. Isolated, self-sufficient, rural communities;
- 2. Town-country communities;
- 3. Urban communities that attract into their orbit the surrounding town-communities; and

4. Metropolitan subcommunities.

To designate land use aspects that relate to mobility and growth within a community we should first designate its divisions: (33)

- as a settlement pattern: location, size, shape;
- as competition for space: ecological processes;
- as it maps and establishes its boundries: business, religious, school, etc., and the overall combination of all these segments.

The current problem facing planners is not whether projections should be proposed for one generation ahead or for shorter periods of time, but whether rapid response to evolving situations is possible. However, the means to obtain greater effectiveness depend on modern methods, financial support, planning staff, better data interpretation, and a master plan that is subject to revision as rapidly as the condition requires. (3^4)

(32) Irwin Sanders, <u>The Community</u> (New York: Ronald Press, 1966) pp. 69-72.

(33)_{Ibid••} pp. 57-76.

(34) Jay Shivers and George Hjelte: <u>Planning Recrea-</u> <u>tional places</u> (New Jersey: Ass. Univ. Press, 1971) pp. 203-204.

Within this frame of identified situations, planners and researchers should conduct their studies, collectively or individually and come out with a variety of suggestions, solutions, policy implementations, and plans of actions.

This study, in its attempt to benefit from the review of literature, will explore here some of the field studies most relevant to land use planning as it influences the mobility and development of human settlements:a). Zuiches and Fuguitt conducted a study to portray residential decisions by comparing actual location choices with preferred ones.⁽³⁸⁾

The preferred distribution shows about 70 percent would prefer to live within 30 miles of a central city, and about 30 percent would like to live in non-metro areas. When eliminating the distinction of proximity to central cities, 21 percent preferred the central city and its suburbs, and 61 percent would prefer small towns and rural areas.

The study provided an indicator of the direction of potential mobility when related to the trends of past mobility. The large city is less preferred as a community size. b). Land use changes, focusing on effective land use planning as a reflection of change and mobility, was another point of view.

(38) Zuiches and Fuguitt, op. cit, p. 621.

This view by Kimball and Neal⁽³⁹⁾outlined some effects of the planned land use aspects in Michigan as follows:

- Every mode of transportation is changing with increasing mobility. Planning should provide for access to new forms of land and increase their availability to people who will use them.
- An increase in Mobile home parks, with lower costs and taxes show increased mobility.
- Public facilities at some distance from crowded population centers are another reflection of mobility.
- Increases in rural non-farm residences is another indicator, but agriculture lands should be preserved against this vast absorption for non-farm uses: planning could guide the conversion of less productive lands only to the non-farm uses.
- Shopping centers at suburban locations compete with old downtown shopping locations.
- Urban decay and renewal processes help cope with many problems.
- Planned subdivisions, water-front lots, new employment patterns, preservation, for the natural attractiveness, of the lakes and streams from pollution are other indications of planned change in land use.

⁽³⁹⁾ William Kimball and J.E. Neal, <u>Focus on Michigan Land</u> <u>Use Changes</u>, Ex. Bulletin 671, Coop. Ext. Service, Michigan State Univ., 1971.

c). Lansing, tried to trace the indirect effects of the construction of new homes to analyse the working of the housing market, and in assessing its probable effect on the housing of the poor. Among his findings were these: ⁽⁴⁰⁾

- people voluntarily enter into a transaction (of moving) only if they expect to be better off as a result.
- roughly half of all sequences of moves are initiated by deaths, the subdivision of existing structures, emigration, and the like.
- The poor are indirectly affected by the construction of new housing even if they do not occupy the new dwellings.
- race has disadvantages for minorities in the housing market because of their lower incomes.
- any policy which increases the total supply of housing will be beneficial to low income people.

The study did not attempt to review methods of improving the demand and supply of housing by land use measures. It recognized that no single method is sufficient and that a mixture of programs is needed. It suggested that long term loans at low interest rates can influence the supply of housing for the poor, and that rental allowances and subsidies influence the demand of the poor for housing.

(40) Lansing, <u>New Homes</u>, op. cit, pp. 65-69.

d). Another study by Lansing⁽⁴¹⁾ conducted in southeastern Michigan showed that preferences for different kinds of living arrangements, with which people are concerned, include:-

- Their individual dwelling unit and the property on which it is located. They found that preference for a single house was very high especially among married people with children.
- The immediate neighborhood (within the sight area of the front door). People preferred low density places where they are familiar with neighbors, close to their business, and quiet.
- Location of their neighborhood within the metropolitan area. People preferred to be located farther from the center of the city, and they did not like the hustle and bustle (77%).

The relationship between income and lot sizes showed that there is some increase in median lot size as family incomes rise. The major considerations when deciding upon lot sizes are: space for activities, privacy, and maintenance. As for the locational preferences, the majority prefer low density development and more space.

⁽⁴¹⁾ John Lansing and Gary Hendricks, <u>Automobile Uwner-</u> ship and Residential Density (Ann Arbor, <u>Mich.</u>; Institute for Social Research, 1967) pp. 102-145.

Lansing concluded that the desire for outdoor privacy, space for different activities, and quiet can most easily be met in the outer areas. This tendency is likely to continue and to be a force in future developments.

e). A third important field study conducted by Lansing⁽⁴²⁾ explained the differences among three levels of highly, moderately, and less planned communities. Major aspects of considerations were related to:

- Administrative divisions and civil units.
- Transportation means (paved roads, mass transportation and private)
- Open spaces
- Types of migrants (free movers, especially among elderly of different backgrounds and forced replacement)

The study, which is a report prepared for the US Dept. of Transportation, Bureau of Public Roads, showed much evidence that:

- high income and level of education exist in the highly planned communities,
- facilities for recreation tend to be more available in planned communities,
- people of certain demographic and socio-economic

⁽⁴²⁾ John Lansing, <u>et al</u>. <u>Planned Residential Environ-</u> <u>ments</u> (Ann Arbor, Mich.: Institute for Social Research, 1970) pp. x, 19-33, 52-58 & 97-121.

characteristics were more attracted to planned communities,

- retired people, while they prefer planned communities, must be most concerned with costs of residing in them. The <u>more planned</u> communities seem to be more <u>higher rated</u> among the retired than the less planned ones. Facilities, activities, and adequacy of transportation are means of satisfying them.
- feeling that one has privacy does not decrease with increasing density except when this density reaches
 12.5 to 25 dwellings per acre,
- increased satisfaction with neighbors occurs with less density. Low density environments are prefered.

These varied studies pointed to a number of facts, solutions, policies, and plans. More investigation into the effects of land use aspects in Mid-Michigan might serve as complementary, and contribute toward an understanding of the reasons for residential growth and mobility, not only in Michigan but in other parts of the world as well. In the light of such understanding we might be able to provide policies for:

- feasible, viable, and desirable movements and community spirit.
- Community environment and residential options compatible with preferences and choices that lessen discrepancies and improve social stability.
- Offsetting of costs and dissatisfaction with present,

and future, distribution patterns of resources and human needs.

CONCLUDING REMARKS

In this chapter the review was limited to some of the major issues that are most relevant to the topic. The review did not go further in order not to miss the focus or permit more branching. However, these additions of the literature review have enriched the topic, highlighted several significant points, and, hopefully, not overlooked the most relevant materials. To this research, the review contributed:

- 1). To disclose the developments that have occurred in land use planning which at one time involved little more than population projections, the preparation of zoning ordinances and the making of master plans, but now encompasses a vast array of social policy concerns, environmental issues, and analytical techniques. The economic, social and public interest and directions to land uses were good examples of this issue.
- 2). To assure the growing concern and awareness of the role that planners can play to decide who should live in a community rather than who was likely to be living there in the future, given market pressures. The decided preferences for living in non-metro rather than metro areas gave explanation to that role.
- 3). To assess the real efforts given to the protection,

development, and conservation of the available resources. This added a new dimension to land use planning to make it able to include the "<u>slow growth</u> <u>strategies</u>" as we noticed from the various theories and practices that deal with this issue.

4). To enhance the tendency that concentrates on the adoption of land use factors as controlling tools in the high density places or vast mobility situations in order to bring about a state of balanced development. This should not be a substitution for other measures but rather a complementary practice in a whole array of developmental plans of action towards a better quality of life.

The review in this chapter generated a wealth of valueable information. One became more convinced that such examples, methods, explanation, theories, and concepts can lead to more substantial change. The implications, with these experiences in mind - can convert expectations and hopes to more sober realism; shape the mainstream of practice; and close the gap between theories and practices.

CHAFTER IV

DATA SOURCES AND INFORMATION FOR MID-MICHIGAN MODEL

For a satisfactory treatment, it is the purpose of this chapter to describe the measurement of the variables employed in the analysis as well as the sources from which they were derived. It will also present the data classification, sources, and information.

DATA CLASSIFICATION

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It has been mentioned previously that the dependent and independent variables in this model are classified as follows:-

- a). Dependent variables, which are measured by the following items in each county:
 - 1. Population changes from 1960 to 1970
 - Migration of aged people (age bracket 60-69) during 1960-70
 - 3. Permanent housing increases during 1960-70
 - 4. Seasonal housing at the end of the period in 1970.
 - 5. Rent value changes 1960-70 (assuming stable prices)
 - 6. Man/land ratio changes by acreage 1960-70 (as a measure of the essential land uses).
- b). Independent variables involve:
 - 1. Transportation system in each county, measured by:

- a- proximity to major highways (a dummy variable scale is used with: (0) for counties without major highways, (1) for counties with major highways.
- b- Total lands used for transportation within each county.
- 2. Potential recreation lands in each county, measured by:
 - a. inland water areas,
 - b. total miles of streams,
 - c. number of water bodies,
 - d. public recreational areas,
 - e. number of public parks,
 - f. number of camp grounds.
- 3. Environmental attraction to migrants in each county, measured by:
 - a. direction of the mobility as shown from the net migration of younger and elder people.
 - b. contrasting the growth through natural increase and net migration.
- 4. Influence of population aggregations of each county measured by:
 - a. distance from metropolitan areas (an ordinal scale of six points is used)
 - b. number of moderate civil divisions with population of four thousand or more.

- 5. Employment opportunities within each county, measured by:
 - a. number of manufacturing plants with 20 employees or more.
- Changes in housing numbers and values in each county, measured by:
 - a. changes in the number of permanent houses during 1960-70 (new units added)
 - b. changes in the value of rent, measured in current dollars
 - c. seasonal houses by numbers at the end of the period (1970).
- 7. Changes in the ratios of the man-land areas within each county by acres, measured by:
 - a. distribution of land resources devoted to essential land uses
 - b. total area (by acreage) of each county.

DATA SOURCES AND INFORMATION

Tied to the above classifications, this study presents the sources and information for each item or variable in a summary table (see table No. 4). Most of these above items are included in the analytical regression model. Other items are shown in the classification but not mentioned in the summary table, and are presented in separate tables, in the same order, to complete sources and information. They will be used to support the study findings in the next

Variables	Popu Inc 196	lation rease 0-70	Migr of o 60-6	ation lders 9 yrs.	Hous char 1960	ing nges)-70	Seasonal housing units in 1970	Rent value change 60-70	Man/Land ratio change	Migration of young 20-29 yrs	Total acreage of county
(1)	C	2)	(3)	(4)	I	(5)	(6)	(7)	(8)	(9)
Observations	No. (0C)	X	Net No.	z	No.	7	No.	2	*	No. % Net	No. (000)
Cheboygan	20.2	13.9	180	1.2	1479	32.5	2924	46	15.0	- 588 - 4.0	510.7
Otsego	28.8	38.1	158	2.1	1491	51.7	478	85	38.5	- 84 - 1.1	344.3
Crawford	15.1	30.4	145	2.9	853	57.8	1684	90	33.3	- 94 - 1.9	362.2
Roscommon	26.9	37.4	798	11.0	3299	77.6	5754	57	38.5	- 297 - 4.1	366.7
Clare	50.5	43.3	926	8.0	4832	77.5	1887	54	45.5	- 326 - 2.8	369.3
Isabella	92.5	26.2	- 81	-0.2	3557	41.3	324	9 0	25.0	2505 7.0	366.7
Gratiot	22.3	6.0	- 132	-0.4	2038	20.1	184	47	08.3	-1190 - 3.2	362.2
Emmet	24.3	15.3	185	1.2	1389	25.3	2086	74	14.3	- 665 - 4.2	305.2
Antrim	22.4	21.6	354	3.4	1695	39.0	1481	114	15.4	- 558 - 5.4	332.8
Kalkaska	8.9	20.3	187	4.3	811	45.9	522	68	23.1	- 272 - 6.2	366.7
Missaukee	3.4	5.0	181	2.7	520	22.7	966	42	00.0	- 597 - 8.8	366.1
Gladwin	27.0	25.1	614	5.7	2653	59.2	1741	7 9	18.2	- 596 - 5.5	327.7
Midland	123.2	23.9	185	-0.4	6539	50.3	210	86	25.6	84 0.2	334.7
Saginaw	289.9	15.2	-1262	-0.7	15975	32.1	188	56	14.9	-1805 - 0.9	521.0
Presque Isle	-2.9	- 2.1	178	1.4	934	26.5	1319	43	00.0	-1139 - 8.7	433.9
Montmorency	8.2	18.6	266	6.0	826	31.1	1470	42	25.0	- 360 - 8.1	362.9
Oscoda	12.8	37.1	329	9.5	995	46.8	1906	40	36.4	- 220 - 6.4	363.5
Ogemaw	22.2	23.0	557	5.8	2470	46.7	1117	62	20.0	- 795 - 8.2	371.2
Osceola	12.4	9.1	195	1.4	1020	22.2	1231	64	11.1	- 793 - 5.8	374.4
Mecosta	69.4	33.0	304	1.4	2704	43.2	2081	66	33.3	1642 3.2	364.8
Montcalm	38.7	10.8	205	0.6	2712	24.1	2577	63	8.3	-1432 - 4.0	460.8
Totals	916.2	451.2	4472	68	58792	873.6	32130	1368	449.7	-7580 -78.9	7967.8
Mean	43.6	21.5	213.0	3.2	2799.6	41.6	1530.0	65.1	21.4	-361.0 - 3.8	379.4
Standard Dev.	64.1	12.2	422.4	3.3	3366.5	16.9	1252.8	19.9	12.8	943.4 3.9	56.0

Table 4. (Cont'd)

Commercial Forest in Acres	Tran Land Ac	sport s in res	High- way (Scale)	Recrea Lands Acre	tion in s	Water Streams	Water Bodies	Inland Water in Acres		Distance from Metro (Scale)	Civil Divisions of 4000 +	Manufact. Establish, 20 employee plus	
(10)	(1	1)	(12)	(13)		(14)	(15)	(16)		(17)	(18)	(19)	
No.(000)	No. (000)	z	Points	No. (000)	*	No. Miles	No. Units	No. (000)	7	Points	No.	No.	
337.2	14.3	3.1	1	2.3	0.5	420	344	49.5	9.7	6	1	07	
251.0	9.1	2.7	1	0.5	0.1	198	378	6.8	2.0	6	0	06	
303.6	9.8	2.7	1	12.7	3.5	204	142	1.9	0.5	5	0	02	
270.0	9.7	2.9	1	8.3	2.5	204	126	33.3	9.1	4	0	03	
228.9	12.0	3.3	1	0.4	0.1	331	389	3.9	1.1	4	0	07	
097.1	12.8	3.5	1	0.5	0.1	330	215	0.8	0.2	4	2	08	
049.4	13.3	3.7	1	11.9	3.3	241	286	0.3	0.1	3	2	21	
182.8	10.4	3.5	0	8.5	2.9	098	272	10.6	3.5	6	1	09	
185.7	10.2	3.4	0	1.0	0.3	264	150	28.5	8.6	6	0	08	
270.8	9.1	2.5	0	0.4	0.1	284	351	4.8	1.3	6	0	01	
227.2	8.3	2.3	0	6.8	1.9	209	165	4.8	1.3	5	0	00	
186.9	8.0	2.5	0	0.8	0.3	473	090	5.5	1.7	3	0	07	
170.2	10.8	3.2	0	1.5	0.4	309	022	2.0	0.6	2	1	16	
098.7	24.0	4.6	0	13.9	2.7	593	093	0.3	0.0	0	10	88	
289.0	9.3	2.3	0	0.8	0.2	301	229	19.3	4.4	6	1	02	
286.9	6.8	1.9	0	0.5	0.1	306	248	7.7	2.1	6	0	04	
301.4	6.9	1.9	Ō	0.2	0.1	219	258	3.3	0.9	5	0	03	
239.5	8.4	2.3	1	5.0	1.4	381	253	5.5	1.5	4	0	08	
174.7	10.8	2.9	Ō	0.5	0.1	301	477	2.6	0.7	5	0	09	
148.4	11.6	2.3	Ō	6.8	1.9	293	399	6.4	1.8	4	1	09	
133.7	15.6	3.4	Ō	19.4	4.2	477	534	4.9	1.1	3.0	1	18	
4433.1	231.2	60.9	8	102.7	26.7	6436	5421	202.7	52.2	93	20	236	
211.1	11.0	2.9	0.3	4.9	1.3	306.5	258.1	9.7	2.5	4.4	1.0	11.2	
77.8	3.8	.7	0.5	5.7	1.4	113.7	133.7	12.7	3.0	1.6	2.2	18.4	

chapter.

It should be clear that these data, though abstracted, compiled, and computed from secondary sources and census data represent the best and most accurate information available during the 1960-1970 period.

Sources of data included in the above table and the following complementary tables were treated as follows:-

Column 1, shows the twenty one counties clustered in Mid-Michigan around the highways 27 and its northerly expansion I - 75 as observations.

Column 2, represents the population increase during the 1960-1970 period in numbers (by hundreds) and in percentage of change. Data in this column were generated and computed from the census data⁽¹⁾ as follows: Total population in 1970 minus the total population in 1960 represents both the natural and net migration increase during this period. Jividing this increase by the base year population (1960) and multiplying by a constant 100 we get the percent change

It is noticed that all counties in the cluster gained through population increase except Presque Isle County. (This county also lost through net migration but gained migrants in the 60-69 year age bracket).

Columns 3 and 8, represent the net old and young people

⁽¹⁾ USDC, Bureau of the Census, <u>Censuses 1960 and 1970</u> (the Michigan Volume); see also **Beagle**, <u>Population</u>, op. cit.

who migrated during 1960-1970 in real numbers and in percentage of change. Data were generated and computed in these columns as follows:

Net migration numbers of older people (males 60-69 years old) from the 1970 census in each county were divided by the total population in the base year (1960) for all counties, then multiplied by a constant 100 to get the percentage of older in - migrants. (In Clare County the number of male migrants aged 20-29 was -326 i.e., net out migration yields a negative figure) Since the data were available for specific age categories of 5-year ranges⁽²⁾ we added two categories to get the 10 year ranges and because we knew how much the migrants in a specific age category contribute to the total migrants, the percentage was computed to indicate the proportion to the base year: (i.e., $-326/11647 \times 100 = -2.8$). Though the analysis included the net number of migrants, some other complementary tables that show the ratios, direction, and expected numbers of migrants were included⁽³⁾. Comparison between net migration and natural increases is shown also. (The ratio was computed by dividing the net in the specific age migrant categories from the 1970 census figures, by the total of expected migrants in the same bracket and multiplying by the

⁽²⁾ Derived from a Preliminary Estimates of Net Migration by Age, Sex, and Race: IBM Printout for the 1960-1970, Univ. of Georgia, (data rounded to one digit).

⁽³⁾ Computed from the above source.

constant 100. In Clare Country ratio of male migrants aged 20-29 was $-326/2052 \times 100 = -15.9$). From the direction (minus = loss, plus = gain) and amount of change we can observe the characteristics of old and young migrants as related to mobility. (As shown in the following Tables 5 and 6).

Column 4, represents the changes in housing as an indication of growth. It includes the number of new units built and added to the existing units during 1959/69 period. The percentage of change as related to the base year is computed.⁽⁴⁾

Column 5, represents the number of seasonal housing units as shown in $1970.^{(5)}$

Column 6, shows the percentage of change in the median rent value (1960-70) in current dollars for houses with all plumbing facilities. Change in the value indicates the demand for houses and corresponding population growth.

Column 7, data in this column introduces the Man-Land Ratio by acre in the counties of the study area as an indication of the change in the essential land use. According to Barlowe, population density shows the quantity (number of

⁽⁴⁾ Computed from the <u>1970 Census of Housing</u> part 24, (U.S. Dept. of Commerce, Bureau of Census).

⁽⁵⁾Michigan State University, Michigan Department of Commerce, and Executive Office of the Governor, <u>County and</u> <u>Regional Facts</u> "n.d.," Table 8.

Counties		Young Peo	ple (20-29)			01d P	eople (60-	-69)
	no.	no.	😚 ratio	of	no.	no.	ratio	% of
	exp.	mig.	and	total	exp.	mig.	& dir.	total
	<u>1970 </u>	1970	<u>dir.(=)</u>	popu.	1970	1970		popu.
Cheboygan	2593	- 588	-22.7	-4.0	1347	+ 180	+13.4	1.2
Otsego	1361	- 84	- 6.2	-1.1	687	+ 158	+23.0	2.1
Crawford	832	- 94	-11.3	-1.9	462	+ 145	+31.4	2.9
Roscommon	1142	- 297	-26.0	-4.1	832	+ 798	+96.0	11.0
Clare	2052	- 326	-15.9	-2.8	970	+ 926	+95.5	8.0
Isabella	7634	2505	+32.3	7.0	2347	- 81	- 3.5	- 0.2
Gratiot	6868	-1190	-17.3	-3.2	2684	- 132	- 5.0	- 0.4
Emmet	2887	- 665	-23.0	-4.2	1438	+ 185	+12.9	1.2
Antrim	1871	- 558	-29.8	-5.4	1017	+ 354	+34.8	3.4
Kalkaska	786	- 272	-34.6	-6.2	425	+ 187	+44.0	4.3
Missaukee	1311	- 597	-45.5	-8.8	577	+ 181	+31.4	2.7
Gladwin	2082	- 596	-28.6	-5.5	831	+ 614	+73.9	5.7
Hidland	9326	- 84	+ 0.9	ō.ź	3112	- 185	- 5.9	- Õ.4
Saginaw	32365	-1805	- 5.6	-0.9	14872	-1262	- 8.5	- 0.7
Presque Isle	2399	-1139	-47.5	-8.7	1092	+ 178	+16.3	1.4
Lontmorency	803	- 360	-44.5	-8.1	476	+ 266	+55.9	6.0
Oscoda	519	- 220	-35.5	-6.4	337	+ 329	+97.6	9.5
Ozemaw	1826	- 795	-43.5	-8.2	869	+ 557	+64.0	5.8
Osceola	2529	- 793	-31.4	-5.8	1099	+ 195	+17.7	1.4
Mecosta	4704	1642	+34.9	3.2	1481	+ 304	+20.5	1.4
Lontcalm	6281	-1432	-22.8	-4.0	2915	+ 205	+ 7.0	0.6

Table 5. Characteristics of Net Migration Among the Young and Old People (Categories 20-29 and 60-69 yrs.) in Counties of Consideration(*)

(*) Computed from Census data

(=)Ratio is rounded to 1 decimal point (Lumber expected 1970 minus number of migrant 1970/100). Notice that (-) ratios among olds and (+) ratios among youngers are few.

Counties	<u>Natura</u> No. 1960-7	<u>1 Increase</u> 0 % of 1960	<u>Net Mi</u> No. 1960-70	gration % of 1960
Cheboygan	1,404	9.6	619	4.3
Otsego	1,076	14.3	1,801	23.9
Crawford	418	8.4	1,093	22.0
Roscommon	68	0.9	2,624	36.4
Clare	1,069	9.2	3,979	34.2
Isabella	5,122	14.5	4,124	11.7
Gratiot	4,926	13.3	(-)2,692	(-) 7.3
Emmet	1,444	9.1	983	6.2
Antrim	539	5.2	1,701	16.4
Kalkaska	231	5.3	659	15.0
Missaukee	351	5.2	(-) 9	(-) 0.1
Gladwin	817	7.6	1,885	17.5
Hidland	9,789	19.0	2,530	4.9
Saginaw	30,521	16.0	(-)1,530	(-) 0.8
Presque Isle	1,215	9.3	(-)1,496	(-)11.4
Nontmorency	101	22.6	722	16.3
Oscoda	143	4.1	1,136	33.0
Ogemaw	384	4.0	1,839	19.0
Osceola	1,042	7.7	201	1.5
Necosta	2,442	11.6	4,499	21.4
<u>Montcalm</u> Totals	3,502	9.8	<u> </u>	1.0

Table 6. Comparison between Natural Increase and Migration Growth (1960-1970).(*)

(*)Source: Computed from the 1960 and 1970 Censuses for all

persons per square mile or other measurement), the man-land ratio expresses the quality (as the total persons to the particular supply of land resources on which they depend)⁽⁶⁾. In other words, man-land ratio. represents the relationship between population and the land surface for agriculture, transportation, recreation, and urbanization lands as resources available for use. (For the purpose of this study, forest and inland-water were excluded from these lands, and the ratio was measured by acres). It is assumed that with the increase in population, there is an increase in the quality of these occupied lands which may then be improved for the peoples' benefit.

Taking Clare county as an example, this item was computed as follows:

- Land surface only (without inland water which has been considered separately) = <u>365.376 acres</u>.
- 2. Land classified as forest in the county = 229,000 acres.
- 3. Land classified for other uses (not including lands for agriculture transportation recreation, and urbanization) = <u>33.445 acres</u>
- 4. Net land used for productive and direct purposes (as substantial uses). = 365,376-(229,000 + 33,445) = 102,931.
- 5. To get the <u>man-land</u> ratio for 1960, the population numbers in 1960 of that County were divided by the net

⁽⁶⁾Barlowe, op. cit. pp. 52-56.

land i.e.:
$$\frac{Pop. 1960}{Net land} = \frac{11647}{102931} = 11.3$$
 and for the

This had been done for all counties of the study area and results are shown in column 7.

Column 8, represents the migration of the young people 20-29 years old. Details of this item were included in column three.

Column 9, represents the total number of acres (both land water and land surface) in each county rounded to the nearest thousand of acres.

Since data in columns number 9, 10, 11, 13, 14, 15, and 16 were processed and abstracted from one source which is not considered as a central one (and since there is a general agreement on the categories for the lands they analyse) it seems appropriate to mention that these data were assembled in a special research effort undertaken by graduate students in the Department of Resource Development at Michigan State University during the Summer and Fall of 1972.⁽⁷⁾

The data were obtained from various Michigan state governmental units and from the United States Bureau of the Census. When utilizing more than one secondary data source, a number of problems arise, such as overlapping definitions, variation in collection years and variation in methodology.

⁽⁷⁾ County and Regional Facts, op. cit., Table 27.

The totals may be misleading because the data are not necessarily additive. Only data which were comparable for all counties in Michigan were included; thus, data from a number of good local studies were excluded. The data will prove useful, however, for interpretation of land use trends if the above limitations are kept in mind.⁽⁸⁾

It is also worth mentioning that the total area is represented by the sum of "Inland Water" and "Land Surface": Inland water includes the surface area of all water bodies within the state boundaries (excluding the Great Lakes). Land areas underlying lakes, streams and ponds are included in this definition. This figure was obtained by subtracting the 1969 Census of Agriculture's Approximate Land Area figure from the 1940 Census of the United States' Total Area figure. Land surface includes all the land area in the state. The land surface figure is representative of the summation of forest, agriculture, transportation, recreation, urbanization and other lands.⁽⁹⁾

The forest land category includes that land which is at least 10 percent stocked by forest trees (of any size). It excludes lands currently developed for nonforest use such as urban or thickly settled residential or resort areas, city parks, orchards, improved roads or improved pasture

(9) Ibid., Land use section.

⁽⁸⁾ Ibid., Land use section.

lands... Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions (bogs and swamps) were excluded. Also excluded were productive public forest land withdrawn from commercial timber use through statute or administrative regulation -- i.e. national parks, state parks, national forest campgrounds and state forest campgrounds. These latter public land exclusions are included within the recreation classification. The minimum area classified as forest land was one acre. Roadside, streamside, and shelterbelt strips of timber with crown width of at least 120 feet and all unimproved roads and trails, streams and clearings in forest areas were classified as forest.⁽¹⁰⁾

Agricultural land includes that land used for the raising of livestock and crops. Also included as cropland are soil improvement crops lands, crop failure areas, cultivated summer fallow areas and idle cropland. Agricultural land includes areas used for woodland, "woodland pasture, pastureland, rangeland and land in house lots, barn lots, ponds, roads, wasteland, etc."⁽¹¹⁾

Transportation land includes land devoted to public highways, roads, railroads and airports. City and village streets were impossible to separate from urban land and were,

⁽¹⁰⁾ Ibid., (Cited in the US Dept. of Ag., US Forest Service, North Central Michigan Counties 1966).

therefore, not included in this category. Transportation land does not include land area devoted to pipelines and power transmission lines, for these are usually constructed under easements which still permit owners to use the land.⁽¹²⁾

Outdoor public recreation land includes publicly owned land used primarily for recreation purposes. Included in this definition are all national forest and state forest campgrounds, national parks, state parks, game areas, recreational areas, public fishing sites, public water access and county and township recreational areas.⁽¹³⁾

The following criteria were used in determining areas that qualified as urban lands: (14)

- a. All incorporated cities and villages of over 2,500 inhabitants.
- b. Incorporated cities and villages between 1,000 and 2,500 inhabitants, providing their density was generally greater than 1,000 inhabitants per square mile.
- c. Unincorporated places over 1,000 inhabitants as identified by the U.S. Census Bureau, providing their density was generally greater than 1,000 inhabitants per square mile.

Other land includes all lands not previously categorized. Private recreational land and unproductive forest

(13) Ibid., Land use section.

(14) Ibid.

^{(12)&}lt;sub>Ibid</sub>.

lands, such as conifer swamps and bogs, are included in this definition.⁽¹⁵⁾

Column 10, represents the commercial forest in acres, computed from County and Regional Facts as follows: total forest land multiplied by the percentage of commercial forest land gives the real number of commercial forest in thousands of acres.

Column 11, represents the transportation lands in thousands of acres and its percentage as related to the total acres of land in each county multiplied by the constant 100 (Clare County for example has a total transportation land of 11,964 acres, which is divided by the total land area, 369,280 acres, then multiplied by 100 to yield 3.3 percent).

Column 12, shows a dummy scale of (1) for each county that has U.S. 27 or I 75 highways included in its land, and (0) for other counties that do not include them (even if they might include other highways).

Column 13, represents the public recreation lands, computed as in the case of transportation lands above. Additional information about lands already used for public recreation purposes such as public parks, campgrounds and camp sites in the study cluster can be shown in the following table (No. 7).

Evaluation of the recent growth in camper numbers suggests that the stimulation of demand for camping by the

(15)_{Ibid}.

County	No. Pub. Parks	Campgrounds	No. Camp Sites
Cheboygan	3	154	760
Otsego	1	414	201
Crawford	1	205	45
Roscommon	1	184	201
Clare	l	42	160
Isabella	-	75	-
Gratiot	-	12	-
Emmet	3	80	300
Antrim	-	245	-
Kalkaska	-	68	-
Missaukee	-	266	-
Gladwin	l	86	45
Midland	-	40	-
Saginaw	-	_	-
Presque Isle	2	66	247
Montmorency	1	186	200
Oscoda	-	296	-
Ogemaw	l	50	139
0 sceol a	-	312	-
Mecosta	-	635	-
Montcalm	-	-	-
Totals	15	3416	2298

Table 7. Public (State) Parks, Campgrounds, and Camp sites in the study cluster.(*)

*Source: Computed from Mich. Outdoor Guide, Touring Dept. Auto Club 1974. manufacturers of camping vehicles and equipment has been impressive. Demand for more camping space or campgrounds has probably resulted more from the marketing of these equipments than from the efforts of campground owners.

LaPage has produced an evaluation of family camping potential. Based upon a national estimate of 65 million households with 3.19 persons per household in 1971, his data indicates that 19.4% of these families were campers and another 14.0% were inactive campers (that is, they expect to in future).⁽¹⁶⁾ The data on the public recreation lands help one understand the degree of the environmental attraction to residential mobility and population growth.

Column 14, represents the exact number of miles of streams in each county as a measure of environmental attraction. Data are taken from the County and Regional Facts.

Column 15, shows the inland bodies of water in total numbers corrected for intercounty and interregion bodies of water. The reason we are choosing numbers of water bodies and not their acreage is that it is assumed that the more bodies of water the more opportunities there are to move to them, build houses, or be attracted by the environment.

Column 16, represents the inland water areas, which were compiled and computed as were the transportation lands.

⁽¹⁶⁾ Cited in Michigan State Univ. & Coop. Ext. Service, Supply - Demand in Mich. Campgrounds (E. Lansing, Bulletin E-895, 1975) p. 6.

Column 17 and 18, reflect the distance of the county as a unit from metro areas (SMSA), and the presence of absence of civil divisions with 4,000 population or more in the 1970 census.

Since the study tries in part to gauge the results of residential mobility and population growth in terms of relative distance from metropolitan locations, and the effects of established settlements (civil divisions with 4,000 or more) in each county, it should therefore, investigate:-

- 1. How far is each county from the nearest metropolitan area.
- 2. Presence and absence of civil divisions with 4,000 population or more in each county.

It should do this in order to see if there are linkages between these two aspects and the residential mobility in the counties of the study cluster.

But some notations should be considered first:-

Metropolitan areas in Michigan are defined by the Standard Metropolitan Statistical Areas - (SMSA). There are Ann Arbor, <u>Bay City</u>, Detroit, <u>Flint</u>, <u>Grand Rapids</u>, Jackson, Kalamazoo, <u>Lansing</u>, Muskegon, <u>Saginaw</u>, and Toledo partly in Michigan.

Areas that are located on a distance of 31 miles from the center of the metropolitan city are not considered as metro areas. Computation of this distance (on a scale of 6 points) takes place from the center of the County to the center of the major SMSA city as shown in Figure 5.

The 6 point scale used to measure distance was: very close^{"1"}, if the county is located within the reach of 3 Metro areas; Close^{"2"} if within the reach of 2 Metro areas, nearly close^{"3"} if within the reach of 1 Metro area; nearly far^{"4"} if there is one county in between; far^{"5"} if there are two counties in between; and very far^{"6"} if there are more than two intervening counties.

Of the 11 metropolitan areas designated as SMSAs, the nearest to the counties in this study are these five:

- 1. Bay City(adjacent to Gladwin and Midland counties)
- 2. Saginaw (adjacent to Gratiot and Midland counties)
- 3. Flint
- 4. Lansing

5. Grand Rapids (near to Montcalm county)

Column 19, shows the distribution of major manufacturing establishments (20 or more employees) to see if there is any relationship between such manufacturers and population growth in these counties. Data in this column were extracted from 1972 Census of manufacturer since it is the most recent available census during the study period.⁽¹⁷⁾

⁽¹⁷⁾ Industries considered here are those producing food, tobacco, textiles, apparel, lumber, furniture, paper, printing, chemicals, petroleum, rubber, leather, stone and clay and glass, metal, machinery, electrical, transportation, instruments and miscellaneous. See: 1972 Census of Nanufacturers, Nichigan.



Figure 5. Relative distance of the study counties from metropolitan locations in Mid-Michigan (scale).

CHAPTER V

DATA ANALYSIS AND FINDINGS IN THE MID-MICHIGAN MODEL

It is the purpose of this chapter to place the investigation and analysis of this project in context. By so doing it is intended to check the feasibility and accuracy of our assumptions and hypotheses. The unit of our analysis, as mentioned, is the county and the procedures of this analysis will follow a three-stage order:

The first stage will consist of a general bivariate analysis in terms of correlation coefficients between each of the dependent and independent variables (21, and then later 18 observations).

The second stage presents a test of the correlation analysis by first eliminating the three top counties: Emmet, Cheboygan, and Presque Isle, and then the three bottom counties of this cluster: Montcalm, Gratiot, and Saginaw.

The third stage will include the results of the intercorrelations (regression analysis) among dependent and predictor variables for a cluster of the upper 18 counties located around the highways US- 27 and I- 75 in the Mid-Michigan area of the lower Peninsula.

Without detailed description of the statistics involved

in this study, ⁽¹⁾ the final processing of the data can be presented as follows: -

STAGE ONE: BIVARIATE ANALYSIS

A matrix of the correlation coefficients between all variables in the cluster of 21 counties is presented in appendix A.

- a) <u>Population Changes</u>. The increased population during the 1960-1970 period is positively correlated with:
 - the number of the moderate civil divisions of 4,000 persons and more, (but they are not SMSA) (r = 0.91);
 - numbers of the moderate manufacturing establishments of 20 employees or more (r = 0.91);
 - increased acres of transportation lands is related to population increase (r = 0.81);
 - the more miles of streams in the counties, the greater the population growth. $(r = 0.58)_i$
 - the size of the county seems to have a positive effect on the population growth (r = 0.44);
 - the more acres of recreation area within the counties the greater the population growth (r = 0.30);
 - the positive effects of other land use factors were noted but the strength of their relation or their contribution was trivial (r = 0.10 with the rent value

⁽¹⁾ The reader is referred to Nie <u>et al</u>. <u>Statistical</u> <u>Package for the Social Sciences Manual</u> for specific details about the techniques and their computer programming, op. cit.
of houses and r = 0.05 with the man-land ratio).

The following variables showed negative correlations:

- distance from metro areas, (r = -0.79);
- areas (by acres) of commercial forests, (r = -0.51);
- number of water bodies (r = -0.33);
- areas of inland water (r = -0.26);
- proximity of highways (r = -0.11); and
- net young migrants.
- b) <u>Net migration of older people</u>. The emphasis here is not on migration due to the personal environment (such as the influence of kinship, friendship, or socio-economic status ties or factors) it is, rather, related to the macro, or larger, environment⁽²⁾ (in terms of land use factors assumed to influence migration decisions); and we are concerned with the general net migration of the older people as an indication of the attraction of this macro-environment.

It worth mentioning that all the counties considered in this study gained population during 1960-70 except one, they also gained through the migration of older people (60-69 yrs old as a specific category out of the total population) except in four counties that are nearer to the metropolitan areas or have specific reasons for

⁽²⁾See for details: Koebernick, T.E.; <u>Migration of Older</u> <u>Persons to Non-Metropolitan Counties in Michigan</u>, Ph. D. Dissertation, Michigan State University, 1974.

^{(2)&}lt;sub>Ibid</sub>.

not attracting older people (namely: Isabella, Gratiot, Midland, and Saginaw).⁽³⁾ The following correlations show the direction and strength of the relationships between the migrations of older people and land use factors selected in this study. There was a positive relationship with some aspects in that:

- the more commercial forests in the counties, the more elderly in-migrants (r = 0.45);
- the greater the distance from SMSA, the more older in-migrants (r = 0.44);
- the more older migrants the greater the increase in the man-land ratios (r = 0.38);
- the more inland water the more older migrants (r = 0.26);
- the greater the proximity to highways, the more older inmigrants (r = 0.20);
- the other positive relationships do not have strong correlation coefficients and have negligible contributions.

There were also negative correlations between the older migrants and:-

- the number of civil divisions that include 4000 people or more (but not considered to be SMSAs),

⁽³⁾ See tables 5 and 6 chapter IV of this study to see the differences and the directions of migration among the young and old as related to each county or compared with the magnitude of the natural increase and net migration for the whole population.

r = -0.87, i.e. the more numerous these divisions, the fewer the older migrants. The elderly seemed to prefer smaller communities.

- the fewer the manufacturing establishments in the county the more older migrants; (r = -0.81),
- the greater the total acres of transportion lands (the more road facilities) the fewer the older migrants, (r = -0.73),
- the bigger the county the fewer the older migrants, (r = -0.52);

An unexpected negative correlation was that arising between older migrants and both total acres of recreation lands (r = -0.39), and miles of streams (r = -0.37). As noted earlier, these two factors have a positive correlation with the total population increases during the 1960-70 period.

- c) Houses built during 1959-1969: There were positive correlations between this dependant variable and the other variables according to this order of magnitude:-
 - the number of manufacturing establishments (r = 0.92);
 - the number of civil divisions of 4000 or more (r = 0.89);
 - the total acres of transportation lands (r = 0.80);
 - the miles of streams (r = 0.62);
 - the total size of the county (r = 0.47); and

- all other positive correlations are less than 0.20. That means the above factors encouraged the process of building new houses in the study area. Meanwhile, the negative factors (that seemed to discourage the mobility process through building new houses) might be due to:-

- the distance from an SMSA: the greater the distance the fewer new houses built. (r = -0.83);
- the total acres of commercial forests: the more
 forest land the fewer new houses built, (r = -0.46);
 other negative correlations were minimal.
- d) The number of the seasonal houses, as they existed by the end of 1970: A positive correlation existed between the increase in seasonal houses and the following variables:-
 - total acres of inland water within these counties (r = 0.63);
 - total acres of commercial forests, (r = 0.40);
 - man-land ratio, (r = 0.26);
 - proximity to highways, (r = 0.17);
 - other factors showed even weaker correlation coefficients. A negative correlation was observed between the increase of seasonal houses and these variables:-
 - the more civil divisions with 4000 people or more, the fewer seasonal houses, (r = -0.30);
 - the more manufacturing establishments with 20 employees or more, the fewer were the seasonal houses, (r = -0.29);
 - other factors had low negative coefficients.

- e) The changes in the rental values: correlations were as follows:
 - the number of seasonal houses; the fewer were these houses, the higher their rental value; (r = -.18);
 - the number of water bodies; the fewer water bodies in the county the higher was the rental value, (r = -.23);
 - the size of commercial forests: the less acreage of forest lands in the county, the higher was the rental value, (r = -.24);
 - the size of the county: the smaller the county, the higher was the rental value, (r = -.43); The only positive correlations here, and somewhat strong, were:
 - the more migrants among young people, the higher was the rental value, (r = .36);
 - the more land surface available for essential uses,
 (man-land ratio) the higher was the rental value,
 (r = .20).
- f) The changes in the man-land ratio: The findings of this study in this regard showed that there were positive relationships between the man-land ratio change and:-
 - the net young migrants, (r = .48);
 - the proximity of highways, (r = .42);
 - the net older in-migrants, (r = .38);
 - the total acres of commercial forests, (r = .27);
 - the number of seasonal houses, (r = .26);

- the changes of rental value, (r = .20).

There were also negative relationships between this land surface for the essential uses (man-land ratio) and these factors of land use:-

- size of the county, (r = -.31);

- total acres of recreation lands, (r = -.25);
- miles of water streams, (r = -.22);
- number of civil units (4000 persons or more),
 (r = -.21);
- total transportation lands, (r = -.20).

These relationships clarify the pressure over areas of essential use.

STAGE TWO: THE SHRINKING TEST

After the major survey of the bivarate relationships that explained the strength and direction between the dependent and predicting variables selected in this study, we need to continue and see what patterns of relationships are going to exist if the model shrinks, at one point, to exclude the northern three counties of the study cluster (i.e. Emmet, Cheboygan, and Presque Isle), and, at another point, to exclude the lower three counties (i.e. Montcalm, Gratiot, and Saginaw).

The three southern counties of the cluster are all much larger in population and more metropolitan in character than the other counties in the study cluster. Their topography is also quite different (they are flatter and easier to develop). The three northern counties all have substantial areas of Great Lake shoreline in contrast to the other counties. It was, therefore, deemed advisable to test the homogeneity of the study sample by selectively eliminating the lower (i.e. southern) three and the upper (i.e. northern) three counties and recomputing the correlations.

Comparison of the results for the general sample and the two subsamples are presented in Tables No.8 through Table No. 11 (only for four of the dependent variables and ten of the predicting land use variables).

Table 8. Correlation coefficients between population increases (1960-70) and some land use factors in the Mid-Michigan model(*)

	Population	increases in a	cluster of:
Land Use Factors	21 Counties	Upper	Lower
		18 Counties	18 Countles
Proximity to highway	11	.13	14
Inland water	26	24	24
Miles of streams	• 58	.17	.65
Water bodies	33	23	34
Recreation lands	.30	10	.29
Distance from Metro	79	72	80
Civil divisions	.91	• 59	•93
Manuf. establish.	.91	.76	.91
Commercial forests	51	64	51
Man-land ratio	.05	•35	04

(*)Source: Pearson Product-Moment Correlation coefficients, contained in appendices A, B, and C.

Table 9. Correlation coefficients between net older in-migrants(60-69 yrs. old) and some land use factors in the Mid-Michigan model (1960-1970) (*)

	Net older	migrants in a	cluster of:
Land Use Factors	21 Counties	Upper 18 Counties	Lower 18 Counties
Proximity to Highway	.20	.22	.22
Inland water	.26	.14	.42
Miles of streams	37	.22	42
Water bodies	.17	05	.17
Recreation land	39	.03	40
Distance from Metro	. 44	36	. 50
Civil divisions	87	51	87
Manuf. Establish.	81	02	82
Comm. Forests	•45	.13	.51
Ratio of Man-land	.38	.42	.41

(*)Source: Same as the previous Table No. 8

Table 10. Correlation coefficients between newly built houses increases (1959-1969) and some land use factors in Mid-Michigan(*)

	New built	houses in a clu	ster of:
Land Use Factors	21 Counties	Upper 18 Counties	Lower
······································		TO COUNCIES	TO COMICIES
Proximity to Highway	07	.23	09
Inland water	20	12	16
Miles of streams	.62	.28	.69
Water bodies	35	31	35
Recreation land	•31	13	.31
Distance from metro	83	82	84
Civil divisions	.89	.32	.91
Manuf. establish.	.92	.70	.92
Commercial forests	46	46	45
Man-land ratio	.06	.42	02

(*)Source, as in Table No. 8

	Seasonal ho	ousing in a clu	uster of:
Land Use Factors	21 Counties	Upper 18 Counties	Lower 18 Counties
Proximity to highway	.17	.26	.13
Inland water	.63	.63	•70
Miles of streams	14	12	17
Water bodies	.08	07	.04
Recreation land	.18	.42	.20
Distance from metro	.17	01	.11
Civil divisions	30	16	32
Manufact. establish.	29	21	29
Commercial forests	.40	•33	•36
Man-land ratio	.26	.25	•35

Table 11. Correlation coefficients between seasonal housing in 1970 and some land use factors in Mid-Michigan(*)

(*)Source, as in Table 8

Comparing column one with column three in Table 8, the results are very similar. Eliminating the upper three counties did not alter the observed relationships among the variables. This implies also that the eliminated cases did not differ from the bulk of the other included cases.

Comparing column one and two, we found major changes in the direction of the relationships of population change to proximity of highways and recreational lands i.e. when the three lower counties are eliminated. This suggests that these counties dominated the effects observed in the analysis of all 21 cases. The correlation between population changes and miles of streams dropped from .58 to .17, and the correlation between population changes and changes in the man-land ratio rose from .05 to .35. The lower counties, as we mentioned, are relatively large in their total population, but the percent change in population was small in these counties compared to most of the other counties. This is reflected in their small change in the man-land ratio, which is relatively small in these three counties (see both percent change of population and the change of the man-land ratio in columns two and seven of Table No. 4 for Montcalm, Gratiot and Saginaw counties).

Other comparisons reflected the following changes:

- Comparing column one with three in Table No. 9 we found that the older migrants had stronger correlations with almost all other independent variables and even stronger with inland water areas (from .26 to .42), and no changes in the direction of relationships were observed in these two columns of Table No. 9.
- Looking to Table No. 10 we found that the increases of houses built during that period had nearly the same correlations as before except the changes in the direction of the relationships as in the number of houses built and the man-land ratio from .06 to minus .02 (column one and three in Table 10).
- In Table 11, columns one and three, the seasonal houses have nearly the same degrees of correlation as before.

When we compared column two with column one in Tables 8, 9, 10 and 11 we also found that:

- population increase had a weaker correlation with the total recreation lands (from .30 to -.10), with the number of civil divisions of 4000 persons or more (from .91 to .59) and with the number of manufacturing establishments of 20 employee or more (from .91 to .76).

Despite these changes in the strength of correlation, there was still evidence, in terms of the correlations between population changes and the above factors of land use, that the planned land uses exert their influence over the distribution of population. As for the changes in the direction of the relationship between population increase and land use measures, we noted a number of changes in the total recreation lands, the total size of the county, and the proximity of highways (from .29, .43, and -.11 to -.09, -.23, and .12, respectively). These changes might be due to the differences in the sizes and locations of the lower counties, specially Saginaw and Montcalm which are bigger, rather than for any other reasons.

Obvious changes (drops) were observed between the strength and direction of the correlations between older migrants and the independent variables: commercial forests, inland water, recreation lands, water bodies, distance from metro, moderate civil division, and manufacturing establishments. Other obvious changes (drops) are seen between also the strength and direction of correlations between houses built and the following variables: recreation lands, miles of streams, civil divisions, man-land ratio, and proximity of highways. It seems that things return to their normal relationships after taking away these three lower counties, which are located in the middle of the Lower Peninsula and absorb the major effects of these changes.

Since the three lower and larger counties hinder the evaluation of changes taking place in the other semi-rural counties of the study cluster, and their effects worked as a weighting process that offset the discrepancies of land use factors as they influenced the development and growth in population and housing, a deliberate regression analysis which favors the cluster of counties that includes the upper counties and rejects the lower three will be chosen for the following section.

STAGE THREE: REGRESSION ANALYSIS OF THE UPPER CLUSTER

Four dependent variables were analysed using multiple stepwise regression with backward elimination of variables. In this approach all predicting variables are entered initially in the equation. At successive steps the variable whose coefficient has the smallest computed F ratio is eliminated from the equation and the remaining coefficients are recomputed. The elimination procedure continues until all remaining variables in the final equation have F ratios larger than some arbitrary criteria. In the present analysis

an F of 2.0 was chosen. For the number of variables and the number of observations considered in the analysis, the F of 2.0 corresponds to a possibility of error of approximately .18 in accepting the coefficient as different from zero. For each of the four dependent variables, the initial and final equations are shown in Tables 12 through 15 with ten of the land use independent variables which are: proximity of highways, inland water (in acres), miles of streams, number of water bodies, recreation lands (in acres), distance from SMSA's, number of moderate sized civil divisions, number of moderate manufacturing establishments, commercial forests (in acres), and total transportation lands (in acres) as follows:

(A) <u>Dependent Variable</u>: Amount of population increase 1960-70

<u>Independent Variables</u>: Ten variables as shown in Table 12. <u>Number of Cases</u>: A cluster of the upper 18 counties. The regression measures the strength of the dependence, or the amount of variation in population that can be explained by linear dependence upon the predicting land use variables which are operating jointly according to the backward elimination approach.

Regression Coefficient, $(R^2 = 0.966)$, i.e. 97 percent of the variation in population is explained by the predicting variables (shown in Table 12) operating jointly (overall contribution). Three variables did not meet the required significance, thus were left out of the equation, while the

Tand lines	Initial Equation			Fina	tion					
(Indep. Var.)	Reg. Coef. В	Std. Err.	Sign. test F	Sign. Level	Beta weight	 B	Std. Err.	F .	Sign Level	⊳eta
Proximity to Hwy.	0.765	7.534	0.010	0.924	-0.012	out	-	-	-	-
Inland Water	0.328	0 .3 82	C.737	0.439	-0.132	out	-	-	-	-
Wiles of Streams	-0.075	0.059	1.592	0.276	-0.202	100	.032	9.48	.013	-,271
Water Bodies	-0. 068	-0.056	1.449	0.295	-0.250	046	.020	4.93	5 . 053	170
Recreation Lanas	-1.976	0.954	4.286	0.107	-0.230	-2.049	.715	8.21	7.019	238
Distance from metro	-9.070	6.562	1.853	0.245	-0.331	-11.934	2.828	17.80	3.002	430
Civil Divisions	0.439	11.688	0.001	C.972	0.008	out	-	-	-	-
anuf. zstab.	3.783	1.521	6.182	330.0	0.448	3.674	0.853	18.56	7 .002	•43
Commer. Forests	0.132	0.111	1.413	0 .3 00	0.256	0.089	0.049	3.27	+ .104	.17
Fransp. Lands	6.198	3.866	2.570	0.184	0.371	3.669	1.454	6.36	5.033	.220
Constant 47.12	 R 0.9	18 7 0.	r ² 973	over 1	all F 1.52	Const 59	tant 2 v	R 0.983	R ² c 0.966	veral: 32.1

Table 12. Population changes as predicted by land use factors in a regression analysis model containing the 18 upper counties.

most influential or the largest contributors in the partial regression coefficients among these predicting variables were manufacturing establishments, distance from metropolitan areas, miles of streams, and recreation lands (see Beta column in the final equation of Table 12).

- (B) <u>Dependent Variable</u>: Net older migrants of 60-69 years of age during the 1960-70 period. <u>Independent Variables</u>: Same as in (A). <u>Number of Cases</u>: A cluster of the upper 18 counties. Regression Coefficient R² = 0.85, i.e. 85 percent of the variation in the net migration of older (most counties gained) is explained by the predicting variables (shown in Table 13) operating jointly. Four variables were left out of the equation because they did not meet the required significance. The major contribution came from distance from metropolitan, inland water area, water bodies, and manufacturing establishments(see Beta column in the final equation of Table 13).
- (C) <u>Dependent Variable</u>: Number of Houses Built during 1959-1969.

Independent Variables: Same as in (A).

Number of Cases: A cluster of the upper 18 counties Regression Coefficient R² = .88, i.e. 88 percent of the variation in the houses built is explained by the predicting variables shown in Table 14, operating jointly. The greatest contribution came through the distance from SMSAs,

Inna linen	_	Initial	rquati	on	<u>_rinal cquation</u>					
(Indep. Var.)	Reg. Coef. B	Sta. zrr.	Sign. test F.	Sign. Level	Beta ₩eight	B	Stá. zrr.	F	Sign L evel	Beta
Froximity to Hwy.	124.210	127.370	0.950	0.385	0.246	162.500	87.730	3.430	ú.101	0.322
Inland #ater	14.340	6.450	4.940	0.090	0.751	15.870	4.240	13.971	0.006	0.632
wiles of streams	1.190	0 .99 9	1.419	0.299	0.419	0.975	0.580	2.827	0.131	0.343
Nater podies	0.857	0.948	0.817	0.417	0.413	1.119	0.442	6.401	0.035	0.539
Recreation Lands	4.976	16.130	0.095	0.773	-0.075	out	-	-	-	-
istance from metro	452.400	112,640	1.830	0.247	-0.723	470.900	62.400	7.500	0.026	811
Civil Divisions	-37.180	197.610	0.035	0.860	-0.089	out	-	-	-	-
anuf. Estab.	-28.640	25.720	1.240	0.328	-0.440	-28.440	14.450	3.870	0.085	•437
Commer. Forests	1.118	1.670	0.357	0.562	0.283	out	-	-	-	-
Iransp. lands	49.640	65.370	C.578	0.490	0 .386	out	-	-	-	-
Constant 3111.6	0.9	R 1 935 0.1	R ² 6 75	ove	rall F 2.15	Constan 3127.4	nt	R 921 ().	R ² ov 849	erall 4.99

Table 13. Net older migrants as predicted by land use factors in a regression model containing the upper 18 counties.

and the second secon

total transportation lands, commercial forests, and recreation lands as shown in Beta column in the final equation of Table 14.

(D) <u>Dependant Variable</u>: Number of Seasonal Houses in 1970.
 <u>Independent Variables</u>: Same as in (A)

Number of Cases: A cluster of the upper 18 counties Regression Coefficient $R^2 = .88$, i.e. 88 percent of the variation in the number of seasonal houses is explained by the predicting variables shown in Table 15 which are operating jointly. The greatest contribution came from inland water, distance from SMSA, water bodies, manufacturing establishments (see the last column in the final equation of Table 15). Since our independent variables were measured on different units (miles, acres, numbers, scale points etc.), the Beta weight or the standardized coefficients provide the most sensible way to compare the relative effect of each independent variables. The other results of the regression coefficient, standard error, signifacant test and levels were clear in each table for both the final and initial equations.

REMARKS AND IMPLICATIONS FOR LAND USE PLANNING IN MICHIGAN

Planned land use factors have proven to be potent influences in population mobility and residential redistribution. They can be used effectively to direct and control growth and development.

We have considered a number of the land use factors so

Iord Hoop	Initial Equat		tion			rinal	Equat:	ion		
(Indep. Var.)	Reg. Coef. B	Std. Err.	sign test r	Sign Level	Beta Weight	В	Std. Err.	F	sign Level	peta
Froximity to Hyw.	526.62	582.86	0.816	0.417	0.164	out	-	-	-	-
Inland Water	10.94	29.52	0.138	0.730	0 .09 0	out	-	-	-	-
Liles of Streams	-1.83	4.57	C.159	0.710	-0.101	out	-	-	-	-
water podies	-2.26	4.34	0.271	c.630	-0.171	out	-	-	-	-
Recreation Lancs	-156.50	73.83	4.500	0.161	-0.371	-128.50	46.52	7.63	6.017	-0.304
Distance from metro	-903.90	515.42	3.070	0.154	-0.674	4099.20	154.41	50.67	J.00C	-U.Ĉ2u
Civil Divisions	176.80	904.26	0.0 38	0 .855	C.066	out	-	-	-	-
hanuf. Estab.	77.60	117.71	0.434	0.546	0.187	out	-	-	-	-
Commer. rorests	8.80	E .5 9	1.040	0.363	0 .35 0	11.26	4.70	5.75	0.034	0 .44 8
Transp. Lands	480.60	299.10	2.580	0.183	U.587	559.16	132.60	17.78	6.001	0.683
Constant 9716.69	R (.9	R ⁴ 67 (.9	2 35	overa 4.4	11 F 39	Constan 6962.1	nt 1 5 0.9	R 935 ს	R ² .879	overall F 17.498

Table 14. Number of housing increases as predicted by land use factors in a regression model containing the upper 18 counties.

		Initial Equation				rinal rquation				
Land Uses (Indep. Var.)	Reg. Coef. B	sta. Err.	sign test F	Sign Sign tes t Level F		; В	Std. Err.	F	Sign Level	Beta
Froximity to Hyw.	76.57	560.09	0.019	0.898	0.030	out	-	-	-	-
Inland water	118.21	28.36	17. 370	0.014	1.255	112.99	16.30	48.0 0	0.000	1.200
Liles of Streams	-0.137	4.39	0. 000	0.977	-0.009	out	-	-	-	-
water pooles	5.28	4.16	1,600	0.273	0.516	4.26	1.59	7.14	0.023	0.415
Recreation Lands	79.49	76.94	1.255	0.325	0.243	93.97	38.91	5.83	0.036	0.286
Distance from metro	-794.80	495.30	2.575	0.184	0.764	-688.10	188.77	13.28	0.004	661
Civil Divisions	317.82	868.94	0.133	0.733	0.154	out	-	-	-	-
Manuf. Estab.	-130.91	113.11	1.339	0.312	-0.407	-129.62	54.81	5.59	0 .040	403
Commer. + orests	5.36	8.23	0.423	0.551	0.274	out	-	-	-	-
Iransp. lands	-22.28	2.7.43	0.006	0.942	-0.035	out	-	•	-	-
Constant 12188.9	۱ ۱.۷	R 949 0.5	κ ² γυο	overa 2.7	L1 F 39	Constan 11287.0	t .9	н 38 . 8	R ² ov 80 1	erall H 0.485

Table 15. Number of seasonal nouses as predicted by land use factors in a regression model containing the upper 18 counties.

as to give more insight for interpretation of the growth taking place in the Mid-Michigan counties, the rapid residential redistribution, and local developments. (Population changes and increases in new houses built in general, and net older migrants and seasonal houses, in particular, were selected to indicate the changes during the study period of 1960-1970).

The findings showed in <u>general</u> - that improved roads, the recreational potentialities, and other planned factors of the land uses explain most of the population change in the sample cluster.

As shown by the Mid-Michigan Model outcome, <u>in parti-</u> <u>cular</u>, the author concluded that:-

- 1) The population increase, mobility, and redistribution during the 1960-70 period were influenced to a substantial degree (regression coefficient of more than 80 percent in a number of cases) by the role of the land uses considered in the Mid-Michigan model when they operate jointly as they must in the real life.
- 2) Older migrants during the 1960-70 period, seemed to be selective in their migration to places that provide greater calm, attractiveness, high quality of environment and far from larger communities or industrial disturbance, close to major highways and close to recreational facilities with access to public water sites and open space.

- 3) The increase in the houses built during that period was positively associated with land use features such as the total transportation lands and commercial forests; and negatively related to the distance from metropolitan centers and the areas in recreational lands.
- 4) The seasonal houses were found more in counties that have access to public waters, and other recreational facilities. They were also negatively associated with distance from metropolitan centers and presence of manufacturing establishments.
- 5) It seems clear in our findings that to consider land use planning as a tool for understanding and directing the development, we have to consider the impact of these specific variables upon the particular groups or types of people.
- 6) One expects these relationships to exist, and could expect better, and balanced, developments in these counties over the 1970-1980 period, with the control of identical measures in the planning of land use.

This would be a clear policy for the best use of these lands. It should be a feasible task that could enable planners to guide, control, and direct community growth, and for researchers to prove how much this expectation is true or false, as a contribution to the development of regional science.

Before shifting to the next point, it is better to briefly review the shortcomings of these findings:

1. Though we pointed out the total transportation land, recreation areas, streams of water, etc., as causes of mobility and growth of population in 1960-1970 period, we should realize that some of these factors were there and exerted their influence before the period studied. However, we assumed that these factors of land use did not receive as much attention as they received during the later 1960-1970 period. We were - in addition - looking to see if the existence of these factors were affecting these developments more in one county than the others.

It would be better if we compared cases item by item. But the regression technique takes the average total in the cluster in one variable and relates it to the average total of the other variable. That is to say the regression transferred the comparison from the county unit to the cluster as a whole.

2. The selected set of dependent variables do not depend on the selected set of predicting variables alone. The population increase in the study cluster, for instance, may be due to other non-land use factors such as fertility and natural increase. We assumed that fertility rate, hence, the natural increase, was similar within the study cluster and outside it therefore it was held constant.

3. Lack of data and information limited the scope of the Mid-Michigan model to the frame of the suggested variables. Had this model additional information such as the governmental expenditure for highways, sewage, parks, recreation,

housing and urban developments, we should have been able to obtain a clearer picture of the development that took place in the study area.

4. Since we are using a cluster of counties out of the total counties of Michigan, and we are not inferring our findings to all counties of state, our cluster is a complete population, and the findings need not be subjected to signi-The test is needed when we relate the ficance tests. selected 18 counties to all the 83 counties of the State. In such a case, the selected counties represent more than 25 percent, which is a large sample related to the whole State. As the sample size becomes larger the standard error will be distributed over more cases and becomes insignificantly small. To be on the safe side, significance tests were provided as part of the computer outputs. 5. The study assumed nearly equal sizes for each county (area by acres), although they are not equal in fact. 6. The model is not so complete that it can comply with, or simply fit, in other situations. But it was useful to handle the situation within this frame of limitations.

JUSTIFICATION FOR TRANSITION

Developing the land use base model of Mid-Michigan, it would have been desirable to develop a similar one based upon the Egyptian planned land use data. These data were not available to the author, and indeed may not exist at appropriate form in the near future.

The Mid-Michigan model does serve to make the point that within a particular cultural and geographic setting, there are dependable relationships between land use features and residential and population redistribution. The task of the planners is to account for these features of land use or infrastrucutre in order to facilitate and attract the future new developments as part of a program of population redistribution, direction, or control.

Though the cultural factors, and the resource endowments are different in Egypt, still, it is the intention of this study to trace the Michigan model using other planned land use features in a trial to understand how land use planning could benefit the future development of Egypt. she is in urgent need to develop her scarce resources in a rapid and rational manner, and match the rapid growth rates in population and urban sites.

Primarily, these resources are land and water for agricultural use, man-made resources as in the High Dam project to bring about more lands into use, and human resources who must be secured a kind of settlement that provide them with security, stability, and quality of life. Keeping in mind the scientific insight developed with the building of Mid-Michigan model, the coming chapter will describe the Egyptian situation and examine the potential role of land use planning over these prime resources in particular and the overall development of the country in general.

CHAPTER VI THE POTENTIAL ROLE OF LAND USE PLANNING IN EGYPTIAN DEVELOPMENT

INTRODUCTION

Pressure on land due to the demographic conditions in modern Egypt urged officials to seek alternative solutions otherwise the dimensions of socio-economic problems would have mounted up. The intensive use of agricultural land, industry, the reclamation of new lands, and resettlement efforts, together with the construction of the High Dam, constituted essential inputs to confront the country's basic, cumulative problem of imbalance between man and resources. The construction of the High Dam - in particular - helped to increase the cultivable area, regulate water resources, and provided electric power. As a result of this dam, in the last decade, new communities have been established on the irrigated and reclaimed lands. The millions of new settlers in these communities can serve as potential tools for more change and development.

This chapter will first introduce an overall review to describe some of the country's socio-economic conditions, the man-land relationships, and the role of the High Dam. It will also investigate efforts and problems in agricultural land use, and the activities of reclamation and resettlement undertaken after building the High Dam to stimulate the development in the country. The contents of this chapter

therefore will be as follows: -

- Socio-economic conditions
- Man-land relationships
- Benefits and costs of the High Dam
- Agricultural land use issues
- Reclaimed lands and resettlement efforts (including a case study)
- Contrast findings with the Mid-Michigan model.

Depending on the available sources of secondary information, in terms of specialized reports, observations, articles, seminars, and surveys by a variety of specialists and top officials the author has tried to collect information, objectively analyze it, and then evaluate and synthesize these issues from a land use planning point of view. A final section will be added to clarify the differences and similarities in the study findings in both locations: Michigan and Egypt.

I. SOCIO-ECONOMIC CONDITIONS

Though this study emphasizes land use policies for settlement, a quick review of the major political and economic challenges that impede the move towards development are worth mentioning:-

1. The country is confronting two major challenges simultaneously: an external defense responsibility to regain and protect legal-political rights, and internal development and reconstruction responsibilities. Both are vital to the public interest and, together overtax the present income by about 50 percent.⁽¹⁾

2. The coordinating task between the present, urgent needs of the masses and future requirements that would match the expected rapid population growth.

3. The international crisis of inflation causes prices to go up and negatively affects the foreign exchange balance of hard currency. The country is facing an 1800 million L.E.^(*)deficit in this sector, in addition to the annual payments of the external loans(along with their interests).⁽²⁾

4. The deeply rooted bureaucracy has not been overcome through the so-called revolutionary measures of administration. This administrative complexity works against the productivity and efficiency of the use of available resources.

5. The delay in allowing the function of the free market, under the name of socialism, should not continue any longer. If the free choices have to be efficient, stable, and capable, to achieve a desired and just distribution of income, the only restriction should be the prevention of

men exploiting other men.

6. Public expenditure is increasing rapidly along with an increase in consumption rates. Public expenditures in 1965 were about 600 million L.E., and reached over 2000 million L.E. in 1975. Meanwhile governmental revenues (direct and indirect taxes) increased only from 500 to 1000 million L.E. during this period (current currency values).

7. Domestic production accounts for only 43 percent of the domestic consumption of wheat, 80 percent of the corn, 70 percent of the beans and lentils, and 80 percent of the sugar.⁽³⁾ The individual consumption of industrial commodities also increased at rapid rates.

The increasing consumption is due to population growth and the increase in income from salaries. It is also due to the government policy which is supporting and holding the prices of consumption goods at low levels to enable poor people to satisfy their needs. This leads to more consumption, and even to illegal trade of these subsidized goods. To increase salaries without increasing commodities available will increase prices and affect the people of limited income. Therefore, increasing production and exports, and controlling consumption, public expenditures, and imports is a must.

To improve general welfare, the government has launched three five-year plans since 1959/60. Industrial development, rather than other sectors, received the most emphasis:

(3)_{Ibid}.

- The percentage of actual investment in industry in the three plans averaged 22.6 percent, in petroleum 5.2 percent, and in electricity 8.7 percent, of the total plans investment.⁽⁴⁾
- In 1960 income from industry was 16.9 percent, from oil 2.3 percent and from electricity 8.0 percent of the total.
- In 1974 income rose to 18.0 percent and 13.0 percent from industry and oil, respectively, and decreased to 1.9 percent for electricity, after achieving the maximum High Dam output of electricity.
- Total funds allocated for industry, oil, and electricity during the 15 years were 1980.4 million L.E., which equals 16.6 percent of domestic total investment.
- Total increase in the output of these three sectors (estimated by base year prices) at the end of 1974 reached 1113 million L.E. of which: 1002.4 L.E. was from industry, 68.7 L.E. was from oil, and 41.6 L.E. was the increase in the electricity (a total of 2230.4 millions L.E., if measured by the 1974 prices).
- The income increase (1960 prices) was 322.7 million

⁽⁴⁾ Report in Arabic about the analysis of the Fiveyear plans by: M. Saleh, Y. El-Awami, A. El-Gayar, and A. Dabbos; Experts at the Ministry of Planning, Al-Shabab, Al-Arabi April 19, 1976.

L.E. or 638.8 millions in the 1974 prices.⁽⁵⁾

- Funds allocated for investment in land uses were neither obvious nor seem of major interest.

The importance of investment in the agricultural sector decreased relative to the national product, despite the increase of its share in that national income. "Agricultural represented 32 percent, 29 percent, and 28 percent during 1960, 1966, and 1967, respectively. It is the main source of the job market, and about 51 percent of the active labor force are working in that sector in 1967 compared with 11 percent in the minerals, industry, and electricity. This sector is also the major supporter of the foreign exchange and export. In 1967, 68 percent of the total export which was 260 million L.E. came from this sector."⁽⁶⁾

Recent data about national income and product accounts show that total investment in the agricultural sector was only 35.2 million L.E. in 1973 as compared with 154.3 million for the industrial sector, while national income from agriculture was 1062.4 million L.E. and only 635 million L.E. from industry in the same year.⁽⁷⁾

In terms of the unit change and multiplier, each 0.18

(7) Al-Ahram Sept. 20, 1976 (Economic Report).

⁽⁵⁾ Ibid.

⁽⁶⁾Arab Socialist Union; <u>Socio-Economic Effects of Land</u> <u>Reform in 20 yrs.</u>, Experts Panel Discussion(Seminar), Cairo Sept. 6, 1972 p. 180.

L.E. invested in agriculture gives a 1.0 L.E. output, while in industry each 0.75 L.E. gives 1.0 L.E. output.

What is invested in the agricultural sector lies far beyond its basic needs. As a result of this stability in land investment, and the vast population increase, Egypt changed from an exporter of food to an importer, to keep feeding these numbers. The budget became loaded with items of consumer and service projects rather than developmental ones. Pressure for more spending on services, transportation, utilities, etc., expends a large amount of the annual income. A situation such as this reflects the real need for land use planning, and calls for national policies to develop and improve the physical, economical, social, and administrative aspects of the public works.

II. MAN-LAND RELATIONSHIPS

The total population of Egypt as estimated by the Central Census Agency, June 1976, is 38 million. This means, every 33.3 seconds a newborn is added, every 61.8 seconds one person dies, and every 37.5 seconds the total population increases by one. By this mode, the total population will reach 70 million in 2000, and Cairo City alone will reach 20 million.

Very high increases occured in the capital city from 8.2 percent of the total population 1937, to 16.1 percent of

the 1976 population.⁽⁸⁾

The provinces with the next highest population density are Giza and Kalyoubia which lie adjacent to Cairo on the west and north. The high density in these two provinces is due to their proximity to the capital city.

The Upper Region of Egypt is partially isolated from development as a result of the lack of transportation. Its location, in a narrow valley, makes it difficult for new agricultural expansion, and industrial processes are going very slowly. These factors made the regional economy unable to compete with its population growth. Migration out of this region reached 11.8 percent while migration to the region was only 2.8 percent. Each family-head is supposed to feed 3.6 persons in addition to himself.⁽⁹⁾

Urban units in the Lower Region of Egypt (Delta) ranged from 30,000 persons for the smallest town, to 90,000 persons for the biggest city in 1927 (not including metropolitan cities), and in 1960 the smallest town was only 5400 persons while the biggest city included 180,000 persons, and the metropolitan cities came into existence.⁽¹⁰⁾

⁽⁸⁾ Declaration by the president of "The Central Agency for Mobilization and Statistics," Al-Ahram Newspaper, June 3, 1976.

⁽⁹⁾Fathy Fayadh, An M.A. thesis, Geographic Dept., Ain-Shams Univ., cited in: Al-Shabab Al-Arabi, May 31, 1976.

⁽¹⁰⁾ Fayza Salim, Ph.D. dissertation about Delta cities in Arabic, cited in Al-Shabab Al-Arabi Apr. 4. 1976.

In Egypt there are more than 20 million rural inhabitants. They live in about four million houses, about four thousand villages and about 29 thousand small farms which lie close to villages.

From a sample study conducted in some rural areas to investigate how integrated rural development can stop or reduce the migration to Cairo City, the General Authority for Urban Planning concluded that: (11)

60 percent of rural houses should be demolished. They are completely lacking in fitness by health or social standards.

27 percent of rural houses need major repairs and renewal.

13 percent of rural houses need minor repairs.

Attitudes towards small families among the housewives, in a study conducted by the Office of Social Surveys in Cairo, show that, theoretically, about 76.8 percent of the housewives prefer a small family of two to three children only. But a comparison between attitudes and practices shows that about half of those who prefer small families do not use any family-planning measures because of other cultural reasons.⁽¹²⁾

Among these cultural reasons for the high birth rate

⁽¹¹⁾ Report by M. Hefnawi; President, General Authority for Urban Planning, Al-Shabab Al-Arabi, Apr. 7, 1975.

⁽¹²⁾ Badrawi Fahmy, "Population Problem" Al-Shabab Al-Arabi, Dec. 1, 1975.

are: early marriage; high fertility rate among rural women; low social and educational standards, especially among women; ignorance of the methods of birth control; and the fear of divorce. The peasants' thoughts related to birth control were tied to their theological philosophy. Family planning or birth control are not simply dependent upon the knowledge and availability of contraceptive devices, but rather on the willingness to use them. Such a willingness can only come with a new approach to life and broader horizons for the individual. Moreover, in traditional agricultural societies, children are economically productive and inexpensive to rear, in addition to being a social asset contributing to the further prestige of the individual family unit.

As a result of this social climate, the birth rate in Egypt has remained largely unaffected by the factors that have brought about their reduction within industrial societies. On the other hand, the extension of modern health measures has brought a sharp decline in the death rate.

"It is likely that the present trend in population growth will continue. Life expectancy, at present, is 51 years for males and 53 for females as compared with 32 for males and 34 for females 30 years ago. Furthermore, the number of females in the most fertile age group (ages 10-29) is expected to double between 1960 and 1980. This high fertility rate and the sharp decline in the infant mortality

rate, means that the population has become younger. The country has at present 8.5 children under 15 to every 10 persons between the ages of 15 and 59. In 1947 there were only 7 under 15 per 10 over 15 years old."(13)

The relationship between the population, the arable land, and the harvest areas can be projected in the light of the previous years' censuses and estimates. An investigation of past years shows a slight decrease in the natural increase rates over the years, (from 27.4 percent to 21.5 during 1952 to 1971) but this rate remains high when compared with the developed, and even some of the other developing, nations. Without repetition, the population numbers during the last few decades projected until the end of the year 2000, can be shown as follows.⁽¹⁴⁾

in	1941	total	population	n was	17,542,000
in	1951	"	*1	tt	20,871,000
in	1961	••	"	N	26,579,000
in	1971	14	*		34,076,000
in	1981	it is	estimated	at	41,000,000
in	2000	H H	**	•	65,000,000

The complete relationships among these variables is shown in Table 16.

(13)Salah El-Abd, <u>Nile Resettlement in Respect of Deve-</u> lopment (Cairo: Egyptian Authority for Cultivation & Development, 1974) pp. 10-11.

(14) Source: Central Agency For Public Mobilization & Statistics (CAFPMS) <u>Statistical Handbook of Egypt Cairo</u>: 1972 and other sources.

Year	Population millions	Arable land million Feddan @	Harvest area (seasons of cultivation) million Feddan	Individual share by Feddan	
1907	11.3	5.1	6.8	0.47	
1917	12.8	5.3	-	0.41	
1927	14.2	5.5	-	0.38	
1941 17.5		-	-	-	
1951	20.9	-	9.3	-	
1957	24.1	5.8	-	0.23	
1961	26.7	-	10.0	-	
1967	30.9	6.1	10.5	0.20	
1971	34.1	6.1+	10.7	-	
1981*	41.0*	7.3*	-	-	
2000#	65.0+	10.5*	-	0.10*	

Egypt's total population, arable land, harvest Table 16. area, and the individual share in the land (1907-2000) collected from a variety of sources in Arabic.

Data not available

(*) Estimated

Despite the fact that reclamation had brought new areas of land into cultivation, and the shifting of land to other uses (especially buildings) the total area remained stable.

shows that the principal problem facing Table 16 Egypt today is the very low rate of expansion of cultivated land area in comparison to the very rapid numerical increase of the population. During the last few decades, the cultivated area, or arable land, increased by about 20 percent (from 5.1 million to 6.1 million feddans) and the crop or
harvest area increased by 57 percent (from 6.8 million to 10.7 million feddans), while the population increased by 201 percent (from 11.3 million to 34.1 million). As a result, the number of persons supported by each feddan of agricultural land rose from two to five. By the end of this century each feddan will be supporting ten individuals, causing a declining per capita income and a continuous lowering of the standard of living.

Figure 6 gives more explanation of this critical relationship. As it is clear from both the table and the figures, the population increase compared with the expansion in the agricultural area reflected the need for more horizontally-oriented expansion (in land area), as well as a perpendicularly-oriented expansion in productivity through the augmentation of the yield of every cultivated area in the country. Otherwise, the problem will mount up and bring about more complications.

In addition to this, all the cities are now facing over-population and very rapid urban growth. The percentage of the total population in 1927 of the urban population was 23 percent, 31 percent in 1947, 38 percent in 1960, and 42 percent in 1970. The transition from rural to urban locations should be a change in quality of life rather than in quantity or figures alone.

Since the total area of the country is about 1,002,000 sq. km., of which only 34,500 sq. K. meter (or about 3.5 percent) is under the plough population density (in terms of quantity)



was 34 persons per km. in 1971, and the man-land ratio (in terms of the quality or essential land used) was 988 person per square kilometer which is among the highest ratios in the world.

III. BENEFITS AND COSTS OF THE HIGH DAM

In her description of the Aswan High Dam of Egypt, Sterling stated that: "Bigger than any dam of its kind ever built, it is equipped to generate 10 billion kilowatts of power; it forms a lake nearly 2,000 miles square, it hobbles the mighty Nile River that spans half of Africa. The dam took 11 years to build and cost close to a billion dollars. The late President expected it to pay for itself in two years, double Egypt's national income in 10, industrialize his poor agricultural state in the same decade, and water an immense empty desert for his hungry, crowded people."(15)

An early study of the project had been done by groups of experts from Egypt, Germany, International Bank for Reconstruction and Development, United States, France, Switzerland, and the Soviet Union. This study took seven years before the execution stage was reacted.

Work on the High Dam was inaugurated in Jan. 1960, and completed in 1970, as one in a series of projects on the Nile River for year-round storage and hydroelectric power. A lake extending 500 k.m. upstream to the Dal Cataract was formed, inundating all of Egyptian Nubia and the Wadi Halfa district in Sudan.⁽¹⁶⁾

The government looks to the High Dam as a key project

⁽¹⁵⁾Life Mag., Feb. 12, 1971, p. 46.

⁽¹⁶⁾ Hussien Fahim, "Nubian Resettlement," article in Ekistics Mag., Athens, Greece: July 1973.

that has great potentialities for future development. Specialists and officials projected these potentialities, at the time of construction, as follows, (17)

- 1. Adding about 1.3 million Fed. to the already existing agricultural land.
- Convert 700,000 Fed. from basin to perennial irrigation. This process doubles the yields of this area.
- Water will be secured for irrigation purposes all the year round and during the critical periods of drought or flood.
- 4. The country will be protected forever from the damaging floods, and benefit from the water that had been ever lost in the sea.
- 5. Rice production will be expanded along with opportunities to export its surplus.
- 6. River navigation will be possible all the year round.
- 7. It will generate 10 billion K.W. per hour of electricity to be used for industrial and domestic purposes, and supply even the remotest corner of the country with cheaper electric power.
- The national income is expected to increase by L.E.
 234 million per annum.
- 9. Some politicians consider the dam as an expression

(17) CAFPMS, <u>Statistical</u>, op. cit.

of Egyptian sovereignty and free will.

- 10. These overall goals can be reinforced by some other practices to help maximize the benefits from this project:
 - a. The highest utilization of all the river water resources.
 - b. The best allocation of water according to the crops' need and not according to the random running of the waterway.
 - c. Changing the timing of crops' cultivation according to suitable seasons because farmers are not tied up and have flexibility in supplying water at any time. This allows them to guage their production to their expectations about market conditions, and enables the greatest benefits from the development cost decisions: social costs, time costs, and supersession costs.

What should concern us--as a direct result of the High Dam project--is the newly reclaimed land and plans for the new reclamation and settlements. Officials consider the development and utilization of the newly reclaimed land as one of the most vital and helpful solutions of population problem. About two million inhabitants will be resettled there, and about 100 new villages and towns will be constructed.

However, the tangible returns from these projected benefits will be discussed and explained with figures in the

following sections of this chapter (to the most recent available dates).

In spite of all this, the project does not show its complete outcome yet, and a lot of criticism has been directed at it. Some of this criticism seems reasonable and valid and some does not. Among these critical points are:

- 1. Extensive public works in the field of transportation and communication, as social overhead capital to serve the economic outgrowth of the dam, have been overlooked. The present highway system outside the Delta area is inadequate. There is no major road connecting north Egypt with the rapidly growing industrial complex based on the dam in the South. Highways are vital to the future development of the country.⁽¹⁸⁾
- 2. The lack of Nile sediment has reduced plankton and organic carbons (in one estimation, to a third of what they used to be).⁽¹⁹⁾ This deprived from the cultivated land the Nile's life-giving sediment, and increased the need for artificial fertilizer (i.e. the dam has robbed the downstream soil of the silt that had made the country the most fertile on earth). It prevented

⁽¹⁸⁾ A. Simmons, "Industrial Development of UAR," <u>Business</u> <u>Topics</u>, Vol. 14, Winter 1966.

^{(19)&}lt;sub>M.</sub> Tamer; (Kiev Univ.) Article about the High Bam, Al-Shabab Al-Arabi, Feb. 17, 1975.

the flood from washing salts away, so that soil salinity will reach ominous levels. It killed off or drove away a fifth of the annual fish catch of sardines in the mediteranian (an alternative is the fish catch from the upstream lake, but due to the lack of transport facilities, the country does not benefit from the huge fish supply in this lake). It also exposed the whole Egyptian coast to erosion.

- 3. Increases in the bilharzia disease rate have occurred because its carrier loves the placid irrigation canals. (Other reports show that this has facilitated the preventive procedures to attack this disease, and health indicators show a decrease in the number of diseases due to this cause, this may also be due to medical care improvement).
- 4. There is less water coming downstream today than there was before. Some is probably escaping underground every year. (Recent reports say that this escape of water underground is temporary. It will end with the stabilization of the lake and the opposite underground water current).⁽²⁰⁾ Evaporation losses were bound to be staggering, because planners failed to take into account the high wind velocity.
- 5. The increased water supply, for irrigation all the

year around, encourages the lavish use of water. This leads to more complications in the drainage system.

Sterling summarized all her criticism by saying: "the dam has impoverished an already destitute nation, driven the fish from the eastern Mediterranean, exposed the whole coast to erosion, endangered every bridge and barrier dam astride the Nile from Aswan to the sea, robbed soil of the silt that had made it the most fertile on earth, threatened millions of acres with the blight of salinity, set off an explosion of water-borne disease and squandered the very water it was meant to save."⁽²¹⁾

The project generated other kinds of unexpected problems but Egyptian and U.N. Development Program experts are studying the lake, the erosion, the parasites, the fish, the weather, the shoreline, the desert detritus and other factors. Reports--year after year--show that the project is standing on its own and its outputs outweigh most of what are considered as shortcomings.

IV. THE ISSUE OF AGRICULTURAL LAND USE

Efforts to intensify the use of available lands (usecapacity efforts) are continuing. The following table shows the harvest areas in 20 years, according to cultivation seasons:

(21) Life, op. cit.

Season	1952	1967	1971
Winter crops	4364	4776	4871
Summer crops	3026	4857	5012
Nile crops	1824	622	610
Orchards	94	207	249
Total	9308	10462	10742

Table 17. Harvest areas (in thousands of Fed.) according to cultivation seasons in Egypt (*)

Since agricultural land is cultivated three times or more each year, the cultivated harvest area is estimated as 10,742,000 in 1971. This harvest area is divided into: (22)

- Seed-crop area (wheat, rice, and corn) about 43 percent;
- Fodder-crop area (clover) 27 percent,
- Fiber-crop area (cotton, lint) about 14 percent,
- Vegetable-crop about 7.5 percent;
- Seed-pod crop (beans and lentils) about 3.5
 percent; and
- Orchard and sugar-cane about 5 percent.

The demand for food production increases by 5.5 percent every year while the rate of development in agriculture does

*Source: CAFPMS, Statistical, op. cit.

^{(22)&}lt;sub>M.</sub> El-Gabali (late Minister of Ag.), article about the Agricultural Problems, Al-Shabab Al-Arabi 3-8-76.

not exceed 3.5 percent every year. (23)

Relying on a study conducted by a group of the Food and Agricultural Organization experts in 1973 concerning agricultural development in Egypt, the President of the Egyptian Agricultural Syndicate stated that: ⁽²⁴⁾ "Egyptian agriculture is one of the most intensified multiple use systems in the world. Crops are seriously crowded on the land."

Despite these encouraging indications, efforts to intensify the use of agricultural land are confronted by a number of remarkable problems that limit maximum use. Some of these problems are discussed below: -

a. Fragmentation of farm land ownership into very small holding parcels: In 1965, holders of less than 5 Fed. were 94.5 percent of the land owners (there were 3,211,000 land owners, and out of these 3,033,000 owned less than 5 Fed., 78,000 owned between five and ten Fed., 90,000 owned between ten and 50 Fed., and 10,000 owned between 50 and 100 Fed.).⁽²⁵⁾ The size of the parcels is as low as one-fourth Fed. in many cases. These diversified

(23)_{Ibid}

⁽²⁵⁾CAFPMS, 1972, <u>op</u>. <u>cit</u>. p. 57.

⁽²⁴⁾ S. Hugrus, article about Agricult. Development, Al- Shabab Al-Arabi 1975.

crops in small parcels, that lie close to each other, with a different plan of cultivation for each, help the spread of insects and do not enable the use of machines, thereby reducing the output and raising the cost of production. It is said that the inheritance system contributes to the generation of these practices.

Lack of effective drainage systems in many agricul-Ъ. tural areas: Due to farmers' ignorance, overirrigation results in a rise in the underground water levels, and, through absorption, adds more salt to the land surface. The underground water (which varies in depth and chemical composition from one area to another) contributes substantially in changing the characteristics of the soil's fertility. It is doubtful that the land converted from basin to perennial irrigation (700,000 Fed. as projected in the dam goals study) might have gained high ratios of sodium absorption.⁽²⁶⁾ Money allocated in the yearly budgets for improving the drainage system is hardly enough to cover all the cultivated land in 20 years, while this improved system in some regions of the country proved its ability to increase the output by one-third every year. Thus, if

⁽²⁶⁾ Samir Salama , Institute for Land & Water, article about the side effects of the High Dam on soil, Al-Shabab, Al-Arabi, Apr, 26, 1976.

enough investments are allocated to that purpose, the total output will not only increase but will also cover its costs within a year.⁽²⁷⁾

- c. Top soil removal for brick production. Some land owners take off the soil surface in order to make mud brick (it can also be baked until hard) and this takes the surface down closeror to the ground water level and increases its salinity. It is hard for land to regain its fertility if the top soil had been taken off. The large scale use of insectisides and fertilizer also affect the soil. Insectisides kill useful kinds of soil organisms and the misuse of fertilizer (without washing out the salt) decreases the land's productivity.
- d. The primitive process of cultivating the farms (using manual and animal power rather than advanced techniques).
- e. Poor and weak rural institutions and social activities ,
- f. There is a continuous decreasing in the cultivated land (and its production) due to the shifting of it to other uses (mostly residential) and the less intensive, and lavish, use of the available land, water, and human resources.
- g. Competition, between humans and animals in the consumption of crops. There is an imbalance in agricultural land use: while land cultivated in hay to feed livestock

(27) Al-Ahram Sep. 20, 1976. (Economic Report).

equals about 30 percent of the harvest area in 1971 (there were about 4.4 million animals, mostly cows, buffaloes and camels in that date)(28),the human-food crops occupied only 55 percent of the harvest area to feed the total population.(29)

Though so much of the cultivated area is used to feed the animals, the real amount consumed by animals is estimated at 45 percent of the production of agricultural lands, while these animals have less capacity to produce meat and milk. Also, these animals are needed to meet the lack of machinery. The dependence on animals will continue until a full mechanization of agriculture takes place.

To cite an example, the winter crop area cultivated in wheat in 1971 was 1,349,000 Fed. (12.7 percent of the crop land), while that area cultivated by clover (Berseem) was 2,770,000 Fed. (25.8 percent of the crop land).⁽³⁰⁾ The idea of reducing clover lands (and substituting it by the development of new grazing lands) has no strong supporters since policy makers in this field consider clover as a kind of fertilizer which improves soil and serves the livestocks as well.

There is also competition over the use of agricultural land to produce raw materials for industry like cotton and

(28) CAFPMS, <u>op</u>. <u>cit</u>. p. 44

(29)_{El-Gabali,"Problems of Human Food in Egypt," article} in Al-Shabab Al-Arabi. 3-1-1976.

(30) Statistical Handbook 1972 op. cit.

lint. Total land cultivated in cotton and linen in winter and summer 1971 was 1,547,000 Fed., about 14.4 percent of the cultivated area. If technology could lessen the demand for cotton, by using synthetic materials as substitutes, then surplus land could be used for food crops.

- h. Unsettled policies of allocating land and of adopting agrarian reform acts and arrangements among operators.
- i. Problems of allocating manpower, planning, and administration and supervision. The government had decided recently to shift its property rights to some lands to farmers who hold under a lease system, or to those who are able to invest in them).
- j. Also there is great competition over the productive crop lands for exportation, food, and domestic industry uses and the determination that specific areas and crops would be cultivated and sold through governmental agencies, generated some conflict among the farmers who tried to avoid such controls and shift their investment to crops that satisfy their free choice.

Further studies to enable prediction of the optimal utilization of these land resources are essential. But should vertical expansion take place to produce crops for domestic food consumption, for industry, and/or for exports? Plans for the optimal development of these land resources should not rest on a one-sided policy. Further more, plans of this sort must consider the needs and potentialities of the surrounding countries in the larger region of the Arab

States, at least.

V. RECLAIMED LANDS & RESETTLEMENT EFFORTS

Proper treatment of this subject should include the performance of the reclaimed lands and the efforts to resettle the people on these lands. A case study will be presented to show how much these efforts are contributing to the development process, and point out some of the deficiencies of this pattern of land use planning.

Reclaimed Lands

An improvement and expansion program was used to bring about the use of new lands for essential uses before, during, and after the building of the High Dam. To review the governmental efforts without referring to the various agencies that work in that field, we can use these data: ⁽³¹⁾

- Before 1952 the rate of reclamation was about 2500
 Fed.^(*) per year. This would reclaim about 50,000
 Fed. in 20 years.
- From 1952 to 1960 the rate of reclamation increased to 10,000 Fed. per year and the country was able to reclaim about 78,883 new Fed. in this period.

(31)_H. Helal & M. El-Kahki; <u>Agricultural Development of</u> <u>the High Dam Water</u>; (Cairo: Egyptian Authority for Land Cultivation & Development, 1973) pp. 16-18.

(*)Fed. (Feddan as mentioned earlier equals 1.03 acres).

- From 1960 to 1965 (the first 5-year plan) the rate was 107,300 Fed. per year. This reclaimed 536,400 new Fed. in this period.
- From 1965 to 1970 this rate was only 55,000 Fed.per year which reclaimed 269,100 new Fed. in this period.
- From 1970 to 1972 political and economic pressures led to a decrease in the reclamation efforts and only 21,000 Fed. were added to bring the total reclaimed land from 1952 to 1972 to 905,300 Fed.

In other words, the total area in Egyptian Feddans, (the total physical land of the country) is 245 million, while the economical portion (land to be used for agriculture and other uses in the present and in the future) is estimated at 12 million, half of which are already cultivated, and the other half can be used but need sufficient funds and investment. (32) Not all the cultivated area is a first grade land, rather it is classified into four classes according to land fertility, sodium absorbtion ratio, and soil reaction. (About 25.8 percent of the reclaimed land is sandy soil, 27.4 percent gypsum soil and 46.8 percent is mud soil). (33)

It is estimated that the High Dam could supply about 55.5 billion cubic meters of water plus 1.5 billion cubic meters from Sudan, plus 10.0 billion cubic meter as purified

(32) Arab Socialist Union, <u>Socio-econ</u>., op. cit. pp. 174-5.
 (33) Helal <u>op. cit</u>. p. 50

water from drainage projects in the upper and lower lands. There is also another amount of water reserved from the reclaimed lands that will not be used for agricultural purposes.

That is to say, available water could irrigate an area of 3.5 million new Fed., or about 4.5 million Fed. if water conservation and recent techniques of irrigation were applied carefully.

On this basis, the General Authority for Reclamation and Land Reconstruction is thinking of a 10 year plan (1975-1985) during which efforts will be made toward: ⁽³⁴⁾

- reclaiming 580,000 Fed. in the river valley and on the Delta (including West Nobaria and West Delta)
- reclaiming 500,000 Fed. around the Kattara Depression
- reclaiming 450,000 Fed. South of Port Said and Salhia (on the west bank of Seuz Canal)

- reclaiming a million Fed. in the Sinai area.

In light of the present and future water resources, improvements in the irrigation and drainage systems, the type of soil, and the cost of reclaiming a unit of the land, officials and experts are estimating about 3.2 million new Fed. will be reclaimed by 2000, in view of the projected available water resources of 77 billion cubic meters, while the needs for water presently are estimated at only 51.5 billion

^{(34)&}lt;sub>Abdul Azeem Abo-El-Ata,</sub> (now Minister of Agriculture & Irrigation) Report, Al-Shahab Al-Arabi, Feb. 10, 1975.

cubic meters.

We should mention here that because of the shift of land to other uses, the loss of essential lands for residential purposes, the high costs of reclamation (one Feddan costs about 500 L.E.⁽³⁵⁾, and the misuse of land resources for example, in over-irrigation coupled with a weak drainage system) the process of reclaiming new lands turned out to be less effective and there has been no significant addition to present lands in the last period. Data show that the country is losing about 60,000 Fed. each year to residential uses alone out of these essential lands.⁽³⁶⁾ And if there are no efforts to stop this trend, the country will not only have lost about 1.5 million Fed. of its essential lands by 2000. but also an individual's share in the remaining agricultural land will reach only fifteenth Feddan. This share was half Fed. in 1907 and was quite enough to support each individual with food and fiber then.

Table 18 summaries the Egyptian efforts in reclaiming and bringing about new lands over a number of years. It is worth mentioning that the reclamation process passes through three stages: (37)

(1) The Engineering Stage: This stage includes the leveling

(35) Al-Ahram June 15, 1976.
(36) Al-Ahram Aug. 6, 1976 (economic study).
(37) El-Abd, <u>Nile Resettlement</u>, op. cit. pp. 17-19.

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Land Category	July 1952- June 1965	July 1965- June 1967	July 1967- June 1971	Total
Nubian lands	38,800	_		38,800
Tahrir province	143,200	5,600	-	148,800
Kuta, Oshim, and Abis	36,100	-	-	36,100
Converted from Deserts	87,800	61,400	-	149,200
Converted from Wastelands	61,700	15,000	-	76,700
Other zones	247,600	90,200	121,100	458,900
Total	615,200	172,200	121,100	908,500

Table 18. Land Reclaimed 1952-1971 (in Feddan) in Egypt.*

of land, the implementation of the major irrigation and drainage schemes, the construction of various kinds of internal canals and drainage, regulators and distributors, the locating of villages, public utilities, and the construction of roads.

- (2) The Agricultural Stage. This stage includes the treatment of the different soil types in order to increase the fertility of the soil. This stage consists of two sub-stages.
 - a). Soil Investigation Stage. To determine the physical and chemical structure of the soil in order to

*Source: CAFPMS, Statistical, op. cit. p. 58.

arrive at the most adequate type of soil treatment. b). Soil Improvement. This stage deals with mechanical, chemical, and biological structure of the soil. These steps are then followed by the raising of the crops most suitable for the conditions of the soil. Crop rotation is applied later in order to extend the quality of soil and to raise its productivity to the level necessary for subsequent distribution to permanent settlers. The time needed to reach a marginal level of productivity is three to six years of cultivation. During this stage hired migratory laborers are used to cultivate the land.

(3) The Social Stage. Land which has been developed and has reached a level of productivity sufficient to support a family on an average of five feddans, is distributed to settlers from the neighboring provinces who meet certain qualifications. They must be literate, able farmers, twenty-five to fifty years old, and of a maximum family size of five. Transport for transfering families and their household goods is provided free. Upon arrival in the reclaimed area, each family receives a house, a cow, some simple furniture and a maximum of five cultivated feddans of land.

The small-holder village type of settlement is composed of approximately 200 houses. For every 300 families an agricultural cooperative society is

organized to deal with providing the settlers with agricultural requisites, a community development council is formulated to evolve standards of hygiene, informal education and animal care, as well as, to advance welfare and community spirit by means of self help projects. Government services such as schools, clinics, and post officies are provided through the ministries concerned. Other facilities and utilities are a part of the village construction.

Resettlement Efforts

As for the resettlement efforts on these reclaimed lands, we need to recognize that there are three types of resettlement activities in the Egyptian experience as a result of the High Dam project. Those types are: ⁽³⁸⁾

- Forced resettlements for a whole group of communities whose land had been inundated as a result of the creation of the reservoir.⁽³⁹⁾
- Voluntary settlements on the reclaimed lands that are close to or among the already inhabited areas.
- Settlements on reclaimed desrt lands where the only previous inhabitants were a few nomads, and

(38) El-Abd, <u>Nile Resettlement</u>, op. cit. p. 21.

(39) See for details. Fahim's article, Ekistics Mag., op. cit.

a completely new infrastructure was provided to accomodate them.

The last two types will be the major focus of our interest in this section.

Excluding Nubian, as a forced type of settlement, the task of settlement is now mainly the concern of the General Egyptian Organisation for Land Cultivation and Development (G.E.O.L.C.D.) which was established in April 1966 to supervise the utilization and development of all land irrigated by the water of the High Dam. This area is divided into the following working sectors: ⁽⁴⁰⁾

South Tahrir	South West Tahrir (Tahaddi)
North Tahrir [#]	Mariut
North West Delta	East Delta
East Middle Delta	West Middle Delta
Middle Egypt	Upper Egypt
West Nubariya [#]	

Figure 7 shows the distribution of the zones on a map. Each working zone presently covers about 80,000 Fed. and is divided into 5000 Fed. farms. The zone is headed by a director general assisted by five departments, namely, the departments of crops, animal production, farm machinery, soil and water, community development, and training.

In order to ensure the extension of services in an integrated way, a central committee was formed comprising

⁽⁴⁰⁾ EL-Abd, <u>Nile Resettlement</u>, op. cit. p. 30-31.

^(*)Both were considered as one sector.





Sec	tor	Iot. lands (000) red.	Land dis- tributed	No. farms	No. of civil units	No. of houses	ho. of population (000)	Labor Camps	Fost & Fhone	Folice	Schools	Hth. Units	Yards & Clubs	bakeries
1.	z. Delta	63.0	23447	11	40	2744	18.7	4	6	2	5	5	14	3
2.	Hamoul (EMD)	69.7	37523	12	49	3277	25.6	4	5	1	4	3	9	1
3.	Mansour (WmD)	77.5	21000	11	38	2102	12.2	2	3	1	3	3	6	2
4.	N.W. Delta	71.8	31444	11	7 0	5267	40.6	3	2	2	7	6	43	2
1ڭ 5	1 N.Tahrir	5 3.2	3 338	12	29	4241	32.8	8	3	2	6	5	11	3
6.	Mariot	52.1	3 970	9	31	2325	18.5	11	4	2	1	4	6	3
7.	Tahadi (SWT)	37.2	1 500	7	25	3464	23.9	4	2	-	3	2	6	1
8.	S. Tahrir	57.1	7088	11	47	51 30	40.2	6	10	3	20	8	27	7
9.	Mic Lgypt	57.9	9413	12	66	51.84	37.0	13	4	2	7	9	13	1
10.	Up Egypt	60 .6	23884	9	42	18371	97.0	1	12	6	43	15	55	1
Tota	1	600.1	162205	105	437	52105	346.5	56	51	21	100	60	187	24

Table 19. Reclaimed lands and resettlement facilities under the auspices of the General Egyptian Organization for Land Cultivation & Development 1972.

This table does not include private-type organizations like: co-operatives, Community Development organizations, insurance, kindergartens, craft shops, etc.

representatives of the G.E.O.L.C.D. and the Ministries of Youth, Social Affairs, Education, and Health. Other committees were formed at each sector level to integrate the function of welfare. Most of the activities carried out up to 1972 are summarized in Table 19 above.⁽⁴¹⁾

The development and utilization of these reclaimed areas is of vital importance to the country. A planning process is very necessary to enable new communities to achieve a dynamic equilibrium with their local resources in order to avert a distructive imbalance between resources and population growth, secure an enduring stability and efficiency for the new settlers and provide for them job opportunities and an improving standard of living.

To achieve these broad goals, the planning staff has prepared a double-five-year plan till 1982. The total amount of money estimated to be needed in the coming 10 years (1972-1982) is shown in Table 20.

Table 20.	Doubl	.e-five-year	plan of	investment	in	new	lands.
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Investment (million L.E)	Housing	Services	Utilities		
Current investment	13.9	8.1	.8		
First 5 year Plan	13.9	8.1	.8		
Second 5 year Plan	10.3	4.3	•9		
Source: Arab Social cit. pp. 10	List Union, <u>So</u> 58-72.	cio-Economic	Effects, op.		

(41) Compiled from Arab Socialist Union, op. cit. p. 159 and other sources in Arabic.

Since land reclamation is a continuing process, some basic operations have accompanied this process. Among the basic operations that accompanied the reclamation to secure maximum benefit were: ⁽⁴²⁾

1) The processes of water resources supply.

and a subscription of the

- 2) Housing and public buildings: about 52,000 units of housing, plus stores, stations, shops, schools, markets, health units, facilities, utilities, and animal production units had been constructed (this accounts for 40 percent of the total investment in reclamation).
- 3) Building paved roads to connect these areas with the major roads, or to connect the new settlements with each other. The total kilometrage paved for that purpose was 1200.
- 4) Adding pumping and drainage stations (lavish use of irrigation harms the capacity of these stations).

Planners must be aware that providing the proper kind of housing in these new communities, together with their facilities and utilities, is not everything needed by the settlers who are selected from other traditional rural communities and who have strong loyality, kin relationships, and solidarity with their old communities. It takes time for those new settlers to become familiar with the new environments and they need proper and intensive programs of community development to help them cope with these new

(42) Al-Shabab Al-Arabi, Feb. 10, 1975.

situations and their emerging problems.

Abis Sector: A Case Study

Since it is difficult to investigate all ten sectors of the new settlements, Abis is a good example for these reasons:

- Efforts to convert this sector into a model one, are taking place.
- This area happened to be the birth place of a variety of experimental processes in land developments instituted by a number of national and international contributions.
- Data present and time elapsed since its settlement might be quite enough to support the requirements of the present evaluation.
- The International Center for Resettlement and Development is located close to this area and is using it as the model for field work and it is the setting for many plans and decisions.

The Abis sector was originally a part of Lake Mariut near Alexandria that was converted to dry, reclaimed land. It has an area of 7286 Fed. allocated among 1681 farmers. It consists of two major villages and 17 minor villages. The total number of families living in this sector is 2020, and the total number of houses is 1520. Most of the settlers have moved from the neighboring high population density zones and were motivated by:- a) desire to own agricultural land (77.7 percent), b) desire to obtain jobs (12.8 percent), c) desire to have a better opportunity to increase personal income (7.6 percent), d) and/or desire to get rid of their previous problems with the original communities (1.9 percent). (43)

In 1967 the first group of settlers were selected from among landless farmers in the nearby villages according to the criteria of selection as mentioned previously.

The Abis settlement represents a part of the northwest Delta reclamation sector (sector number 4 on the map) and not the whole sector.

A recent study had been conducted on that area of these new settlements.⁽⁴⁴⁾ Though the hypotheses and goals of that study differ from our approach, its findings were very relevant to our concern and can be used as modified evidences of the contribution of planned land uses in this resettlement activity.

The hypothesis of that study was that: the commitment to a particular set of preconditions in selecting the type of people who will form and utilize the new communities located on the reclaimed lands, together with the provision of suitable public services might lead to better living conditions among new settlers than the conditions which were

⁽⁴³⁾ Saneya Khalil ; <u>Results of a Study on Mobility and</u> <u>Resettlements in Abis</u>, The Egyptian Authority for Cultivation and Development, 1974 (in Arabic) p. 40.

⁽⁴⁴⁾ Ibid.

available to the settlers in the old communities. (45)

Issues examined were related to the changes in settlers' characteristics, degree of benefit from the situation, and their expectations for the future according to their attitudes toward education. There was a control group from a number of similar communities located in the opposite direction from Alexandria City, but near by and in the same geographical situation.

Some socio-economic indicators were available to evaluate the influence of planned land uses in the Abis settlements as a planned community. Evidences from the mentioned study showed that: ⁽⁴⁶⁾

- 1) A feeling of instability is contemplated by land users who moved with the hope of owning the land but stayed as tenants only. This feeling would not be dominant if the settlers were assigned the land they had expected.
- 2) The age category of the head of families show that most of them were young. This was due to the selection process of the movers (age between 21-50 years was one of the criteria). The result of this selection was:
 a) an increase in the younger age groups. (Under 15 years of age in these communities were 52.7 percent in contrast to 49.6 percent in the controlling communities, or 42.3 percent in the total rural population according

⁽⁴⁵⁾ Ibid. p. 30

⁽⁴⁶⁾ Khalil, op. cit.

to the 1970 census estimates); b) a decrease in the older age groups (65 years and more). That is to say, to impose an age specification when selecting the settlers is not sufficient to secure and maintain either optimum numbers in the working groups or the rate of population increase, unless such additional measures as land capacity controls and family planning are concepts adopted. There were also other differences between the controlling communities and the test communities, as in the sex distribution. where the number of males exceeded that of females. This was due to the need for in-migrant men who were added to the labor force. 3) Illiteracy decreased by about 10.5 percent compared with the educational status of the settlers before moving within a four year period among inhabitants. This indicates good results for the educational efforts, although these communities should not include illiterate people since they were selected from among those who were able to read and write. (But this condition does

- 4) There was an increase among heads of families who were married to only one wife (from 85 percent to 94 percent) which indicates more stability in the family relationships.
- 5) Non-agricultural jobs were fewer in this planned communities than in the classic rural communities.
- 6) There was a decrease in family size in the planned

not apply to other members in each family).

communities compared with the others, especially when there were controls against newcomers (family relatives) who would change the family structure from simple to compound.

- 7) When asked about the name they would like to give to the area they are living in, people got confused and showed less familiarity with the different names of these new communities. The author inferred that the relationship with these local communities was still weak.
- 8) When asked if they were willing to return to their old rural areas, about 96.2 percent assured their desire to stay in their new communities.
- 9) People in these new communities were not reluctant to get married to others from within these new communities instead of the old communities where their relatives and past friends were. If we know that it is among the traditions of rural inhabitants to seek marriage among their relatives or with whom they have strong relations and respect, we can appreciate the influence of moving to these new places has.
- 10) Among the strong indications of belonging to these new, planned communities is that people have no objection to burying their dead in these new areas. It is the habit of rural inhabitants to have their dead buried in places where they have feelings of belonging, and they are ready to pay high costs to do this (about 95 percent of the families agreed to have their dead buried in their

new communities).

- 11) Some changes in the type of houses are taking place through the modification of the structure of the dwelling and adding more rooms to fit the increased numbers of family members. That is because dwellings are standardized to one design and were not built according to the individual desires of the settlers.
- 12) The density in housing is almost the same in both the classic and the new communities (3.5 persons per room). This density was lower among the settlers before they moved to these new communities (2.9 person per room), which is an indication of the lack in proper housing design.
- 13) The options desired to be added to present dwellings were:
 - expansion in the size of the house (lot).
 - Adding an inner enclosure.
 - Including a high fence.
 - Adding a manual oven.
- 14) As for land productivity, the studies showed that there were improvements in production due to the improvement in the land fertility on these new farms compared to the controlling communities where agricultural land remained at its basic level of production.
- 15) There were differences in the per capita income among families in these new communities. Though incomes were expected to be close to the same, these changes

were due to the size of the labor force within each family, other income from owned livestock production, and the degree of skill or experience in the farming work among the settlers. The study showed a relationship between the previous job and the change in the land condition. Land produced more when farmed by the more experienced farmers. There is also an increase in the annual per capita income among the settlers compared to what it was before they moved.

16) The study also tried to show how the people feel the effects of public services provided to them through these new planned communities. Therefore, it included a brief investigation of health, social, education, transportation, consumption through cooperatives, drinking water, electricity, religious, post, police, fire, local trade market, and food processing services. The results showed that planning was effective in assimilating the residents and strengthening their stability within these new communities.

Deficiencies and Strengths

Judging on the basis of the on-going programs' consequences and impacts, we can state that most of the difficulties or frustrations which often arise from the living conditions in these new communities did not occur, primarily as a result of the planning policy of the reclamation and resettlement process. They stemmed, rather, from disability, underestimations, or the inadequacies in comprehensiveness

that accompanied the implemention process. Some of these problems either resulted from, or were results of shortages in transportation means, school districts not being within the commuting range of all residents, shortage in electrical supplies, the remoteness of the fire protection station, giving more emphasis to reclamation and settlement rather than the other aspects of planning. Since these new communities depended heavily on agriculture. they needed surpluses in the labor force, in terms of school-age boys, therefore, education should be directed to facilitate the agricultural task if school enrollment should include more boys. Land use measures, in terms of regulations, standards, land and public services capacity, should have been used as controlling and directing measures. And more effective measures for motivating the settlers and preparing them for resettlement should replace selection and forced moves.

Frustration might also be due to failure to translate broad agreements and socio-economic approaches into specific decisions, or it may also be due to delay in bureacratic problems with multiplicities of or divorce between policy and implementation.

As Alter stated, "many public policies are failures, policy objectives are not met, and thus perceived problems are not resolved adequately. Typical responses are to restructure ongoing policies or to develop new ones."⁽⁴⁷⁾

⁽⁴⁷⁾T. Alter, <u>Land Policy Implementation</u>, Ph.D. Diss., Michigan State University, 1976 p. 1.

One of the officials stated that while land reclamation and settlement projects in Egypt for areas irrigated by the waters of the High Dam are considered as the most important socioeconomic developments during the last two decades, there are still some problems which are facing the new settlers and development of the project as a whole. The following are some of them: (48)

- a) Low Land Productivity;
- b) Inadequate Credit and Marketing Facilities;
- c) Failure to Relate Production to the Type of Land and Marketing Demands;
- d) Negative aspects of physical layout of settlement;
- e) The heterogeneity of settlers;
- f) The changed social status of the settler from the tenant to landowner; and
- g) Maintenance of drainage and canals.

Regarding the Egyptian experiment as we have seen in the results and findings of this study, planning was effective in assimilating the residents and strengthening their stability within these new communities as it was effective and contributed in mobilizing the people and redistributing them in the Mid-Michigan model.

(48) El-Abd, <u>Nile</u>, op. cit. pp. 48-49.

VI. FINDINGS CONTRASTED WITH MID-MICHIGAN

It is not the intent of this study to make a comparative analysis of Michigan and Egypt. Its intention is rather to be a kind of evaluative, complementary, and supportive investigation that can follow up the results of adopting some patterns of planned land uses as they influence residential mobility and population growth.

Michigan analysis showed reliable relationships between some land use features and population redistribution or growth in the rural counties of Mid-Michigan.

The examination of the role of planned land use in Egypt, proved also that certain kinds of land use planning can provide and promote desired land developments and new local communities on a satisfactory planned basis.

Although the predicting factors that were used to measure the above relationships in both locations seem different, they are, in fact, similar in being oriented to planned land uses. Their final impacts and contribution to the growth and mobility were tangible in both cases. They facilitated the redistribution and eased the establishment • of new local communities.

These planned land use factors were exemplified in Michigan through the impact of improved roads, recreational options, moderate industrial establishments, proximity to or remoteness from metro locations etc., and were exemplified in Egypt through the impact of reclaimed lands, competition on the tiny agricultural land, and the resettlement efforts
occasioned by the High Dam project.

If we assumed the existance of similar units and cluster of counties as observations in Egypt as those in Michigan, along with available census data indicating population changes, housing distribution, and land use classifications, then we should have been able to define a sample cluster and apply our model to it as an effort in direct crosscultural comparison. This would have strengthened our conclusions about planned land uses as incentives for residential mobility, population concentration and redistribution.

For our present situation, it suffices to highlight the role of planned land use and its noticeable impacts in the Egyptian practice as far as it showed reliability in the Michigan site.

Among the limitations and differences in the field of implementation that we should also account for, are:-

- Differences in the overall conditions, administrative boundaries, and land classification.
- Differences between free-choice of communities and the pre-assigned or imposed movement schemes. Also the time needed to accommodate the settlers.
- Lack of adequate data especially in the land use field which constitutes a challenge to the developing nations.
- Differences in the available technology and material resouces that enable the use of advanced aerial mapping and topographical, and soil studies on a

large scale.

- Differences in the expression of the interdependent political, economic, and social pressures.
- And the differences in the appropriate level or extent of the standards and regulations of land use. Due to the pressure over the essential lands in Egypt we can just talk about minimum standards of improved roads, attraction of the environmental open spaces, recreation facilities etc. which are far behind the maximum standards of the Michigan land use features.

Due to these limitation in both: the implementation of land use planning measures, and in data concerning their effects, the evidences that show optimal and successful results in the Egyptian practice were not as strong as expected, given the perspective of modern land use planning approaches. The efforts of planned land use in Egypt might have contributed more to controlling the growth and reducing the mobility from rural to urban places, had the planned programs been well-designed and carried out in their implication.

Consideration of the Mid-Michigan model used here, as well as its contrasting with the development of lands in Egypt, suggest these additional implications:

 The recognition of land use interests, practice, and arrangements in both locations: The author observed that there is less interest in some land use issues in

Egypt or they might be carried out through poorlyorganized, inadequate, or ineffective measures of the local municipalities or governments. Among such issues are: comprehensive plans; zoning ordinances; planning commissions and boards; appeals boards with power to overrule local land use decisions and curb the misuse of lands; the use of public powers and directions to influence the best uses as in taxing, spending, proprietary, and taking powers; the environmental protection agencies that impose anti-pollution plans and set quality standards; solid waste; and maintenance of the shores and river sides from erosion; and the urban renewal and community development acts or laws.

2) There is a need to overcome the lack in material resources and provide for deliberate and specialized studies of the land resources and of the complications that may arise from the lack of information and force planners to work under the "art of the possible" approach. Future planning of the land based on sound studies, together with the provision of basic utilities and facilities such as communication, roads, water and sewer, energy and electricity should become the prime determinants of where and how fast new development occurs. Planning and practice for land use programs in Egypt should be farsighted because they have a profound impact upon growth patterns. The results can enhance the public interest if land use

decisions by planners are based upon clear scientific grounds. Otherwise these decisions can be limitations that hinder the effective utilization of land use factors. 3) There is a need to spread the practice of land use planning among local communities and regions as well, in order to achieve a more balanced development between rural and urban areas, and foster desirable population redistribution in Egypt.

Further criteria suggested for more evaluation of the on-going public policies or programs success or failure would be to investigate: effort, performance, adequacy of performance efficiency, and the process, ways, and procedures of attaining the desired results.⁽⁴⁹⁾

Depending on participant observation and review of the planned land use factors as implied in Mid-Michigan relevant to similar efforts in Egypt, one can infer that:-

 a) Improved transportation land facilitated the increase and mobility to rural communities in Michigan. On the contrary, lack of adequate roads made possible mobility toward big cities and impossible toward the rural areas in Egypt. Adequate improved roads would help many in the labor force to reside and make from

⁽⁴⁹⁾ Edward Suchman, <u>Evaluative Research</u> (New York: Russell Sage F., 1967) p. 61.

these rural areas the base for their daily trip to work. This costs less, provide social and emotional satisfaction, and improve the living conditions in rural areas.

- b) Consideration given to development and maintenance of recreational facilities in Michigan facilitated the move and population increase in the rural areas. Quality of environment, amenity factors, and quiet invited the settlers to reside there far from the pollution of air, water, noise, and land. Recreational facilities are limited in Egypt, and the rural and agricultural areas that may serve this purpose, do not receive adequate consideration, therefore, they are not attractive to settlers as the case in Michigan.
- c) Rural areas in Egypt, contrary to these in Michigan, are deprived almost from the start, of better opportunities to live, to work, to learn, to entertain and enjoy adequate public services. Therefore, metropolitan areas are more attractive to the mobile population in Egypt, while the rural areas in Nichigan seem to be more attractive than the metropolitan areas as may be inferred from the recent censuses, because options in facilities and utilities can meet the local needs.
- d) Industrial establishments (big, moderate or even small) are rarely located in rural areas in Egypt.

The misallocation of the industrial firms greatly contributed to concentrating the population and growth problems in the big cities in Egypt. There is somewhat equitable distribution of public services and industrial firms in Michigan, therefore it would seem preferable for older people to select calm environments to stay in. Similar groups almost have no options in Egypt.

e) The man-land ratio in Egypt is among the highest. This is the case for both rural and urban areas. Due to the concentration around the narrow valley lands, intensive use and overpopulation lead to stagnation, less efficiency, and complications. Land use action on all levels, coupled with a set of alternative solutions, is badly needed to offset and confront the accelerated growth problems that arose from this situation. For the Egyptians, as for most active and hard working people, if there is an opportunity there will be a way. Land use is a new field, full of great opportunities.

CHAPTER VII

RECOMMENDATIONS

It has been argued in this study that the process of planned land use is important for population resettlement and growth. The study calls attention to the major techniques that can be practiced to exert controls, curb undesired trends of population redistribution and introduce desirable locations for human settlements.

The author feels that planning in land use is essential in the approach to urban development in Egypt as it is everywhere. It should not be ignored or neglected. It must be given sufficient consideration if the country is really to move toward an era of comprehensive, sound, equilibrium, and stable development.

This section outlines several recommendations regarding the improvement, integration, and enforcement of some activities related to this issue. These recommendations will be applicable to the Egyptian experience as far as it is looking for a rational manner of development:

First: Adopt a Sound Land use Development Process

The land use development process should follow an appropriate course of action in terms of land acquisition, management, programming, planning, political approvals, financing, development of infrastructure and facilities, and producing the economic outcome and consequences, then, long

term maintenance measures must correspond with these aspects.⁽¹⁾ The participants should include and involve: land investors, speculators, builders, developers, local governments and agencies that carry out the services.⁽²⁾

Specifications characterizing a new community should include: the size (a minimum of 5000 acres for 50,000 people); the location (such as outer fringes of urbanized areas); the economic base (half of the community inhabitants should be able to work in it, and half of the people who work in it should be able to live in it), multiple options, enough open space, local government, and it should have a different pattern from the old communities.⁽³⁾

The process must encourage procedures that lead to the improvement of environmental quality and decrease pollution. This can be managed through tax structure, controls, distribution of services and firms, enforcing the urban planning regulations, and controlling overpopulation by encouraging a population level that permits improvements in the living standards instead of forcing the majority to live at a subsistance level.

Local governments should be more inclined to complete basic planning studies (population, economic base, and land use studies) and depend on the help of a professional staff

(1)g. Kaiser et. al. (ed.), New Community Development, Seminar, U. of N. Carolina, 1971 pp. 1-46. (2)Ibid. (3)Tbid.

and consulting firms. Zoning should be viewed as a panacea for the control of growth and development. Numerous other benefits might accrue through the planning process and, therefore, it must be fully utilized.

Second: Include Land Use in the Short and Long Term Flans

Officials and planners in Egypt introduced several fiveyear plans. Other than a few housing and agricultural land use programs, the plans almost ignored other land aspects. Though they were able to point out some problems of both the horizontal and vertical expansion of the agricultural lands, they neither proceeded to put most of their resolutions into effect nor did they benefit from the recent policies for land use in the developing nations. It is time to formulate public policies that could direct and secure the best use of lands, as in taxation, spending power, taking power, proprietary power, etc., which were successfully used in other areas to:⁽⁴⁾

- foster more intensive use,
- promote conservation measures,
- attain particular goals,
- influence investment decisions, and
- enhance property values.

Deliberate and desirable policies should be adopted in this regard rather than the accidental or incidental procedures that deal with land resources in the absence of public

⁽⁴⁾Barlowe, op. cit., ch. 17 p. 534.

direction. The suggested land use policies should include comprehensive and master plans, zoning ordinances, subdivision regulations, planning boards and the like. They should account for the impacts on the use, the ownership values of land resources, the prevention of hazards, the curbing of undesired population growth, and urban blight and sprawl. These policies also, should tend to emphasize the welfare interests of large number of citizens and provide for opportunities, use rights, efficiency, security, stability, and development.⁽⁵⁾

It is true that demands on our growing society make the picture of land use trends more complex. Maintenance of agricultural production will continue to be an important policy issue, but other interests will compete in the formulation of policy, such as non-agricultural developments to meet the vast population increases, competition for land and water, reclamation of waste lands due to erosion and weak drainage system, and attempts to maintain lands for environmental reasons. This complexity calls for an expedient plan to supply these demands through reclamation of desert areas, maximization of the benefits from present lands, and spelling out land use measures that encourage a better distribution, and low rates, of population growth.

To overcome most of the agricultural lands' problems, the suggested policies and plans must deal with land

(5)_{Ibid}. p. 521.

property as a social function and as an exclusive not absolute right. In the mean time, planners need to give more consideration to an improved drainage system; prevention of the practice of removing the top soils; mechanization and industrialization of the agricultural processes; allowing for an appropriate size of land holdings to permit maximizing of production opportunities, consolidating farming through fixing crop rotations; solving the increasing demands for land used to feed livestock and export and strengthening rural institutions.

Since increasing population places increasing demands on resources, the future development of residential areas has the use of desert land as the only option available. Estimates show that available desert lands can accommodate about six millions by the year 2000, while we need to accommodate about 30 million people by that date.⁽⁶⁾ Therefore a strategy of multiple dimensions should be used to confront the situation with such measures as:

a. Curative procedures to reduce growth rates (2.0 to 2.5 percent a year are acceptable). Urban areas should be closed in the face of new migrants, municipalities and local governments must be delegated the authority to practice the roles of land use controls.

⁽⁶⁾ Saad Ibrahim, (Soc. Dept., American Univ. in Cairo) article about the population and Land, Al-Ahram, June 11, 1976.

- b. Preventive measures that curb undesired growth through future development projects.
- c. Programs to stress the development of desert lands.
- d. Programs to train leaders and change the peoples' attitude toward the desert, which is considered as fearful and lifeless.
- f. Lobbies and debates about these issues should take place among officials, legislative bodies, and political powers.

Some of these measures will be treated below separately.

Third: Give more Intention to the Family-Planning Efforts

Workable solutions in this concern should stem from the dissemination of knowledge among the masses and changing the existing incentives of individuals that now encourage large families.

All that the Family Planning Authority has been able to do during the last years is to reduce the birth rates by 0.001 every year. If they keep up with that level, the population numbers will reach 41 millions instead of 43 millions in $1982.^{(7)}$

The Minister of Planning⁽⁸⁾ dismisses emigration as a workable solution to the problem of population increases. Reasons are that about half of the population is under the emigration ages and that emigration occurs only among the

⁽⁷⁾M. El-Sammaa, Report, Al-Shabab Al-Arabi, March 22, 1976.

⁽⁸⁾Ismail Sabri, article about Emigration, Al-Shabab Al-Arabi, June 16, 1975.

active labor force. Since other nations welcome only professionals and skilled people, this means a disaster for the country. The surplus among university graduates (who cost the country too much) must be directed to meet the country's needs first, then the surplus could be encouraged to foster the integration of the neighboring countries. Fourth: Provide an Efficient Network of Major Roads:

An efficient network of inland roads is needed throughout the whole country. Roads are of paramount importance to meet the needs of the socio-economic growth and serve strategic purposes as well.

Roads, in general, are still far from super, and there is a need for several major roads communicating to each corner of the country and traversing through trade centers and cities.

Roadside facilities for travelers and their cars must be made adequate. Maps and information about the roads facilitate and serve the travelers.

Fifth: Adopt Urban Planning Policies that Encourage

Population and Urban Controls

Useful urban theories and techniques that were applied in different areas to curb the urban and population growth are:-

a. The carrying or holding capacity method: related to the capacity of the physical and social environments to absorb all forms of new growth (including air, water, noise and energy in addition to land capacity). In spite of the fact that none of these are absolute and all are open to political decision we can limit to that system both the amount of new land development, growth, and the "right to travel." This system could provide a solution since it would be made available prior to the time land use control decisions are made.⁽⁹⁾

b. Allocation of capacity method: like the allocation of water sewer, solid waste, etc., among categories of users in the community. The theories that ask for the development of new public facilities to handle the new growth pressures, are not acceptable in such cases. This method has the concept of centralization of services to control people, and of extending services to reallocate them.

c. Performance/restrictive zoning: the adoption of zoning ordinances and subdivision regulations is a reasonable tool to control growth in the long run.

d. Transferable development rights: these could be used as
a new way to limit the use of land in accordance with a plan.
e. Enabling legislation and acts could impose limitations
on many communities.

f. Tax exemptions: use value assessment, and subsidies to encourage or discourage particular land uses.

g. Adoption of a combination of dominant use and multiple use management, i.e. land should be managed so as to capitalize on its value. Uses that interfere with the determined

⁽⁹⁾ AIP Journal, Fall 1974 (article)

dominate use could be prohibited. Multiple use management requires production of a mix of goods and services consistent with site capabilities and economic realities in lands not limited to one possible use.⁽¹⁰⁾

The above techniques are not only useful to direct and control growth and mobility of population, but they are also helpful to:-

- avoid the tendency of communities to sprawl and blight.
- save on land costs, construction costs, energy consumption, air and water pollution, and manicipal operating costs, as compared with haphazard growth.
- make smaller communities have greater success implementing laws because of the direct communication between the local government and citizens.
 - impress upon residents the need for controlled growth by citing the rising taxes that would occur should the city expand outward and force increased school, sanitary facility and street taxation.
- Sixth: _moloy Pastoralism and Development of Lemi-Desert Areas
- a. The forthwestern Sone

gypt has many lands that could be converted and prepared for grazing, which is an economic activity that suits

⁽¹⁰⁾ Michigan State University, Land Use Policy for Mich. Conference; May 17-18, 1973.

tribal people. The northwestern zone is an example of such activity, where soil, rainfall, and underground water could facilitate the process. Flocks of goats and sheep, form the livelihood of local tribes living in that region, and the number of flocks they own fluctuates from year to year according to how drought or rainfall affect sufficiency of pastures. (11) This coastal region encampasses an area of rbout 3.8 million Fed., of them about 15,000 Fed. are under perennial crops, and other 100,000 Fed. depend on rain water for cultivation. (12)

Despite the shortage of water, the lack of good soil and the tribal land ownership system, recent technology in development and motivated investment, could open the door for real development in this area and help the stability and living standards of its bedouins, in addition to some other new settlers. Care should be taken to ensure viable size of holdings, drilling of underground water wells, construction of wind and mechanical pumps, and land improvement subsidies and long term loans. Such measures can increase the income from both livestock and agriculture, and lessen the movement of bedouins in their search for pasture and water. A parallel effort should be taken to improve the environment of

⁽¹¹⁾ Abdul Sahib Alwan: Report on the <u>Impact of Morld</u> <u>Food Prog. Aid on the Settlement of the Nomads in the N.</u> <u>Mestern Zone</u>, FAO, UN, Alexandria 1966.

⁽¹²⁾ Salah El-Abd; An approach to Integrated Rural Development in Africa, Cairo:, Egyptian Authority for Cultivation & Development, 1973) p. 166.

settlers in such rain-fed areas. The nomadic tribes, by custom and usage, have the recognized right to use the land for grazing and cultivation. Carefully prepared legislation to regulate this man-land relationship should be issued to encourage the use of such waste lands and prevent confusion and conflict between tribes.

Cooperatives can be encouraged and directed to serve the purpose of marketing, mechanization of water resources, and development of small-scale industries, if we are eager to start development in these areas.

b. <u>Al-Wadi El-Gadid</u>

This area was previously known as the South Egypt Oasis or the South Desert Province. It includes: Kharga Oasis (the capital), Dakhilah, and Frafrah.⁽¹³⁾ It has only two cities: Kharga City (with 4 old villages and 4 new villages close to it), and Dakhilah City (with 18 old villages, Frafra included) and three new villages. About four big hospitals, 29 health units, seven high schools, 12 preparatory schools, and 33 elementary schools.

This province received attention starting in 1962. About 56,000 Fed. were reclaimed there in the last 15 years. Most of this land is in cultivated crops. This valley represents the highest standards of living, and consumption commodities are less 85 percent in cost compared with other provinces. More investment in this area (capital and

⁽¹³⁾ Al-Shabab Al-Arabi, May 3, 1976.

manpower) could produce more output and provide new places for settlement.

c. The Sinai Desert

A new project plan is under consideration and it will include: an Ag-industrial farm of about (30,000 Fed.) It will be followed by other new lands. This project will be directed mainly to the production of livestocks, meat, and milk. Irrigation water will be supplied in part through tunnels under the Suez-Canal. It will include also the establishment of six new villages with a capacity of 200 housing units each.

It is our hope that desert projects which seem viable and important to the development and support of the population's needs, could find sufficient funds and be implemented.

Seventh: Utilize Benefits from Religious Trends

We cannot ignore the role of religion in influencing the trends of the population problem, therefore, we need to recognize the essence of the religious insights. Most of Muslim scholars lean toward the resource side of the problem. Efforts should not be distorted by stressing the birth control side that uses radical preventive methods to discourage any increase in human resources. These efforts should rather be directed toward the development, and best uses of the resources, with emphasis on the integration among nations.

Moderates among those scholars see no harm in birth control if it takes place on the individual and not on the formal level. Birth rate and the natural increase are declining in the European countries but yet the problems of natural resources and economics are increasingly worse. When we look at the magnitude of the available resources in the Arab states and compare it with the lack in preparation and the misdistribution of their human resources, we can see that the arguments of those scholars are far-sighted.

Land use planning can gain the support of those scholars as a tool for controlling undesired future growth.

Eighth: Implement A Program for Rural Housing Renewal

A Rural nation-wide housing and village rebuilding program is urgently needed. A modified project that can benefit from the Gourna model could help.(14)

Though some politicians argue that rural housing is not the most urgent problem facing Zgypt, and it is better to devote attention to providing work, food, or other basic needs, still, by far the biggest part of the population will continue to be found in the villages. And houses are the first essential in raising their standard of living, which is not determined solely by the amount of food consumption nor their health nor the age at which people die. The standard of living is determined as well by housing, recreation,working conditions and human freedom.

Housing is always thought to be the negligible factor among these people and too often the quality of housing is assessed according to minimal standards. But the best solution should consider these aspects: improved local materials, design, money, space, hygiene, and beauty.⁽¹⁵⁾ Fathy stresses that these aspects can build incentives among Egyptian farmers with which they can build houses out of mud

(15)_{Ibid. p. 129.}

⁽¹⁴⁾ Hassan Fathy: <u>Architecture for the Poor</u> (Illinois: Univ. of Chicago Press, 1973) p. 127.

brick, and use the custom of cooperation, as freely donated services of their future inhabitants, to build them.

Such a program should proceed with carefully planned stages, and should include these aspects:

1. electrical service;

.....

- 2. land use planning, road building, public buildings and utilities;
- 3. re-organization of existing services and activities;
- 4. areas that are self-supported by local resources development;
- 5. balance of population growth with local resources;
- 6. gradual transition to urban standards of living and decreasing imigration to big towns.

<u>Ninth:</u> Find a Regional Development Approach for the <u>Arab States</u>

One of the best alrernative solutions to population problems in Egypt, lies in the economic integration of Arab countries as one region. Redistribution of people in this region would add to the benefit and economic well-being of the countries of the region and should be based on developmental grounds rather than political or idological considerations. Joint plans and policies for the best utilization of local resources and production factors of the region could help as an alternative and complementary solution to the problem in the long-run.

CONCLUSION

To sum up, from a land-use perspective, the suitable developmental programs that could meet the urgent needs, help solve the destructive imbalance in the vital, limited supply of the resources, and lead the way toward a durable accommodation with the ecological system, are:-

- Adoption of a <u>land-use</u> Development Policy and Plans.
- Give more intention to the Family-Planning Efforts
- Accounting for an Efficient Network of Major Roads.
- Development of the Semi-Desert areas.
- Gaining the support of the Religious Trends.
- Urban Planning Methods that encourage growth Control.
- Reconstruction of Rural Areas.
- Adoption of an Integrated Regional Development approach with the neigboring Arab countries.

For as complex a problem as we see here, the alternatives, solutions and recommendations can be an endless chain. Landuse planning can do double duty in this concern if we encourage the above recommendations. High income and highly educated families can also raise their levels of confidence in solving these problems of growth and mobility. Comprehensive actions could work with amorphous fields, and one could be assured that land use planning policies can guide and control population growth, provide efficient allocation of human resources, and achieve stability among the new settlements in Egypt. Related future research is required to support our observations and conclusions.

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V. Unpublished Materials

The Auther Class notes in the Departments of Resource Development, Sociology, Urban Planning, and Economics.

Bivariate Correlation Coefficient	No. of Popula- tion 1960-1970 (Mundredæ)	Net old Migration 1960-1970 (Real Numbers)	No. of Houses Increase 59-69 (Real Numbers)	No. of Seasonal Nouses 60-70 "Real Numbers"	Acres of Commer- cial Forests	portation lands	Acres of Inland Mater	Acres of Recrea- tion land	Miles of Water Streams	No. of Water Bodies	Distance from Metro areas Scale	No. Civil Divi- sions 4000 +	No. Manufac. Establichments 20 Employ +	Percent Change of Rent Value	Matie Change of Maryland by Acreage	Net Young Migration 60-70	Sise of County by Aores	Proximity to Highway (Jcale)
	(1)	(2)	(3)	(4)	.(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
 No. of population 1960-70 Not ald migration 60-70 No. Houses increase 60-70 No. Seasonal houses 60-70 Acres of connercial forests Acres of fransport lands Acres of Recreation land Hiles of water streams No. Givil Divisions 4000 + No. Ranufact. est. 20 emp. + Ratio Change mar/land Net Young Rigration 60-70 Size of county by acres Proximity to Highmays 	1.00 72 97 51 51 58 58 58 58 79 10 .05 05 44 11	1.00 63 .45 73 .26 39 37 .17 .44 87 81 .03 .38 .20 52 .20	1.00 21 46 .80 21 .62 35 83 .89 .92 .02 .06 19 .47 07	1.00 .40 14 .63 -18 14 .08 .17 30 29 18 .26 04 .07 .17	1.00 54 .47 27 01 .65 53 24 .27 03 .11	1.00 02 63 05 66 88 03 25 72 04	1.00 15 03 04 40 12 05 07 11 .20	1.00 .19 .07 48 .47 09 25 37 .36 .04	1.00 00 62 11 22 27 13	1.00 .31 25 21 23 .01 01 .18 .05	1.00 68 75 .01 .15 30 .04	1.00 .97 10 25 .61 12	1.00 06 17 37 .57 15	1.00 .20 .36 43 .05	1.00 .48 31 .41	1.00 38 .22	1.00 .03	1.00

Appendix A. Correlation coefficient among variables 21 cases.

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Pearson Correlation Among Variables "Period 1960-70"	No. of Popula- tion 1960-1970 "Mundrede"	Net Old Migra- tion 1960-1970 Real Numbers	No. of Nouses inorease 59-69 "Real Numbers"	No. of Seasonal Houses 60-70 "Real Numbers"	Acres of "ommer- cial Porests	Acres of Trans- portation lands	Acres of Inland water	Acres of Recrea- tion lands	Miles of water streams	No. of Water Bodies	Distance from Metro areas Scale	No. Civil Divi- sions 4000 +	No. Manufac. Setablishments 20 Smploy +	Percent Change of Rent Value	Ratio Change of Man/land by Acreage	Net Young Migration 60-70	Sise of County by Acres	Proximity to Highway Scale
 No. of population 1960-70 Net old migration 60-70 No. Houses increase 60-70 No. Houses increase 60-70 Acres of commercial forests Acres of Transport lands Acres of Recreation land Miles of water streame No. of water streame No. Givil Divisions 4000 + No. Hummarct. est. 20 emp. + Percent change of rent value Ratio Change mm/land Not Young Higration 60-70 	(1) 1.00 74 .97 29 51 .25 24 .29 .65 26 36 36 93 .91 .05 08	(2) 1.00 65 .56 .57 75 .42 40 42 .50 87 82 .03 .20	(3) 19 19 16 .31 35 34 16 .31 .69 35 34 .91 .92 03 02 24	(4) 1.00 .36 -20 .70 .20 -17 .04 .11 -32 -29 16 .35 02	1.00 69 27 35 48 06 54 54 54 11 01	(6) 1.00 23 .60 .60 .01 76 .90 .91 25 27	1.00 07 29 27 24 .25 25 03	(8) 1.00 .32 .08 .51 .46 18 35 41	(9) 1.00 03 71 .65 .71 32 34	1.00 .31 25 21 20 .01	(11) 1.00 75 78 .13 .21 .26	(12) 1.00 .95 11 23 25	1.00 11 26 41	(14) 1.00 .09	1.00	1.00	(17)	(18)

Appendix B. Correlation coefficient among variables 18 cases excluding the three upper counties.

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Bivariate Correlation Coefficient	No. of Popula- tion 1960-1970 "Nundrede"	Wet Old Migra- tion 1960-1970 Real Numbers	No. of Mouses increase 59-69 "Real Numbers"	No. of Segeonal Houses 60-70 "Real Numbers"	Acres of Commer- cial Porests	Acres of Trans- portation lands	Acres of Inland water	Acres of Recres- tion lands	Niles of water streams	No. of Mater Bodies	Distance from Netro areas Scale	No. Civil Divi- eione 4000 +	No. Menufac. Establishments 20 Employ +	Percent Change of Rent Value	Ratio Change of Man/land by Acreage	Net Young Migration 60-70	Sise of County by Aores	Proximity to Highwny Somle
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1. No. of population 1960-70 2. Not old migration 60-70 3. No. Houses increase 60-70 4. No. Seasonal houses 60-70 5. Acres of commercial forests 6. Acres of Transport lands 7. Acres of Inland water 8. Acres of Recreation land 9. Miles of water streams 10. No. of water bodies 11. Distance from Metro area 12. No. Civil Divisions 4000 + 13. No. Manufact. est. 20 emp. + 14. Percent change of rent value 15. Ratio Change man/land 16. Net Young Migration 60-70 17. Size of county by acres 18. Proximity to Highways	1.0 08 .87 22 648 24 24 10 .17 23 72 .59 .76 .42 .355 .68 24 13	1.0 .36 .56 .13 .14 .03 .22 .05 .36 .36 .36 .36 .36 .36 .36 .36 .36 .36	1.0 .01 46 .39 12 .13 82 .31 82 .32 .32 .32 .32 .32 .32 .32 .32 .23	1.0 -33 -63 -63 -01 -12 -08 -01 -16 -21 -29 -25 -17 -22 -26	1.0 29 .41 .10 05 .48 44 61 53 .07 57 .57 .21	1.0 .38 .03 .27 10 .62 .23 .05 .40	1.0 .05 .13 .04 .34 .09 08 12 18 .28 .61 .22	1.0 48 24 05 04 19 .07 .05 .02 13 .23	1.0 01 38 .10 25 7 12 .03 .41 .10	1.0 .44 05 30 .13 .04 .30 .09	1.0 15 53 17 28 33 .29 08	1.0 .41 .13 .16 .61 .23 .05	1.0 .45 .10 .25 23 04	1.0 .13 .31 .51 .09	1.0 .38 24 .48	1.0 13 .21	1.0 .31	1.0

Appendix C. Correlation coefficient among variables18 cases excluding the three lower commiss.