

INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.
2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.
3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in "sectioning" the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again — beginning below the first row and continuing on until complete.
4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from "photographs" if essential to the understanding of the dissertation. Silver prints of "photographs" may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.
5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

Xerox University Microfilms

300 North Zeeb Road
Ann Arbor, Michigan 48106

76-3087

BRANSON, Vanda Kay Parker, 1944-
EFFICIENT ORGANIZATION OF SOCIAL SERVICE
ADMINISTRATIVE REGIONS IN OKLAHOMA.

The University of Oklahoma, Ph.D., 1975
Social Geography

Xerox University Microfilms, Ann Arbor, Michigan 48106

THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

EFFICIENT ORGANIZATION OF SOCIAL SERVICE

ADMINISTRATIVE REGIONS IN OKLAHOMA

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF PHILOSOPHY

BY

KAY BRANSON

1975

EFFICIENT ORGANIZATION OF SOCIAL SERVICE

ADMINISTRATIVE REGIONS IN OKLAHOMA

APPROVED BY:

James Bohland
Richard L. Nostand
Karen Vico Gray
Joseph B. Schindler Jr

DISSERTATION COMMITTEE

PREFACE

A focus on the spatial aspects of social service location and delivery is the primary ingredient in this work. A spatial viewpoint is inherent to geography and offers an alternate approach to that of social workers and sociologists who usually appraise such systems. While geographic arrangement of social services within a spatial framework does not yield an ultimate answer of the "best" location, it does create new schemes which offer considerable spatial efficiency.

The interest in this undertaking stems from the author's long-standing concern for social conditions in Oklahoma. Exposure to various "myths" about the welfare system; its operation, its success or failure, and the general low-regard for the institution by non-recipients further strengthened my curiosity. The author wishes to point out that she has not had experience as social worker or been affiliated with the welfare system in Oklahoma as an employee. The objective was to explore the spatial efficiency of a social service institution and to offer new locational arrangements which would improve the system's capabilities to deliver service.

ACKNOWLEDGEMENTS

Acknowledgements are extended to several DISRS employees who aided in data collection; the field representatives who supplies background data such as the number of trips made to each county in the past; Ms. Ruth Fornby, Information Director of the DISRS: and Mr. Howard Walkingstick, Director of the Division of Eligibility Administration, DISRS. Special acknowledgement goes to Dr. James Bohland, Department of Geography, who directed this dissertation. Without his suggestions, guidance and encouragement this project could not have been completed.

LIST OF TABLES

Table	Page
1. Derivation of County Caseload.	30
2. Correlation Matrix	33
3. Loadings on Socio-Economic Factor.	34
4. Effect of OAA Variables.	39
5. Population Variables Affecting Aid to Disabled Caseloads	42
6. Contribution of AFDC Variables	46
7. Number of Persons Receiving Aid 1970-71.	56
8. Caseload for Existing Eligibility Regions.	64
9. Regional Caseload Using Proximal Solution.	68
10. Economic Costs of Systems Using Eleven Existing Centers.	71
11. Economic Costs of Systems Based on Different Starting Configurations.	75
12. Comparative Costs of Regional Systems.	78
13. Economic Costs of Expanded Regional Systems.	84
14. Economic Costs of Expanded Regional Systems.	87
15. Regional Transportation Costs.	89

LIST OF ILLUSTRATIONS

Figure	Page
1. Social Well-Being Index	35
2. Standardized Residuals.	36
3. Social Security and/or Railroad Retirement.	40
4. Employment of Disabled Persons.	43
5. Families with Female Heads.	45
6. Employed Female Family Heads.	47
7. Organization Chart -- DISRS	57
8. Existing Social Service Regions	62
9. Proximal Solution	69
10. Optimal Solution.	70
11. Regionalization Derived from Random Centers	73
12. Regionalization Derived from Hexagonal Centers.	74
13. Regionalization Using Thirteen Centers.	79
14. Regionalization Using Twenty-Five Centers	82
15. Regionalization Using Thirty-Eight Centers.	86

TABLE OF CONTENTS

PREFACE.	iii
LIST OF TABLES	v
LIST OF ILLUSTRATIONS.	vi
CHAPTER	
I. INTRODUCTION	1
Research As Applied Theory	1
Regionalization.	2
Research Problem	3
Assumptions.	4
Geographer's Role in Social Engineering.	5
II. THEORY AND METHODOLOGY	6
Justice and Efficiency in Spatial Systems.	7
The Concept of Justics	8
Efficiency in Spatial Organization	11
Public Service as a Value Concept.	12
Space Allocation Models in Perspective	18
Methodology.	25
Criteria for Evaluation.	30
III. GEOGRAPHY OF OKLAHOMA WELFARE.	31
Assessment of Welfare Caseload Patterns.	32
The Formation of a Social Service Institution.	48
Programs of the DISRS.	51
Administrative Organization.	55
IV. PRESENT REGIONAL SCHEME: EVALUATION AND ALTERNATIVES. .	61
Existing Regional Scheme for Eligibility Determination .	61
Alternative Regionalization.	66
V. ALTERNATIVE REGIONALIZATION THROUGH EXPANSION.	76
Regionalization Utilizing Thirteen Representatives . . .	77
Number of Visitations as Basis for Regionalization . . .	80
VI. SUMMARY.	91
REFERENCES	94

TABLE OF CONTENTS (Cont'd.)

APPENDIX

I. COUNTY CASELOADS 1967-71	97
II. CALCULATION FORMULA FOR COSTS OF REGIONALIZATION SCHEMES	98
III. NUMBER OF VISITS REQUIRED BY EACH COUNTY UTILIZING 25 AND 38 REPRESENTATIVES.	99

CHAPTER I

INTRODUCTION

This study concerns the design of a regionalization scheme of Oklahoma's social welfare system. Its purpose is to develop a more efficient spatial organization of the present system. Alternatives are posed which would increase the economic and social efficiency of the existing scheme. Emphasis is placed on spatial efficiency as it relates to social systems, and the methodology involves the adaptation of economic-location models to social variables.

Research as Applied Theory

In geography, as in many scientific disciplines, there are at least two general views of research. The "pure" researcher is concerned with the formulation of theory and the development of new methodologies. His contribution deals with further development of conceptual aspects by utilizing methodological perspectives such as logical positivism.

Applied researchers adhere to the belief that geographic theories and generalities should be used to solve real-world problems. These researchers often see little value in theories or techniques, particularly those that do not lend themselves to solving or explaining existing problems or situations. The theorist, on the other hand, often feels that empirical verification or application of theory is of little value to theory development.

While the two paradigms suggest a dualism within the field of geography, the dichotomy is actually false. Both realms have important and necessary roles and should be intricately tied to one another. Research application must be based on a solid theoretical foundation in order to merit utilization. At the same time, theories not substantiated by empirical testing have little utility in policy formation.

Development of theory is not the goal of this study. The objective is to use theories and techniques, with some required modifications, for a specific regionalization problem: the spatial organization of the state welfare system of Oklahoma. In the strictest sense, this is an example of applied research; the methodology is drawn from existing theory and techniques.

Regionalization

Regionalization is a much-debated concept among geographers and others. The organization of people, commodities, or activities into multi-variate regions is criticized on the grounds that regions are often based on generalities which overlook unique properties. These inequities are compensated for by the utility of regionalization schemes for organizing spatial concepts.

One justification for regionalizing is that regions are useful when the goal is to decentralize administrative activities. This justification for regionalization occurs in any hierarchical realm, including government. Ideally decentralization allows delegation of authority and promotes communication and interaction among all components of an entire system. Decentralization can promote interaction between the bureaucracy and its clientel, something that is often lacking with one central office.

Decentralization can also create and perpetuate problems. Allocation of resources among the components of the system may be unequal. This may eventually lead to a plea for central control in order to make the distribution more equitable. Decentralization also may result in local or regional power structures in place of a central elite group.

Regionalization for any purpose, whether research or administration, is highly dependent on the methodology selected. Regionalization theories can be manipulated in order to achieve predetermined goals. In regionalization the intent and the methodology are crucial.

Research Problem

The question asked here is what constitutes an efficient regional organization for the administration of the social service delivery system of Oklahoma? As a research problem it deviates from the theory-hypothesis testing paradigm of scientific positivism. In that sense the research can be viewed as applied, although the problem incorporates the methodologies and theory of the locational analysis branch of geography. Rather than strive for a new locational algorithm to test and validate, the focus is on the use of existing theory to solve an existing problem.

An important aspect of the question is embedded in the ambiguities of what is meant by "efficiency." The metaphysics of the concept are indeed overwhelming. What parameters does one use? How should it be measured? Is efficiency a desired goal for spatial organization?

My focus is on economic and social efficiency, with the latter of prime concern because the study's problem. For example, one dimension of the problem concerns the state's eligibility field representatives. These representatives are the individuals who determine eligibility for

public assistance applicants. The purpose of the eligibility representative is to determine that each public assistance applicant has been fairly and justly evaluated by the county welfare department staff. It is imperative that an administrative organization be efficiently designed so that administrative costs are minimized, and so that each applicant can have equal access to this service. The system must meet social efficiency criteria.

Unlike many social welfare programs travel costs are paid by the institution. In this case, representatives travel from a headquarters office to each county within their administrative territory. Thus the cost encumbered by the move is paid by the social service agency rather than the individual seeking aid. This distinction becomes critical when discussing the concept of efficiency.

Assumptions

To develop an effective algorithm for regionalizing the administrative scheme several assumptions must be established. The locational cost of the system is assumed to be an important variable cost -- if locational costs were insignificant, there would be no basis for suggesting alternate regional schemes. Since the research is applied, this assumption is critical. In Oklahoma's present administrative organization, regions are large and eligibility representatives must travel considerable distances from their headquarters. Since each administrator must cover his entire region, transportation costs are considerable.

The existing organization of space as utilized for delivering social services in Oklahoma would appear to be inefficient. This assumption is supported by empirical evidence, and this evidence prompted my

initial interest in the topic. Certain characteristics of the present system violate basic geographic principles. The regions are too large. Some representatives' headquarters are excessive distances from their regions, and sometimes they lie outside the functional region. Some regions also have extremely high caseload populations.

An efficient regionalization system should weigh the foregoing assumptions and should consider the interests of the field representatives, the State Welfare Department, and the taxpayers. However, design of the system requires cognizance of the primary objective, which is efficient social service delivery for clients.

Geographer's Role in Social Engineering

The geographer's interest in social problems stems from a concern for the unfortunate consequences of a nation whose value system has been completely enmeshed with materialism. As physical and social environmental deterioration increases and the inequality between economic groups widens, it becomes increasingly difficult for geographers to remain aloof. The study of such issues as social welfare can no longer be ignored.

This research endeavors to formulate a socially utilitarian concept of efficient regionalization. It also depicts social welfare conditions in the state recommends policy changes which are necessary to alleviate social welfare problems. It attempts to enlighten people on the magnitude of spatial inequities. Its justification rests on all these reasons.

CHAPTER II

THEORY AND METHODOLOGY

The conceptual foundation for this research is drawn from spatial allocation theory. The division of space and subsequent allocation of the components within that space is basic to the idea of spatial allocation. An area can be regionalized for administrative purposes, to provide low transportation costs, to improve accessibility to a resource, or for a variety of other objectives.

Most appeals for action against social problems emphasize the need for reallocating resources. How resources are allocated clearly indicates the priorities of society. Policies directed at distributing resources within society take several forms. One can force a segment of the population to conform to existing priorities and values by guaranteeing rewards for such adherence. Some advocate government intervention. Although appealing, this approach never achieves the change in priorities that underlie society's resource allocation system. Geographers have commented on the fallacy of such an appeal, stressing that the problem is not one of resource distribution but of production forces, i.e., the injustice is really in the exclusion of a great portion of society from the production sector (Harvey, 1973).

This so called "radical" perspective on resource distribution emphasizes the fallacy of policies directed solely to allocation. Furthermore, the methodology one undertakes to correct resource mis-allocation may

undermine well-intended philosophical views on the question. Well-intended values and policies, like equal access to resource use, cannot be attained by existing methodologies. These methodologies are grounded in values antipodal to a equalitarian philosophy. For example, geographers like Olson (1974) feel procedures based on gravity model principles by their very nature lead to results that are counterproductive. The paramount need is to develop methodologies which will result in solutions consonant with humanistic philosophies.

The goal of the regionalization scheme in this study is social equity along with economic efficiency. The consonance of these goals is discussed in this chapter. A statement of methodology follows that discussion.

Justice and Efficiency in Spatial Systems

Social justice and economic efficiency are not always consonant. Efficiency can be antipodal to the tenant of justice and equality, particularly as justice pertains to individuals. In fact, the notion of society versus the individual lies at the root of much of the conflict between efficiency and social equity.

Total individual freedom, the right of each individual to set his or her destiny, has within it the seeds for its own destruction. When norms, either established through tradition or legally, are absent the energies of a heterogeneous population cannot be organized to fulfill a given task. A structured set of behavioral norms reduces the energy lost in achieving a task. However, in this model the individual is subordinate to society. Questions of resource allocation are approached from a societal, rather than individual, perspectives.

Efficiency and social equity need not be polar concepts. A spatial system may achieve efficiency without impeding personal social development. To understand this position one must consider the concepts of justice and efficiency independently, as well as their synthesis.

The Concept of Justice

Justice is predicted on a sense of reason, the judgements of individual behavior *vis a vis* some standard code of behavior. The acceptable behavior code has evolved within a particular society. Judication, or the administration of justice, evolved from the conflict of human interests. It is an attempt to resolve conflicts on some basis other than mere strength. Justice is not solely an individual's responsibility. The social group or society frequently acts as judge. Human interest conflicts are commonly resolved on the basis of what will strengthen the group (perhaps a nation) or will result in the least amount of interference to group (national) goals.¹

Therefore, administering justice becomes an obligation of the state rather than the individual. This assumes that the well-being of the state is based on the aggregate well-being of its individuals. Laws, public opinion or social sentiment may be unjust towards the individual at a particular time. For example, Japanese citizens were subjected to unfair, cruel discriminatory practices during World War II due to public sentiment at the time. Theoretically a nation should be weakened from these actions. However, the effectiveness of laws and programs often depends on public sentiment, and the physical force accompanying such

¹For broader discussions on the concept of justice see Carver (1922), Harvey (1972), Runciman (1966) and Brandt (1962).

sentiment. Consequently democratic decision-making does not, in itself, lead to just decisions (Carver, 1922, p. 12).

Since the depression years, there has been a change in the principles underlying our resource allocation systems. Opinion has shifted away from the philosophy that equal inputs (political power, social services, economic benefits, etc.) result in equal rewards, since it has become obvious that wealth has accumulated in the hands of a few. Today, many hold that each individual is entitled to a minimum resource level, i.e., a minimum level of well-being, and that a wealthy country cannot justify keeping individuals below this minimum-reward level. These two points of view on resource distribution form the value foundation for the long-standing argument over the concept of social justice.

Social Justice.

Social justice deals with allocation and distribution of both benefits and costs. In a geographic context, social justice focuses on how resources or services are allocated across space or, according to Harvey, the geographer's concern with social justice should be, "a just distribution justly arrived at" (Harvey, 1972, p. 89).

Spatial Injustice.

Social problems vary spatially; therefore, the geographer's role could be viewed as one of inventorying social conditions within the spatial confines of a social group. This perspective plays a role in the resolution of social inequities by informing the public about social inequalities. However, geographers need to step beyond the bounds of regionalizing social injustices.

Geography should be concerned with demonstrating how society's inequalities are spatial in nature. Harvey's attempts at associating rent theory to slum housing is exemplary of this approach to injustice and space (Harvey, 1973). Discrimination based on location, rather than discrimination in locations, should be the basis of the geographer's concern with social problems.

From a regionalization standpoint this means that boundaries drawn around regions should not be a source for discrimination. Where poor regionalization currently exists the deprived regions should be given compensation for their poor relative spatial location. In the case of social services this means all areas must have at least equal access to the services, in fact, since some areas may suffer because of a poor resource base, regional boundaries may have to be reorganized to improve their relative position.

Boundaries for social service regions should be drawn to help the disadvantaged. Boundaries based on any other criteria would be inequitable. Assurance that an individual, regardless of his or her location, has maximum opportunity for improving their well-being requires bounding the territory in a just fashion. This perspective suggests the relationship between regional size and client population should be inverse, the denser the client population the smaller the region.

In the case of Oklahoma, current caseloads in existing regions indicate a poor system for distributing resources of the social welfare system. Every client does not have equal access to eligibility service because regions are too large or poorly designed to be properly administered.

Efficiency in Spatial Organizations

Efficiency is the ability to accomplish goals with a minimum of effort or minimum loss of energy. In an economic sense efficiency implies either minimization of costs, maximization of return, or maximization of profit. Since most spatial-allocation models are based on economic principles, they usually take an economic interpretation of efficiency. Most social problems, however, entail short and long-term costs that cannot be measured in strict economic terms. For example, how do you measure the total effect of poverty on the aged or on children?

To pursue economic efficiency at the expense of humanistic objectives is counter-productive. Individuals or groups bearing the brunt of social injustices may become so oppressed that programs to alleviate their social problems must be instituted. Such programs would require additional expenditures. Some would say that the most economical system of welfare would be to eliminate all services to low-income persons. Cost would be reduced, and the bureaucracy could demonstrate its efficiency by showing a budget surplus. However, this short-run perspective is grossly misleading, for the poor of today are the connecting link to another generation of malnourished, unhealthy, undereducated families. If the fundamental needs are unresolved, the neglected members of society may resort to anti-social behavior, such as crime, in order to compensate for the neglect of society. In the long run these become costs to the system of social organization based primarily on the economics of efficiency (Harvey, 1972, p. 88). Radicals, in fact, argue that an economically inefficient program may prolong the coup of the "revolution" that is needed to make the changes necessary for a meaningful reorganization, whereas economic efficiency will increase the probability of a social revolution.

A basic question to be asked in designing a model for allocating social services is "for whom is the system designed?" A system may be judged as efficient or inefficient from different perspectives. One must adopt a perspective, become an advocate and let that perspective influence subsequent methodologies and acceptable solutions to the problem (Smith, 1973, p. 140).

In the case of services provided by welfare eligibility representatives two questions are pertinent to placing efficiency in its proper realm. (1) What resource or service is being distributed; and (2) how are they being distributed?

The item for distribution is a service, an administrative function--eligibility determination. It is provided or should be provided, to low-income individuals who request, through application, the service. The method of distribution is by field representatives who inspect the applications for service. To be efficient the system must provide an adequate number of representatives in order for the service to be equally accessible to all clients, adequate time to review applications so that just decisions can be made and easy physical access to the records which will prevent wasting time in travel.

Public Service as a Value Concept

Values refer to those items, acts or institutions which one regards as being important. Values strongly influence one's thoughts and attitudes, however, values are not necessarily consistent with one's behavior. One's attitudes about an issue in one instance may not be equally esteemed in another situation even if the same principle is involved in both cases; consequently, behavior is highly situational.

In the area of public services a unique collection of ideals known as civic values often are independent to personal values. What individuals value for themselves may not be so generously bestowed on society. Values can be used as pretexts for manipulations which actually benefit bureaucratic institutions. Precision and order often hide the inconsistent and random occurrence of social phenomena. If it is indeed true that the values one uses to organize his own individual environment are different from those values from which society is viewed, then it is time for a reconciliation of personal values and public values.

If we believe in equality, ethics, truth and justice, these values must be evident in the political sphere. Rather than using spatial allocation models to reinforce bureaucratic values of cost economics, geographers need to identify instances where injustice is in some part a function of spatial organization, develop models to modify the system so as to make it more equitable to all people. Formation of spatial models is a small phase of the resolution of these cases, and probably the easiest state. Values must be changed, including those of the practitioners of spatial planning, if models are to be created that do truly alter the social conditions of the more depressed members of society.

Geographers must now involve themselves in social problems; solutions, however, have little merit if not accompanied by action to implement them. With regard to public services this necessary action must be directed at political institutions whose values dictate the criteria employed in designing the provision of public services. The problem is, then, basically a political one vested in the present disposition of power (Buttimer, 1974, p. 9).

The Politics of Spatial Reorganization.

The ultimate responsibility for continued ineffective social action and inefficient social institutions rests with the holders of political and economic power (Peet, 1972, p. 14). Labeling a system as socially unjust requires more than taking a stand for improvement. It requires measures of correction. Determining inefficiency that leads to social costs is much easier than the political process of altering the causes of the inefficiency. Since political units have the final decree power, methods of correction must eventually be resolved in that arena. Unfortunately, there is a lag between identification of problems and their resolution.

There are two alternatives for improving the current system; change the resources of investments committed in order to counteract the inefficiency (increase the staff of eligibility representatives) and/or change the institution's method of distribution (Smith, 1973, p. 140). Since the former requires substantially more investment it is more feasible to seek a revamping of the system of distribution. This would bring more immediate results than seeking, through the political system, a larger investment in the system. In fact the two are not totally independent of one another, for if a system is not fulfilling its obligations to its constituents because of poor distributive mechanics, it is questionable whether an increased investment is warranted. However, it should be recognized that a system must reflect more than normative economic thinking, it also must reflect society's priorities.

Social priorities closely correspond to resource allocation. The distribution of resources is often weighed against the results which can be expected from the investment. The greater the ability of a resource to be evaluated in terms of economic parameters, such as profit, cost or sales, the higher the item on the priority scale of renewed investments. The same principle applies to system efficiency. If the results are measurable there is a higher probability that a favorable priority can be assigned. Once again philosophies and values become lost in methodologies.

While it is easy to discuss the philosophic basis of social justice, human rights, poverty, and other issues, it is difficult to put such items into a cost-benefit equation. The costs and benefits of social action have not received the amount of investigation that has occurred in other areas. Consequently, they are more difficult to evaluate. Therefore, systems are normally evaluated in terms of those items capable of being expressed in standard scales of economic efficiency.

Principles for Organizing A Spatially Just System

New spatial arrangements are continually evolving. Many of these new regional schemes, however, are designed by bureaucrats for the purpose of achieving a stated objective. The methodologies employed in designing new systems are sophisticated. However, one cannot assume that the spatial order designed by methodological expertise will be just. Philosophies of organization must be transferred into spatial organization principles. A socially just organization must also be able to function within a spatial framework, i.e., method must be geographically workable.

Three principles are used to guide decisions regarding spatial organization in this research. These three principles are humanism, equalitarianism, and decentralization.

A humanistic spatial organization provides the greatest benefits to those with the greatest needs. This type of organization seeks to solve man's problems by emphasizing human ideals without regard to economics, political climate or feasibility. This view holds that justice lies in the solution of social problems regardless of costs or popularity.

The concept of equalitarianism is based on the notion that the justice of a system is based on equality of service and does not reconcile the inequities existing at the time of implementation.

Decentralization, or the division of a system into components, is often adopted for dissemination of administrative duties or to bring consumers closer to products or services. Decentralization may employ humanistic or equalitarian methods but not necessarily; frequently the basis is economics or political decisions.

Whatever the motive for organizing spatial systems, however noble the original intent may appear, all of the above bases for development of spatial systems must lend themselves to implementation. Society must accept them, the economic means for implementation must be available, and the political system must accept them before the spatial system can be implemented.

Justice, Efficiency and Location Models

The model utilized in this research emphasizes efficiency. Its use in this research is based on its adaptability to the philosophy of a given user. Much of the spatial allocation output to date is based on

economic considerations only and has been devised for private industry, government agencies, or public institutions. However, some of the spatial models developed for economic reasons can also be utilized for allocation systems based on other criteria.

There are three perspectives for viewing the problem dealt with in this research. First, the system needs to be socially just. Second, efficiency must be measurable. Third, a feasible operational solution must be achieved.

Reorganization of space examined in this research involves the state-wide provision of a service for the poor. Therefore, the system is judged on the basis of the adequacy and the efficiency of providing the service. To be just, the supply of services should be limitless, that is, the assumption that society wants to maximize the benefits of the service. The amount of service is normally a decision of the system designer. Economics is typically introduced as an evaluative factor (feasibility often demands a ceiling cost be established for the services), however, in a just system such a constraint should not change the benefits to the clients of the system. Stressing the justice of the benefits for the poor in geographic models is the only means of counteracting the location models based on the "taxpayer's behalf" (Peet, 1972, p. 14).

Location models lend themselves to socially just principles, but the important factor is that the user decides the criteria for provision of services, i.e., equal service, service equal to need, or guarantee of minimum service. In this research justice is interpreted from the equalitarian perspective. Every client shall have equal access to the social service. This form of justice is adopted because of the nature of the problem. The need for the service exists if application for

service is made. There is no varying degree of need for the service. The service is either warranted in full or not at all.

The second criteria is efficiency. Efficiency, as it is used here, based on prior discussion of efficiency concepts, means preventing waste in time and resources in the provision of services without interfering with the individual's right to that service.

For a regional system to be of value, it must be implemented. Often the feasibility issue requires modification of a system because of manpower and/or finance considerations. Both tend to prevent realization of all the basic premises on which the reorganization is founded. Implementation is the third principle for this study, however, the principles of social justice and efficiency take priority over the principle of implementation.

Space allocation models provide the mechanism to achieve such improvement through uniting justice and efficiency. The reputation of location models as economic tools is well known. Their adaptability to social problems needs to be expanded. They are especially well-suited to spatial justice based on equal population per spatial component as found in this particular research problem.

Space Allocation Models in Perspective

Organizing territory in some type of normative manner has been a central theme in space allocation techniques. Theoretical and applied location analysis in economic geography has employed space allocation techniques primarily for minimization of transportation costs. Consequently, much of the work in location analysis can be traced to the development of simple gravity model concepts.

Prior to the quantitative modeling of locational patterns, locational analysis involved assessment of mapped distributions. Factors influencing location were identified by close scrutiny of those distributions. Locational tendencies were seldom generalized and, consequently, theory was subservient to empirical studies. The empirical emphasis at best lead to the creation of locational checklists. These unsystematic listings provided little insight into the dynamics of location.

Early Location Analysis Research

It is difficult to cite a specific date or person for the evolution of contemporary location analysis. It is clear, however, that the foundation of early work, and in fact much of today's, is based on the concepts developed by three individuals -- Weber (1928), Von Thunen (1826), and Christaller (1933). The studies of each are well known so there is little need to review in detail their contributions. Central to all three is the cost of distance as an influence on location, be it industry, land use or central places. Subsequent work became an expansion of many of the concepts of these three.

Hoover (1948), for example, expanded Von Thunen's theory on rents to include a rent gradient; the decrease in rent with distance for any product, related with transportation costs, volume, transferability and market competition. All these influence land use patterns and must be incorporated in decisions of location to minimize costs.

Haig (1926), paralleled Von Thunen's agricultural study with one based on urban activity location. He used "cost of friction" (site rent) plus transportation costs to develop a least cost location system. These and other concepts were formulated in Christaller's theory of location of

tertiary activities. Also, they serve as the foundation for much of the later work on urban land values and economic costs in an urban milieu.

Losch (1954) continued to set forth axioms of location. Most noteworthy was the concept of the hexagonal lattice and its relevance to the location of production and distribution points. He envisioned a homogeneous earth which would naturally divide into hexagonal economic regions due to the efficient space-distance allocation of a continuously distributed population. The hexagonal lattice concept became an initial premise for many spatial allocation models developed in later years due to its adaptability to minimization of total transportation costs.

The importance of transportation inputs to the location process was emphasized in Isard's (1956) systematic treatment of the locational question. Location was approached by "substitution analysis". Reality was replaced by the theoretical. This approach was based on the notion that location was a function of transportation inputs.

Recent Spatial Allocation Trends

Much of the early work in locational analysis was concerned with discrete point locations, often industrial plants using raw materials and producing some type of output. Following Isard and this transport input emphasis is latter 1950's and early 1960's witnessed the introduction of activity analysis (number of trips, number of visits, time spent, preference of users, etc.) to support and form location theories. It was during this period that linear programming became a popular tool in organizational research. The solution to the transportation problem was actually published in 1941 by F. L. Hitchcock but the major developments in this area of study occurred in the 1960's.

Numerous publications on spatial allocation using various techniques have emerged. The majority are based on empirical studies and often seek a particular problem solution. There are many different classes into which spatial allocation studies can be placed, for example, transportation problems, spatial price equilibrium studies, determination of locations and flows, raw materials to plants to markets, studies based on indivisibilities and interdependence, trans-shipment problems, traveling salesman and network design. However, those considered here are those that are related to the problem examined in this research. Most employ an algorithm to determine the solution and the majority employ discrete point methods rather than continuously distributed data techniques.

Approaches to Minimization of Transport Cost

The basic solution to the least cost transportation problem is a linear programming algorithm for minimizing the total cost of movement within a transportation network which has known supply centers and capacities, receiving points and demands, transportation costs (distances between supply and demand points). Scott (1971) illustrate the basic technique of optimizing flows through minimization of transportation costs. Others have concentrated on the optimal location of supply centers based on distances to demand points. Maranzana (1964) expanded the technique to locate supply centers on the basis of distance plus a weight corresponding to demand (mean aggregate travel points). Lord's article (1972) is based on a situation where competition exists and is pertinent to many economic situations involving commodities. The supply is the excess production of an area and the demand is the deficit of other areas.

A cost matrix was developed to allocate the surplus to the deficit areas via least transportation costs. Lord interjected a varying production cost for the surplus producers in addition to the transportation costs. This gave some suppliers with low production costs a greater advantage in their location than was realized by transportation costs alone.

Additional procedures for locating optimal nodal locations have recently emerged. Toregas and Reville (1971) formulated a solution for locating supply points which placed consumers within a maximum time limit of a supply point. The maximum time element was introduced because the authors felt that distance has little meaning to an urbanized country now, and that for some services (fire, police, medical) time is the most critical factor.

In some studies supply and demand constraints are omitted because some facilities (welfare offices) lack a real capacity limitation. If capacities do exist (firehouses) simulation models are often better suited to problem solutions than the transportation problem technique.

Determination of Locations and Flows

This approach is similar to the transportation problem but it can be much more complex if costs are non-linear. The problem involves known consumers and their demands. The solution seeks to locate facilities and establish their necessary capacities by minimizing transportation costs.

Kuehn and Hamburger (1963) utilized this procedure to locate hundreds of facilities within an area servicing thousands of consumers. The idea of locating for a complete network of large size is one that

could be of utility for nationwide concerns. Teitz introduced some major points for consideration when dealing with extensive public or government facility location. Teitz (1968) pointed out the need for a social welfare function, the absence of a competitive price system and the problem of appropriate levels for allocation and optimization when dealing with public facilities.

Public facility location can be based on many criteria including economic, political or personal preference. Gould and Leinbach (1966) used spatial allocation techniques to simultaneously locate multiple supply points (hospitals). Godlund's study (1961) is similar in that he sought to expand some hospitals by spatial allocation techniques based on demands at existing facilities. Morrill and Kelley (1970) use a simulation model to determine the location and flows to hospitals based on personal choice when more than one facility was available within equal distances.

Rushton (1971) developed an algorithm which has as its theoretical basis, central place theory, and as its operational algorithm, multi-dimensional scaling. The problem is to find the number and location of supply points that equalizes the trade areas of each supply node. The solution is an iterative process whereby an initial set of points that are located in a hexagonal lattice is readjusted to fit a pattern of expected interpoint distances that takes into account variations in the population density of the study region.

Problems in Indivisibility and Interdependence

Problems in indivisibility occur when plants, institutions or political regions (states, counties) cannot be divided by allocation systems.

In these situations entire facilities or regions must be assigned. Problems of interdependence pertain to the location or assignment of facilities which may affect the profitability or utilization of other existing plants or facilities. In other words, the components of a system are interrelated, the action of one affects other components.

Yeates (1963) deals with the problem of spatial allocation when political boundaries are involved (indivisible school districts--an entire region had to be serviced by one system). Unlike industrial location problems, public or government facilities are often regulated by boundaries which limit the number of possible sites. This type of situation often becomes a major constraint in determining the best location within a region and/or size of a facility. Yeates' work involved allocation of children to public schools to minimize school bus travel distances considering capacities of the schools.

Goodchild and Massam (1969) worked with the problem of spatial allocation within existing political boundaries too. Their task was to form administrative regions which would minimize the cost of consumers traveling to the administrative centers. A second solution placed an equal population constraint on each center but still minimized travel costs. Every consumer could not be served by the nearest facility and each facility did not have exactly equal population because the results had to be adjusted due to the inability to divide townships between administrative facilities.

The literature clearly illustrates that linear programming as it relates to minimization of transportation costs is a central theme in most models of space allocation.

Methodology

The solution to be sought in this study is to allocate welfare field workers to regions in a manner that will meet the needs of the persons utilizing this service, be efficient in the delivery of the service and constitute a feasible (employable) solution. The problem is primarily social in nature, therefore, social, not economic, criteria must be selected to accomplish this goal. The spatial allocation model selected then must be one that allows some freedom of manipulation to allow interjection of user objectives.

Spatial Allocation Model

The basic linear programming approach to least cost solutions in a transportation matrix is used. The objective is to minimize the total costs of movement between supply and demand points. Mathematically this is stated as:

$$Z = \sum_{i=1}^n \sum_{j=1}^m t_{ij}x_{ij} \quad (1)$$

where the objective function is:

$$\sum_{j=1}^m t_j x_j = \sum_{i=1}^n t_i x_i \quad (2)$$

Z is the total cost of commodity (service) flow. Supply points are represented by n with each individual supplier designated $i = 1, 2, \dots, n$. The demand points (m) are individually symbolized as $j = 1, 2, \dots, m$. The unit cost of flow from i to j is assumed to be linear and designated t_{ij} . The total commodity or service flow from i to j is x_{ij} ; therefore, $t_{ij}x_{ij}$ represents the total transportation cost of the system (Scott, 1971, p. 2).

This model is used because of its applicability to the problem. The problem utilizes transportation costs from a given origin to a given destination, but its versatility permits the use of various other constraints. In this research an iterative process of regionalization is employed. Various regional systems are formulated and compared with one another. The final solution is the regionalization scheme that most closely approximates the principles set forth by the author.

The transportation problem has as its initial input a series of supply and demand points. To ascertain the effect of the original location of these points, several arrangements for supply points are employed, and an evaluation of each solution is made.

First, the existing locations of welfare representatives are used as supply points. A constraint of equal population per region is incorporated to insure an equal caseload. Equal population also promotes equal access to service for the applicants. In this first solution, as well as all subsequent solutions, after each regional iteration the mean aggregate travel point within each region is located. These points then become new supply points for succeeding regional iterations. The process continues until the regional boundaries and the mean aggregate travel points remained constant. At this point the final regional scheme is adopted as the best given the constraints of the problem.

In the second stage of the methodology the number of personnel and amount of service actually needed to deliver adequate service is determined. New regions are devised on the basis of these figures. The added cost of these new schemes is measured in order to assess their operational feasibility.

Criteria for Regionalization

Several criteria are established for evaluating the new administrative regions. First, the state is to be regionalized in such a manner that the opportunities of the poorest region are greatly improved. The prospects for achieving this goal depend on the mechanism used for allocating the services. Equal-area regions can be drawn in which the least advantaged groups are so distributed that resource allocation benefits the most advantaged areas. Such gerrymandering can be avoided by allocation processes which assure that each individual, regardless of surrounding social and/or physical environment, has maximum opportunity for service. For this study equalization of caseloads is used to accomplish this goal.

The second point for evaluation is the stipulation that people's needs must be met. Need is the most important criterion for allocation when striving for social justice (Runciman, 1966, p. 261). The location of greatest need should correspond to the greatest application of resources. To put this concept into operation there can be no constraints, such as budgets, on determination of the resources required to fulfill the stated need. Needs must be justly established and resource allocation must reflect this need.

Assuming regional boundaries are fairly drawn, allocation of social services within the region should correspond to the need of the components of the region (counties). Those counties with greater caseloads should receive more help in determining eligibility. Correlation of existing service (number of days or trips involved in actually delivering service) with service needed (based on caseload) would be a

means of identifying misallocation of personnel. If the current personnel is unable to meet the needs, more service workers should be added to the staff. Part of the methodology utilized in this study entails the determination of the number of field representatives actually needed to fulfill the objectives of the social service programs involved. If the needs of the population are unfulfilled, the services are being misallocated and society must avoid unnecessary impoverishment due to inefficient or unjust resource allocation (Brandt, 1962, p. 20).

Data Inputs

The data utilized to formulate a regional system for this project and to evaluate the existing framework are social welfare information. Since the regionalization algorithm requires an origin-destination matrix, the data must be equated to supply and demand points. Supply points are centroids in the counties which headquarter the field representatives. Demand points are the county seats in all counties requesting the representatives' service. The people requesting this service are distributed throughout each county but because they must travel to their respective county seat to receive the service, the county seats are designated the demand points. Supply is determined by dividing the social service caseload of Oklahoma equally among its field representatives. In subsequent schemes supply will represent the number of clients a representative can effectively serve.

Demand (or need) corresponds to the average caseload of each county. Total caseload for each county consists of the number of families receiving Aid to Dependent Children (AFDC), the number of persons receiving aid from Old Age Assistance (OAA), Aid to the Blind (AB), Aid to

the Disabled (AD) and commodities (now replaced by food stamps). Some persons may receive aid from more than one category but their eligibility for each program must be ascertained by the field representative and therefore are counted in the program from which aid is received.

AFDC totals the number of families involved, for field representatives determine the eligibility of the family unit. The AFDC number is multiplied by two since this program's participants must have their eligibility ascertained every six months; applicants for all other programs are reviewed once each year. The caseload statistics of each program for each county reflect a five-year average (fiscal years 1967-71), the average number of each program is then added to indicate the total county caseload (Table 1).

The economic costs of the system consist primarily of salaries and travel expenses for the field representatives. The average salary for a field representative is \$11,000 and the travel expense is based on a state allowance of \$0.12 per mile. A questionnaire was sent to the field representatives requesting the number of trips made to each county during the fiscal year 1971 in an attempt to ascertain total transportation costs (magnitude of flow x unit transportation cost). One objective of this research is to minimize total transportation costs while improving social services.

A distance matrix, based on mileage from a representative's headquarters to the center of the counties served, is used as a surrogate for transportation costs between supply and demand points. Since the reimbursement rate for travel per unit mile is a constant, the use of distance is a realistic surrogate for travel costs. Total mileage multiplied by

TABLE 1

Derivation of County Caseload*

Example: Adair County

5-yr. avg. AFDC 2	5-yr. avg. Commodity Receivers	5-yr. avg. Old Age Assistance	5-yr. Avg. Aid to the Blind	5-yr. Avg. Aid to the Disabled	TOTAL CASELOAD
1244.8	6133.2	1146.0	33.6	381.2	8938.8

Source: By author from DISRS records.

*See Appendix I for average caseloads for all counties during this period.

number of trips together with salaries gives a close approximation of the total economic costs of administering the eligibility-determination service.

Criteria for Evaluation

Based on the criteria utilized to derive the regional system for the administration of the eligibility determination service, evaluation will require ascertaining that (1) regionalization has improved the opportunities of the poorest region; (2) the needs of those people requiring the services are met; (3) the new solutions are an improvement over the existing system and (4) the derived system can be implemented.

CHAPTER III

GEOGRAPHY OF OKLAHOMA WELFARE

An understanding of the spatial distribution of Oklahoma's lower income citizens is essential to understanding the importance of social service delivery. Much of Oklahoma's citizenry enjoys at least a moderate degree of well-being; others are not so fortunate. As pointed out in Chapter II, poverty is expansive for society as well as the poor; therefore, knowledge of the spatial distribution of clients should aid in planning for improved services and programs. Also a short treatise on the administration of welfare within Oklahoma is vital to understanding the important role of efficient regionalization. The administrative structure also reveals the vital position of the field representative and its capacity for determining the success of social service delivery.

Analysis of the spatial distribution of public assistance cases emphasizes the validity of a regional arrangement for eligibility verification based on equal population per region. Due to the concentration of clients in certain sections of the state, regionalization based on any other factor would diminish the opportunity of some persons to receive service. There are several population characteristics which correlate with client density and these will be pointed out. Variables influencing poverty levels are not necessarily the paramount concern of the eligibility representative; however, the eligibility worker is in a position to act as a liaison for other state or federal agencies interested

in aiding the poor via knowledge of particular problems within an eligibility district. As an example, some counties may be in critical need of day care centers or establishments to hire disabled persons who are able to work but are not in the labor force.

Assessment of Welfare Caseload Patterns

The geography of welfare caseloads in Oklahoma as ascertained by the percentage of each county's population receiving assistance (based on the average caseload per county from 1967 to 1972) shows a general pattern of increasing recipient density along a diagonal extending from northwestern Oklahoma to the southeast portion. The changes during this same five-year period indicate the greatest increases in recipients were in the north-northwest section of the state. One reason for this is that several counties in this area began the food stamp-commodity program in 1970. Other factors involved in these general trends are related to specific programs.

Factor Analysis

Four variables were selected to extract the basic factors influencing the variation in caseload among counties.¹ These variables are (1) Median Income; (2) Median Age; (3) Per cent of Population Rural; and (4) Per cent of Population Non-White.

It was speculated before the results were obtained that median income is an important variable of welfare caseload and that there would

¹Only four variables were employed since the intent is to show the variation of well-being in Oklahoma, not the causes of variation. The variables selected are typical of those which vary with degrees of well-being.

be some intercorrelation between this variable and the other three. This is indeed the case with the other variables having a correlation coefficient of .860 or greater with median income (Table 2). It should be pointed out that intercorrelation between the other variable combinations is also high, particularly between per cent rural and median age (higher median ages occur where greater percentages of the population are rural).

TABLE 2

Correlation Matrix

	Median Income	Median Age	Per Cent Rural	Per Cent Non-White
Median Income	1.000			
Median Age	0.860	1.000		
Per Cent Rural	0.881	0.921	1.000	
Per Cent Non-White	0.868	0.758	0.836	1.000

Source: By Author

Since a small number of variables was used, only one factor was obtained. Each of the four variables loads high on this factor, thus leading to classification of the factor as socio-economic in nature.

The factor scores range from 2.55 in one eastern county to -1.53 in the panhandle (Fig. 1). The scores give an indication of the social well-being within the state (Smith, 1973, p. 12). There exists a definite geographic area in north-northwestern Oklahoma where socio-economic conditions are better than those found in much of the remainder of the state.

To show association of social well-being with welfare caseload factor scores are correlated with the percentage of each county's population receiving aid. The result is a coefficient of 0.982.

TABLE 3

Loadings on Socio-Economic Factor

Variable	Loading
Median Income	.95647
Median Age	.93847
Per Cent Rural	.96463
Per Cent Non-White	.91608

Source: By Author

Standardized residuals of regression are obtained to detect significant deviations from the simple linear model. Those values of ± 1.00 have been plotted (Fig. 2). The positive values indicate under-prediction of welfare caseloads based on the variables used and the negative ones denote over-prediction. Some have random locations but there exists a definite group of higher than expected caseloads in the eastern counties. Three counties in the southwest have extremely high departures from the regression line, all with significantly fewer caseloads than the socio-economic factor would indicate. These deviations are not accounted for in this research but speculation for their occurrence includes economic conditions and/or political climate.

SOCIAL WELL-BEING INDEX

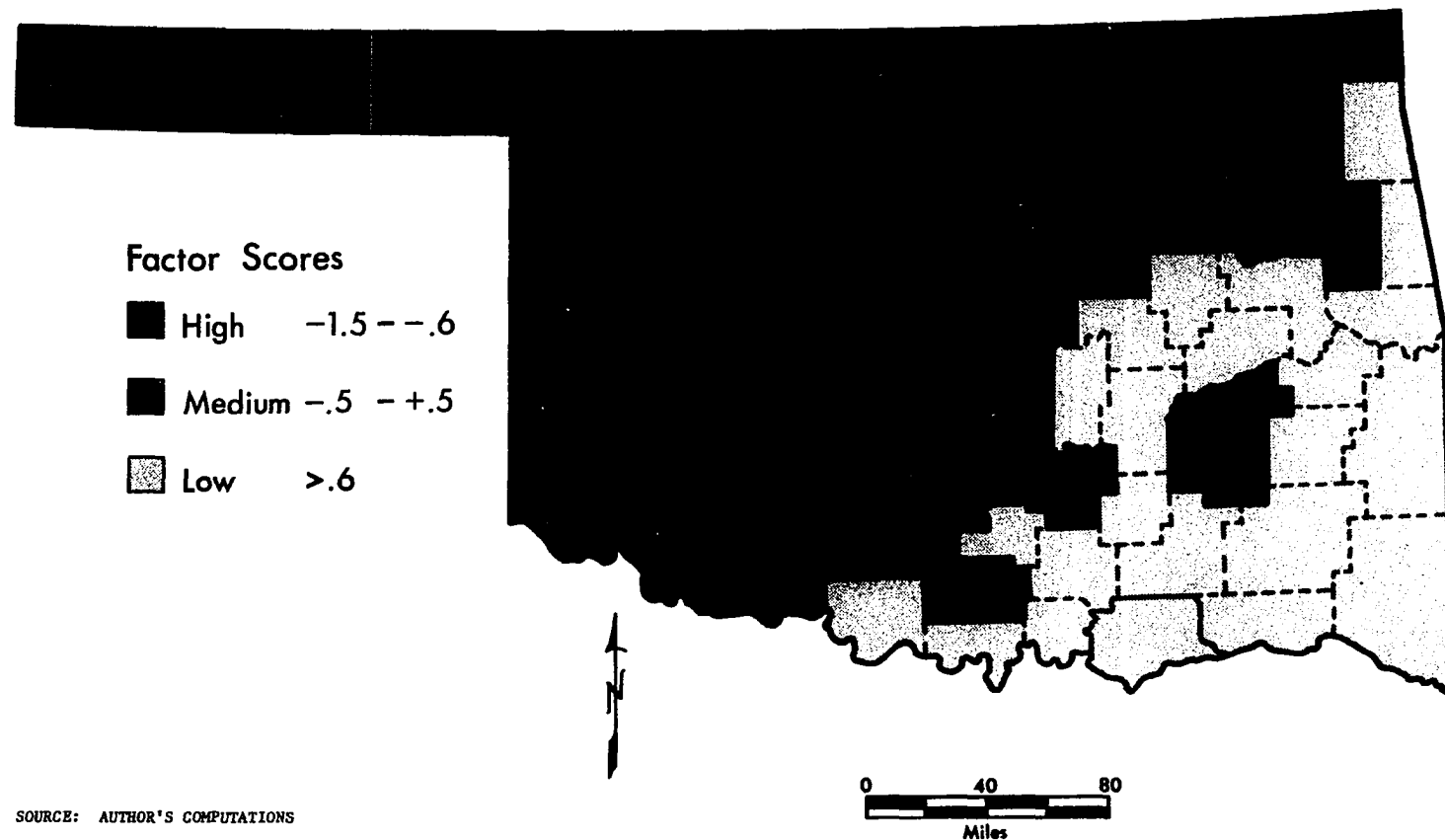


Figure 1.

STANDARDIZED RESIDUALS

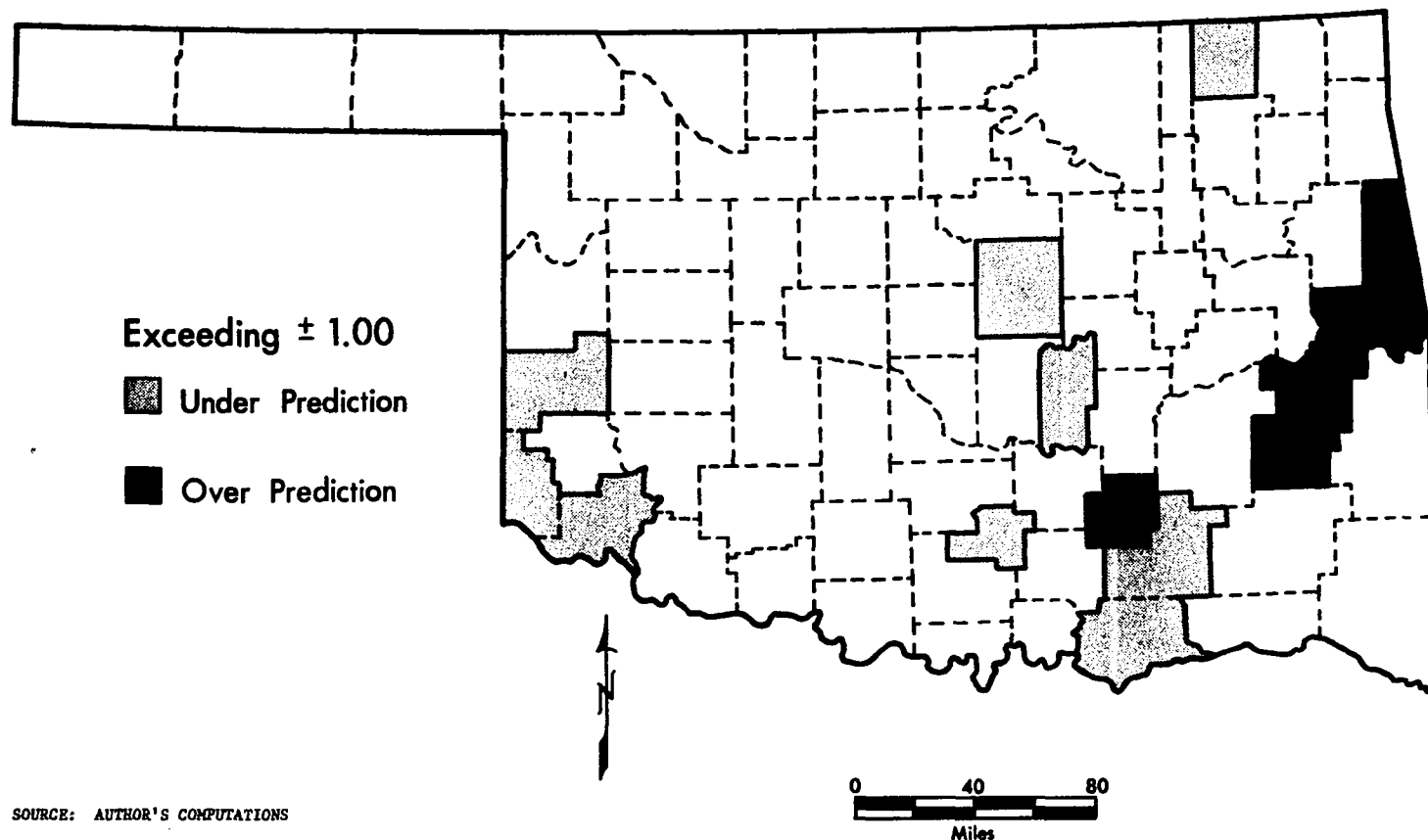


Figure 2.

Additional Analysis of Caseloads

To formulate relationships involved in the caseloads of specific assistance programs stepwise multiple regression is utilized. Three programs, Old Age Assistance, Aid to the Disabled, and Aid to Families with Dependent Children are analyzed. Independent variables are extracted from the 1970 Census of Population.

Old Age Assistance is the oldest program and, with the exception of three southeastern counties, involves less than ten per cent of a county's population. The southeast sector of the state has seven to ten per cent of the total population receiving OAA. An axis from northeast to southwest corners of the state defines an area having five to seven per cent of the population on OAA. The portion northwest of this central diagonal has less than five per cent on OAA. The panhandle has below two per cent of the population receiving OAA benefits.

A study of the percentage of change in OAA over the past five years indicates that all counties declined in total numbers of OAA recipients. The greatest decrease is in the panhandle and northern tier of counties (declines of fifteen to thirty per cent) with the least reduction occurring in the eastern counties bordering Arkansas (less than a ten per cent decrease). A major factor accounting for this overall decline in OAA recipients is the rise in Social Security benefits. As Social Security benefits increase fewer persons have to seek OAA.

Five dependent variables are used in a stepwise multiple regression model to measure the effect of certain variables on OAA caseloads. The variables are: (1) percentage of each county's population that was

65 or older; (2) percentage of the population 65 or older that was below the poverty level; (3) percentage of the population 65 and older that were family heads; (4) percentage 65 and over that received Social Security and/or Railroad Retirement; and (5) percentage 65 and older whose income was not more than 125 per cent of the poverty level.

The results obtained are not as high as anticipated. Only 8.14 per cent of the variance is attributed to the above variables (Table 4). Percentage of county population over 65 is the most important, followed by percentage that receive Social Security and/or Railroad Retirement. The other three variables add very little to the total variance. The insignificance of "percentage below poverty level" and "percentage with incomes of 125 per cent of the poverty level" is due in part to the fact that annual incomes for most of the elderly throughout the state, regardless of county, are below the poverty level. This means that the elderly require sources of income to supplement Social Security, must have accumulated savings, or must own their home and not have housing as an expense in order to realize a degree of social well-being somewhere above the poverty level.

Two factors contributing to the concentration of OAA recipients in Southeastern Oklahoma are not found in Census data. One concerns the inability of persons to participate in the Social Security Plan. Many elderly persons have never paid into the plan, particularly farmers and housewives. In order for such persons to obtain Social Security benefits, they must pay the equivalent of Social Security withholdings for the past ten years. In the southern and eastern sections of the state where median incomes are lower and the incidence of poverty high, the ability

of persons 65 or over to pay this ten-year amount is highly unlikely.
The alternative is OAA.

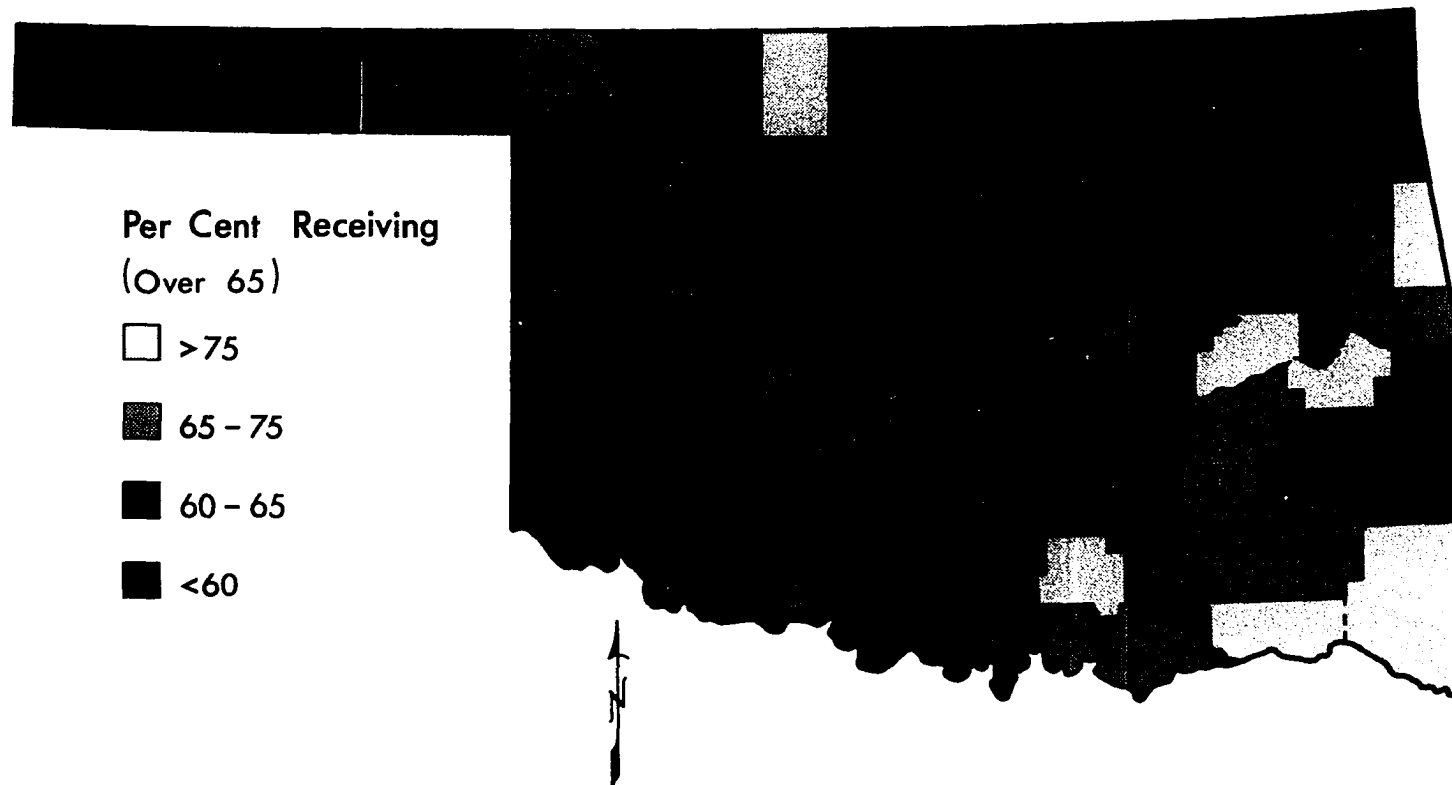
TABLE 4.
Effect of OAA Variables

Variable Entered	Multiple		Increase in R ²
	R	R ²	
Percentage +65	0.215	0.046	0.046
Percentage +65 below poverty level	0.228	0.052	0.005
Percentage +65 and family head	0.242	0.058	0.006
Percentage +65 receiving S.S. or R.R. Retirement	0.282	0.079	0.021
Percentage +65 with incomes 125% of poverty level	0.285	0.081	0.001

Source: By Author

A second insight into OAA caseload distribution is provided by the spatial arrangement of Social Security and/or Railroad Retirement Recipients (Fig. 3). The counties in western Oklahoma have a high percentage of people over 65 receiving at least one type of benefit; however, there is a sparsity of urban places and many of these are "Rural-Farm" by Census definition. Under Social Security guidelines the elderly may have additional income, the amount allowable determined by a ceiling set by the Social Security Administration. For the elderly in western Oklahoma this additional income is likely to come in the form of cash rent from land owned. Land values are higher and farm tenancy lower in western

SOCIAL SECURITY AND/OR RAILROAD RETIREMENT



SOURCE: 1970 U.S. CENSUS USERS GUIDE
FOURTH COUNT (POPULATION) SUMMARY TAPE

0 40 80
Miles

Figure 3.

sectors of the state; therefore, persons unable to undertake rigorous activity can rent their land for income. Tenants in eastern Oklahoma, on the other hand, must either be able to work the land or allow it to revert to the owner. Inability to work for rural elderly leaves Social Security or OAA as alternatives. For the wealthier rural Social Security benefits are often supplementary, whereas for the poor, Social Security does not meet their needs.

Aid to the Disabled.

Aid to the blind and to the disabled involves smaller numbers than OAA. Many counties have no cases of AB and neither program has undergone marked changes over the past five years. All counties have less than three per cent of their population on AD. The higher percentages are in the southeastern one-third of the state. The northwest third, with the exception of Roger Mills county, has a caseload of less than one per cent of the population. Most counties have experienced an increase in AD percentages over the past five years. However, due to the small absolute numbers involved, an increase of one or two cases in a county appears as a large percentage. No geographic pattern was apparent for the percentage increases. One factor responsible for the increases has been the return of Vietnam veterans.

Statistics relevant to an explanation of the distribution of AD cases are sparse. Two variables, percentage of the county population that is disabled and percentage of the disabled who are employed², do account for some of the county unit variation.

²This does not include disabled persons not in the labor force, such as students, or disabled persons unable to work.

Notice in Table 5 that the second variable accounts for 38.44 per cent of the variance in AD caseloads. The actual number of disabled persons in a county contributes very little toward explanation of the spatial distribution of AD caseloads. Plotting percentages of disabled who are employed offers a key to the regional pattern. The counties having over fifty per cent of their disabled employed are in the western half of the state. The southeast one-third generally has less than thirty per cent of the disabled employed (Pittsburgh County has only 19 per cent). The correlation between percentage of disabled receiving AD benefits and percentage of disabled employed (Fig. 4) resulted in a coefficient of -0.620. The implication is that a constant effort must be made towards finding employment for the disabled in southeastern Oklahoma, not only for their financial well-being but their mental and social well-being as well.

TABLE 5
Population Variables Affecting Aid
to Disabled Caseloads

Variable Entered	Multiple		Increase in R^2
	R	R^2	
Per Cent Employed	0.620	0.384	0.384
Number Disabled	0.630	0.397	0.012

Source: By Author

EMPLOYMENT – DISABLED PERSONS

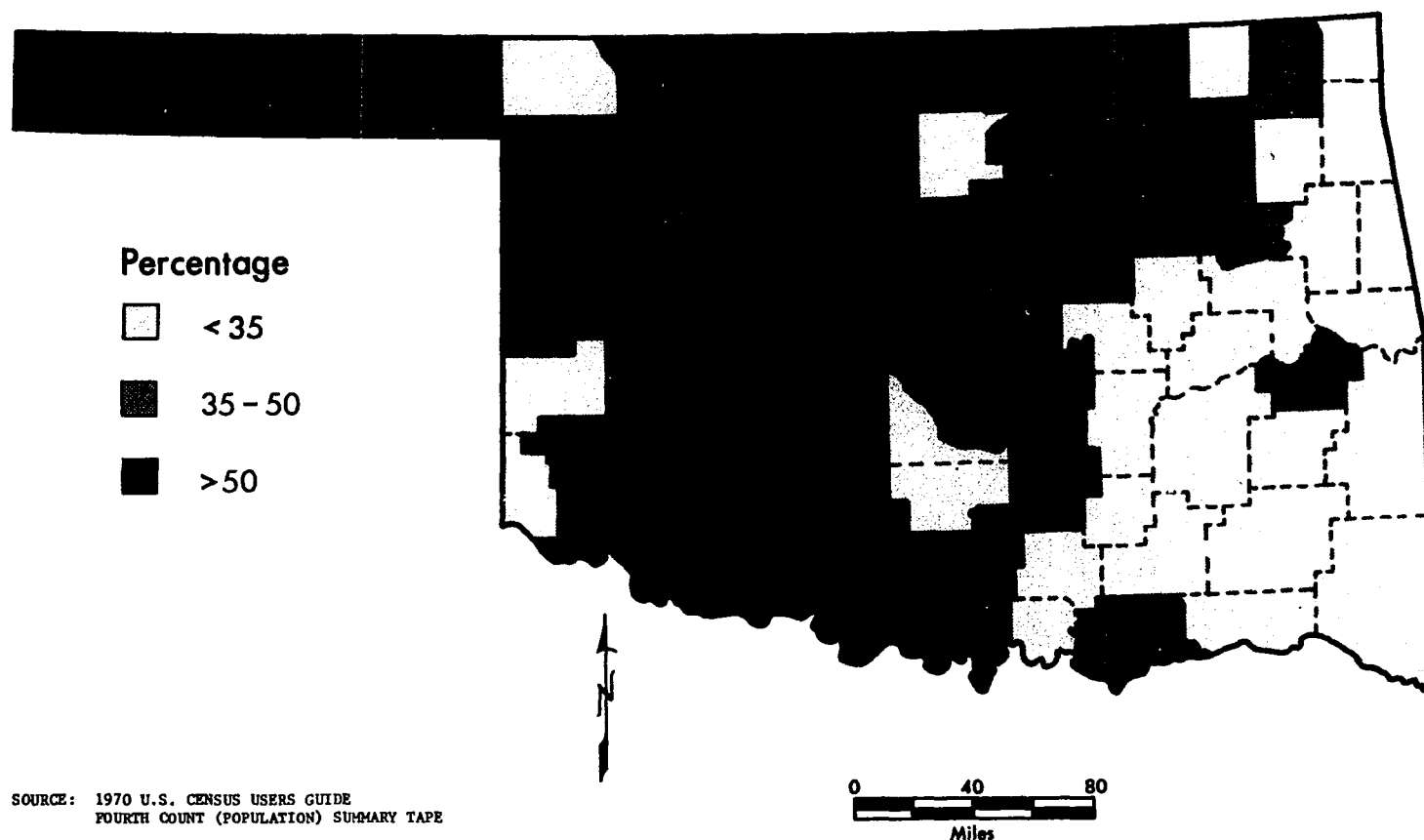


Figure 4.

Aid to Families with Dependent Children

From the viewpoint of numbers, Aid to Families with Dependent Children is the most important program. The program is designed to provide financial aid to children from single-parent homes via funds and services available to the parent. The program is also one of the most controversial among welfare critics because of the belief held by some that welfare benefits are so lucrative that women have additional children in order to receive higher payments. As a consequence, the program has been the target of legislation, such as mandatory sterilization, to prevent growth of welfare rolls.

The pattern in Oklahoma is one of higher caseloads in the southeast quarter. Choctaw, Adair and McCurtain counties have the highest, with over three per cent of the population on AFDC. The northwest portion has the least, less than one per cent of the population on AFDC.

Four variables account for 19.65 per cent of the county unit variance in AFDC caseloads (Table 6). Two relationships in the model highlight the problem areas. Families with female heads have a high association with poverty ($r=0.612$) and there exists an inverse relationship between female heads with children but who were in the labor force and female heads who were below poverty ($r=-0.338$). This relationship strengthens current arguments for securing more funds to establish day-care centers for working mothers.

The spatial distribution of counties with more than ten per cent of their family heads being female definitely shows concentration in the southeastern counties and the urbanized areas such as Comanche, Oklahoma and Tulsa counties (Fig. 5). Those counties which have employed less

FAMILIES WITH FEMALE HEADS

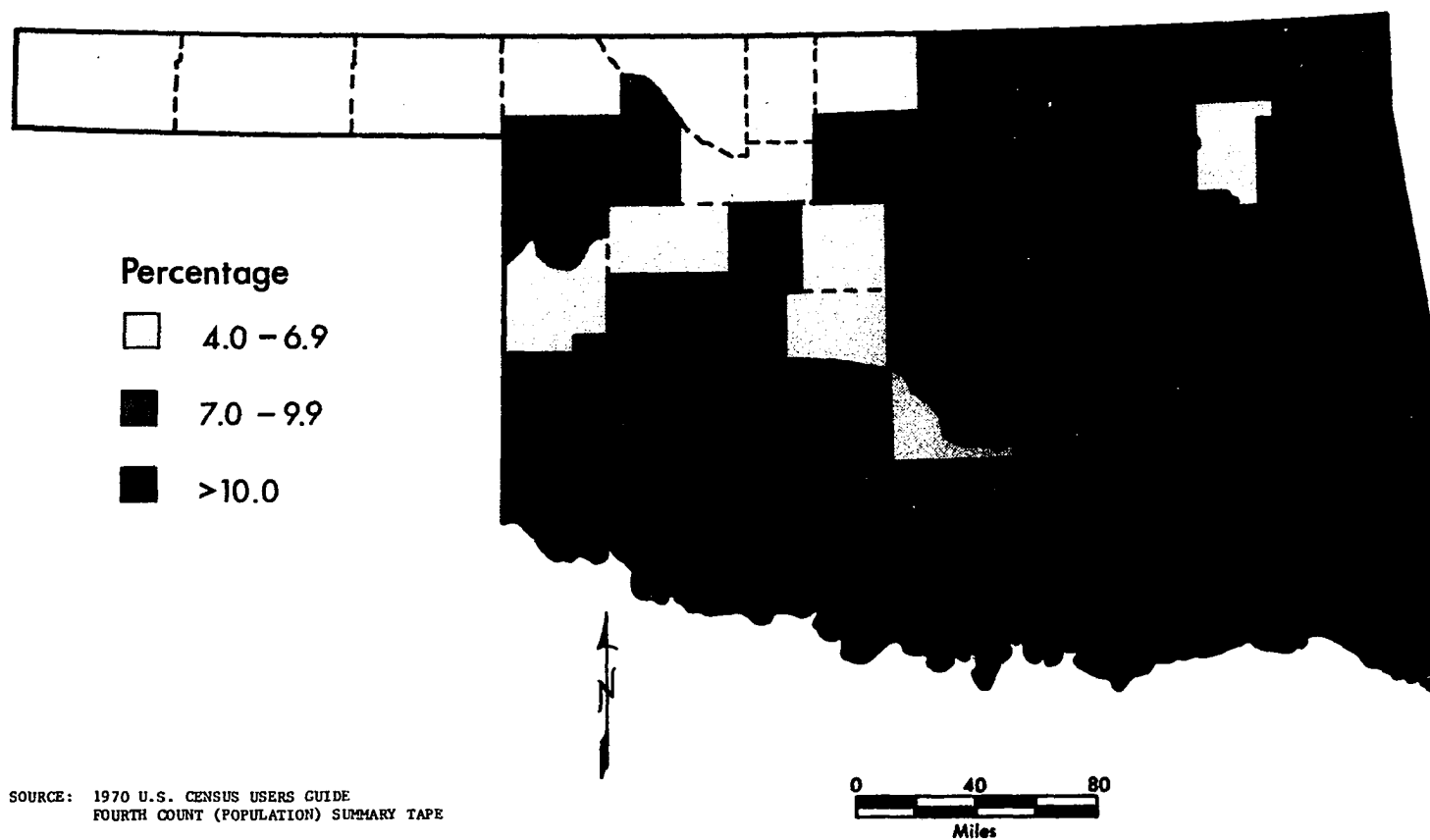


Figure 5.

than 60 per cent of the female family heads with children are concentrated in the east-southeast parts of Oklahoma. Harper County, on the other hand, has 100 per cent and Woodward County 82 per cent of these women employed (Fig. 6).

TABLE 6
Contribution of AFDC Variables

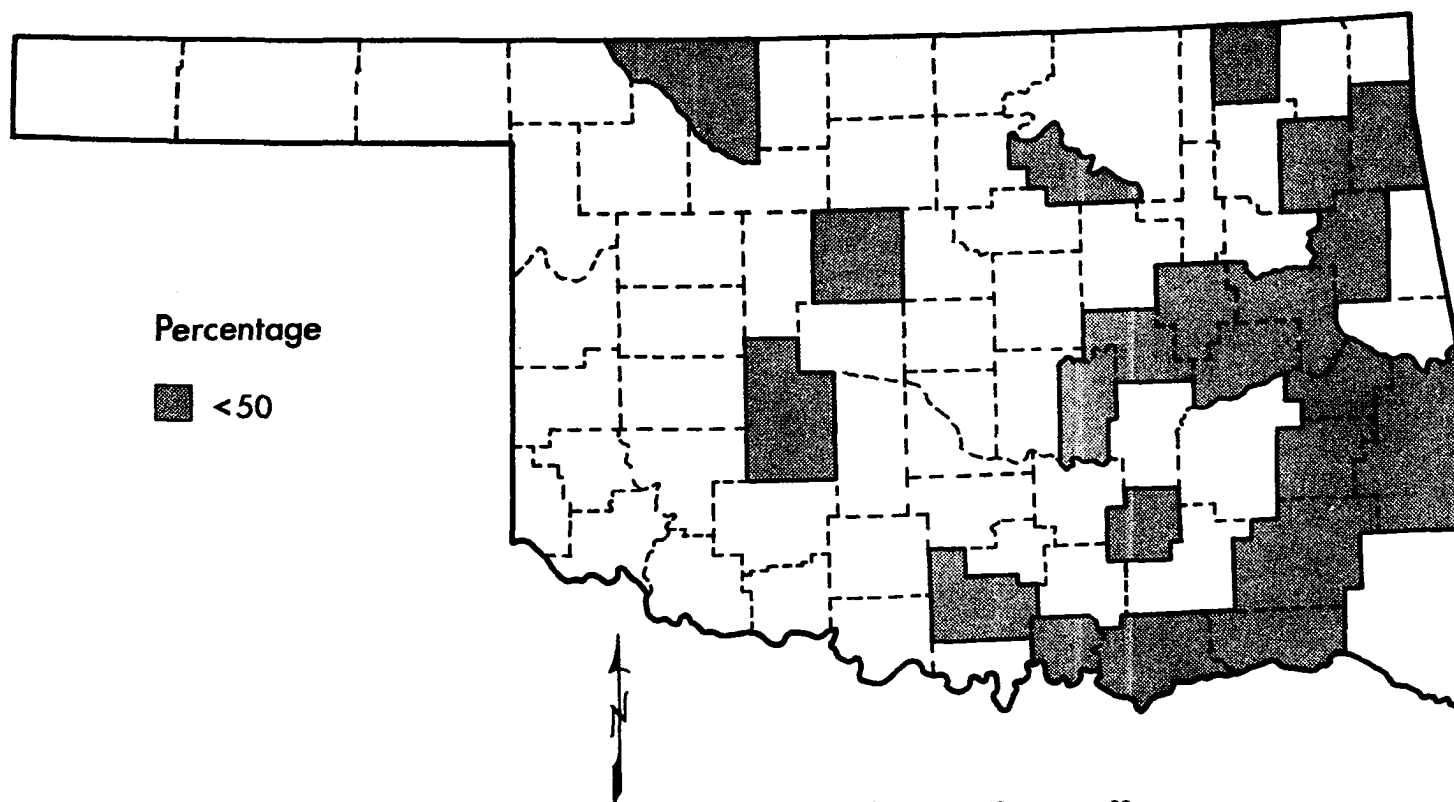
Variable Entered	Multiple		Increase in R^2
	R	R^2	
Per Cent of Families with Female Heads	0.357	0.127	0.127
Per Cent of Families with Female Heads and Below Poverty Level	0.401	0.161	0.033
Per Cent of Families with Female Heads and Children Under 18	0.439	0.193	0.032
Female Heads with Children Under 18 but with Female Head in Labor Force	0.443	0.196	0.003

Source: By Author

Commodity Recipients

Commodity caseloads have increased markedly compared to the other programs. Commodities (now replaced by food stamps) are much easier to obtain than the assistance checks from other programs. A person who has been unemployed or suffered from some temporary ill fate can obtain food-stuffs. Also, at the time this data was collected, the United States Department of Agriculture was very anxious to dispense surplus foods. It shall also be noted that the figures for commodities reflect numbers of individuals, whereas AFDC caseloads are family numbers. In 1970-71 a

EMPLOYED FEMALE FAMILY HEADS



SOURCE: 1970 U.S. CENSUS USERS GUIDE
FOURTH COUNT (POPULATION) SUMMARY TAPE

Figure 6.

total of \$49,143,911 was spent for AFDC. For the same year the retail value of food commodities donated to families was \$23,216,798 (DISRS, 1970-71, p. A21).

Again, the southeastern one-third has the highest number of cases (18 to 40 per cent of the total population), the northern tier (panhandle and along the Kansas border) is lowest with less than seven per cent and the central one-third (northeast to southwest) lies between these figures. Exceptions are counties with urban centers, Comanche, Cleveland, Canadian and Payne, which show low percentages.

The commodity program is not assessed by a regression model, in part because of the highly political nature of the program. Some Oklahoma counties would not join this program until as late as 1970 primarily because of an ideology in opposition to the program held by the governing bodies of the counties. The relative ease of qualifying for this program results in many persons being on, then off, the program several times during a year. Consequently, the mechanical error in the dependent variable is quite high, making regression procedures inappropriate. In general, numbers of commodity recipients decreased in the west and the panhandle. Increases were depicted in the northern tier and the three largely urban counties.

The Formation of A Social Service Institution

To understand the operation of the current method of allocation of service requires some insight into the administrative system of the Welfare Department. The public assistance administration and the programs under its jurisdiction in Oklahoma have several characteristics inherited from the earlier welfare organization. It is important that the early

background of the welfare system and its influence on the present situation be placed in perspective.

The Department of Institutions, Social and Rehabilitative Services (DISRS)

The Oklahoma Department of Institutions, Social and Rehabilitative Services (DISRS) was formed in 1936. Named the Department of Public Welfare, its function was to administer the funds and programs set forth by the federal Social Security Act. The United States enacted the Social Security Act of 1936 for several purposes, one of which was to distribute public aid to some groups of citizens who were unable to provide adequately for their own welfare. Recipients of such assistance had to meet numerous qualifications, but the intent of the legislation was to help the aged, blind and dependent children. The public assistance or welfare aspect of the Social Security Act should not be confused with the Social Security Administration of each state. The two were created by the same legislation but they were distinct programs, each with different objectives.

The national Social Security Act enumerated several specific welfare distributional systems; however, the grants-in-aid for public assistance were of particular importance to this problem. Grants-in-aid gave individual states wide latitude in organizing their welfare administrations and distributional services. Federal legislation also allowed the states to decide on both eligibility and the amount of the stipend for recipients. It was stipulated; however, that each state welfare agency had to submit an annual State Plan which set forth in detail, a description of the agency's organization, rules and regulations governing personnel and policies regarding eligibility conditions and methods of determining the amount of assistance.

The DISRS is directly administered by the Oklahoma Welfare Commission, a commission consisting of nine members appointed by the Governor. Each commissioner serves a nine-year term, but the terms are staggered. A commissioner can be reappointed for any number of terms but cannot be removed during a term. There exists a degree of inertia in such a position; i.e., once appointed a commissioner is likely to remain in office for some time. Positions with built-in inertia can present barriers to change. In the case of Welfare Commissioners, any given commissioner can be replaced only once every nine years and replacement is dependent upon the Governor in office at the time.

The DISR's Director, selected by the State Welfare Commission, is responsible for discharging all policies approved by the Commission. He is also responsible for all programs and functions of the state welfare agency.

The State Welfare Commission also appoints a County Welfare Board for each county, usually persons recommended by County Commissioners. Members receive no salary and serve indefinitely. All members of the County Welfare Department are hired through the state office but, again, are often recommended by County Welfare Boards or County Commissioners. Control of public assistance programs is very centralized within the state headquarters.

County Welfare Departments are somewhat autonomous with respect to their clients. Individuals wishing to receive public assistance or services go to the County Welfare Department in the county in which the applicant resides. It is the county staff's responsibility of deciding if the applicant is eligible for public assistance. The only circumstances

in which a client deals with a state office is in the case of an appeal of a county decision (Public Welfare Commission, 1956). The decisions at the county level are subject to review by a state field representative. Field representatives are the principal communication link between the state headquarters and the county staff. Consequently, field representatives are an important link in the functioning of the system.

Financing for the statewide welfare organization and its programs is a joint federal-state undertaking whereby state funds are matched with federal monies. In 1941 Oklahoma residents approved a two-cent sales tax which was to be earmarked for welfare purposes. One per cent of the total tax collections was designated for child welfare and crippled children programs. This method of funding is still in effect and with increased tax collections and federal aid the number of programs directed by the DISRS has increased. For example, vocational rehabilitation and correctional institutions for minors are under the DISRS.

Programs of the DISRS

Originally three programs composed the welfare system; Aid to the Aged, Aid to the Blind and Aid to Families of Dependent Children. Since that time several programs have been added to the DISRS's responsibility. Some programs encompass many clients whereas others pertain to a smaller number of citizens. Costs vary widely with the nature of each program and the number of persons served. The reasons for the varied costs and number of clients is, in part, a function of the type of program. The programs of concern in this study are outlined below.

Aid to the Aged.

To qualify for Aid to the Aged a person has to meet certain

residence requirements, be at least 65 years of age and unable to support himself (Public Welfare Commission, 1956). These requirements were in effect in 1972, however, the individual yearly income threshold has changed several times. There are numerous instances where Social Security benefits are inadequate. Some persons who are 65 have never been employed (especially housewives) or were employed in areas which did not contribute to the Social Security plan (agriculture) and receive only the minimum Social Security benefits. Some elderly persons receive no Social Security payments. Social Security is often inadequate and for those who qualify, additional income can be derived from Aid to the Aged. Social Security allows an individual to realize a maximum income above his Social Security benefits. Some older citizens are unable to produce even this allowable income and need public assistance to meet their minimum needs.

Aid to Families with Dependent Children.

Aid to dependent children applies to any crippled child who does not have adequate finances to obtain necessary medical care and to any child whose parent(s) are unable to support him due to death, absence from the home, physical or mental incapacity of one parent (Public Welfare Commission, 1956).

Aid to the Disabled.

Several new programs for children and adults have been added to those originally created by the Social Security Act. The most important ones are Aid to the Disabled (1951) and the Medical Care Program for the needy of all ages (1966) known as Medicaid (Department of Public Welfare, 1967-68). Aid to the Disabled provides assistance to any person, regardless

of age, who cannot adequately provide for himself because of his disability.

Medicaid

Medicare (1965), a part of the Social Security Administration, automatically provides hospitalization for persons over 65. Medicaid (1966) extends medical services, including hospitalization, doctor's office calls and medicines, to all needy persons regardless of age. If an individual qualifies for any one of the public assistance programs (aged, blind, dependent children or disabled) he automatically is entitled to the Medicaid benefits. Government expenditures for Medicaid are higher and Medicaid serves more people than any other single program under the jurisdiction of the Welfare Department. During the fiscal year 1970-71 some 219,000 persons received medical services under the Medicaid program and expenditures for this same period were \$94,415,091 (DISRS, Annual Report 1970-71).

Food Stamps

Under the 1964 Food Stamp Act the United States Department of Agriculture issues food stamps in order to provide fuller and more efficient use of agricultural abundances and increase the level of nutrition in low-income households.

Oklahoma did not readily accept the food stamp plan. This was due, in part, to the estimated administrative costs required to achieve the changeover and ideological barriers. Commodities had been distributed from some facility in the county seats; possibly the same building which houses the county welfare office, an adjacent structure or some separate structure. Each commodity-dispensing center had its own employees

charged with proper handling of the food distribution. Under the food stamp program the commodity-dispensing facilities were closed and the employees absorbed into other areas of the DISRS or dismissed. The food stamp recipient is notified by mail of eligibility for food stamps and the value appropriated, depending on need. These stamps are obtained from the local post office and no use is made of the former commodity centers.

The first food stamps in Oklahoma were issued in October, 1972. By January, 1973, only twelve counties were receiving food stamps but plans for adding the remainder of the state were in operation.

The individual county commissioners must ask for the food stamp program before it can begin. This had been true of the previous commodity program. The reliance of this program on the County Commissioners rather than the welfare agency caused some counties to be denied, for a while, benefits of the program because the commissioners refused to request the program. For example, Beaver County Commissioners were recently forced, by court order, to request food stamps.

This type of county reaction to the food assistance program reflects political attitudes rather than the absence of need for the program. Political conservatism has led the commissioners of such counties to believe that by withholding food commodities they are enforcing a work incentive on the needy. Also, the counties which have been most hesitant in instituting food commodities are largely dominated by an agricultural citizenry who perhaps see no justification in "giving" agricultural products to clients not working to produce them. Little, if any, thought may have been given to the fact that the United States has had large

agricultural surpluses or that many persons, particularly children, do not receive the minimum daily food requirements if food stamps are unavailable. Perhaps by not requesting food stamp service a county mistakenly assumes it has no need for such a program. A more thorough ascertaining of eligibility for this and other programs would appeal to all concerned, including those who have been against instituting food stamps in the past. Methods of meeting the needs of the poor in all counties regardless of the political climate is an administrative problem beyond the geographic scope of this research.

The DISRS ascertains the eligibility for food stamps as a service to the United States Department of Agriculture. The DISRS's expenditures are only for administrative services.

The number of people who received aid in some form from the DISRS during the fiscal year 1970-71 is reflected in Table 7. Besides the forementioned programs, the Welfare Department has under its auspices Vocational Rehabilitation, three correctional schools for minors, two state orphanages, three schools for the mentally retarded, a school for the blind, a school for the deaf, a library for the blind and physically handicapped and the Oklahoma Children's Center. Reflecting this extensive and varied involvement, the Oklahoma Department of Public Welfare changed its name in 1970 to the Department of Institutions, Social and Rehabilitative Services (*DISRS Annual Report*, 1969-70).

Administrative Organization

The DISRS has numerous divisions. Divisions have a manager but all all directly controlled by the Department Director (Fig. 7). These divisions handle all programs.

TABLE 7

Number of Persons Receiving Aid 1970-71

Program	Number
Aid to Aged	77,553
Aid to Blind	1,373
Aid to Disables	26,771
Aid to Families with Dependent Children	34,247*
Medicaid	219,248**

Source: Department of Institutions, Social and Rehabilitative Services. *Annual Report* 1970-71.

*This figure reflects number of "families" which includes 95,553 children.

**One person may receive more than one type of service and may receive service in more than one county during the year.

Prior to 1972 there were two separate divisions -- the Division of Assistance Payments, Adult Medical, Social and Rehabilitative Services; and the Division of Services to Children and Youth. The former determined eligibility for all adult assistance programs and provided medical services to needy adults in all categories. The latter was responsible for provision of services to children (needy, foster homes, adoptive and court wards), determining eligibility for families with dependent children (AFDC) and licensing of child care facilities (day care centers).

ORGANIZATIONAL CHART SOCIAL SERVICE FIELD REPRESENTATIVES

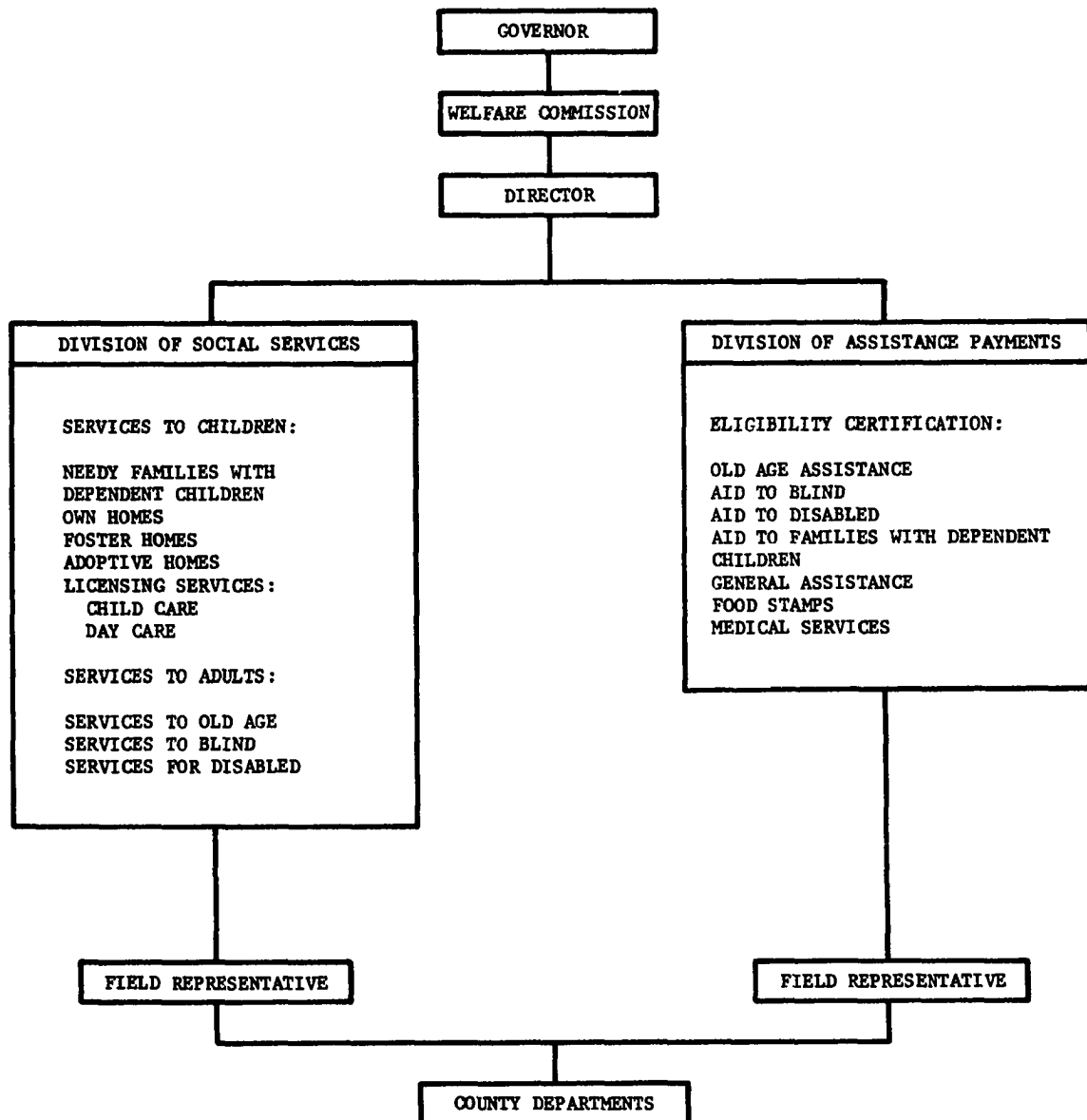


Figure 7.

In 1972 the Federal Government ordered the dispensement of services be separated from eligibility determination. The division was made in an effort to promote more efficiency in both areas by allowing personnel to concentrate on one aspect of the program. Prior to 1972 the field representative served in a supervisory capacity for both the Division of Assistance Payments, Adult Services and the Division of Services to Youth and Children. In response to the federal order for separation and Division of Assistance Payments dropped the Adult Medical, Social and Rehabilitative Services from its name and became responsible for *ascertaining eligibility* for all assistance payments (aged, blind, disabled, medical services, food stamps or commodities and AFDC). The Division of Services to Youth and Children became the Division of Social Services with the task of *administering services* to both children and adults.

There are two separate sets of representatives because of the split. One group of twelve acts as supervisors for the Division of Social Services and the other group (ten) serves the Division of Assistance Payments as eligibility supervisors. The two sets of regions are not synonymous but are similar in geographic area. It is the regional patterns of the eligibility field representatives that are analyzed in this study but the techniques could be adapted to the service field representatives.

Eligibility Field Representatives.

According to the DISRS a field representative is a person who "performs responsible work at a liaison representative between the State Office and the county unit in an assigned geographic area of the State ... and provides advice, consultation and guidance to county administrators

and county supervisors ..." (DISRS, 1972).

Examples of work performed include: "Regularly visits county offices ... for the purpose of insuring proper interpretation and uniform application of policies, procedures, rules and regulations and standards of the Department with respect to assistance payments administrations; providing advice and guidance in assuring validity of decisions made in the area of eligibility for all programs in the Division ... and makes regular reviews of new, active and closed case records to ascertain the thoroughness of investigation and validity of decisions ..." (DISRS, 1972).

There are several qualifications desired by the DISRS for persons serving as field representatives. It is the policy of the DISRS to promote personnel within the Department having many years of service, particularly as a social worker (Fritts, 1972).

All DISRS employees are covered by the state's Merit System. This system sets "grades" for specific positions and a pay scale based on graduated steps for each grade. A field representative, in 1972, was a grade 27 which had a pay scale of \$8,700 to \$12,000. This was also supplemented by recently approved cost-of-living raises (Fritts, 1972).

Summary

As stated above the performance of the field representative's duties depends on regular visits and uniform application of policies within each region. It is apparent that a regionalization system can prevent attainment of the program's goal by allotting a representative too many cases or incurring excessive travel distances which result in a loss of work time. This is the foundation of the appeal for an equitable and efficient regionalization.

Variations in county caseloads for all welfare programs are partially locked in the political climate of each particular county. The County Welfare Board is shackled to the whims of the County Commissioners who, need not reflect public opinion, particularly the opinions of the needy in the county. This may account for the deviations pointed out by standardized residuals of factor scores and the unaccounted variances in the multiple regression models. On the other hand, the eligibility field representative is one of the most important enforcers of federal poverty programs through thorough investigation of eligibility decisions made by the counties. Less than adequate performance at this supervisory level allows inequities at the county level to perpetuate themselves.

CHAPTER IV

PRESENT REGIONAL SCHEME: EVALUATION AND ALTERNATIVES

An evaluation of the existing regional plan suggests that a more efficient system is needed. Discovery of inequities which cannot be justified and, therefore, should be eradicated in devising a new system, is the basis for suggesting a reorganization of the system. A brief overview of the present regional organization and how it functions indicates the existence of such inefficiencies.

Existing Regional Scheme for Eligibility Determination

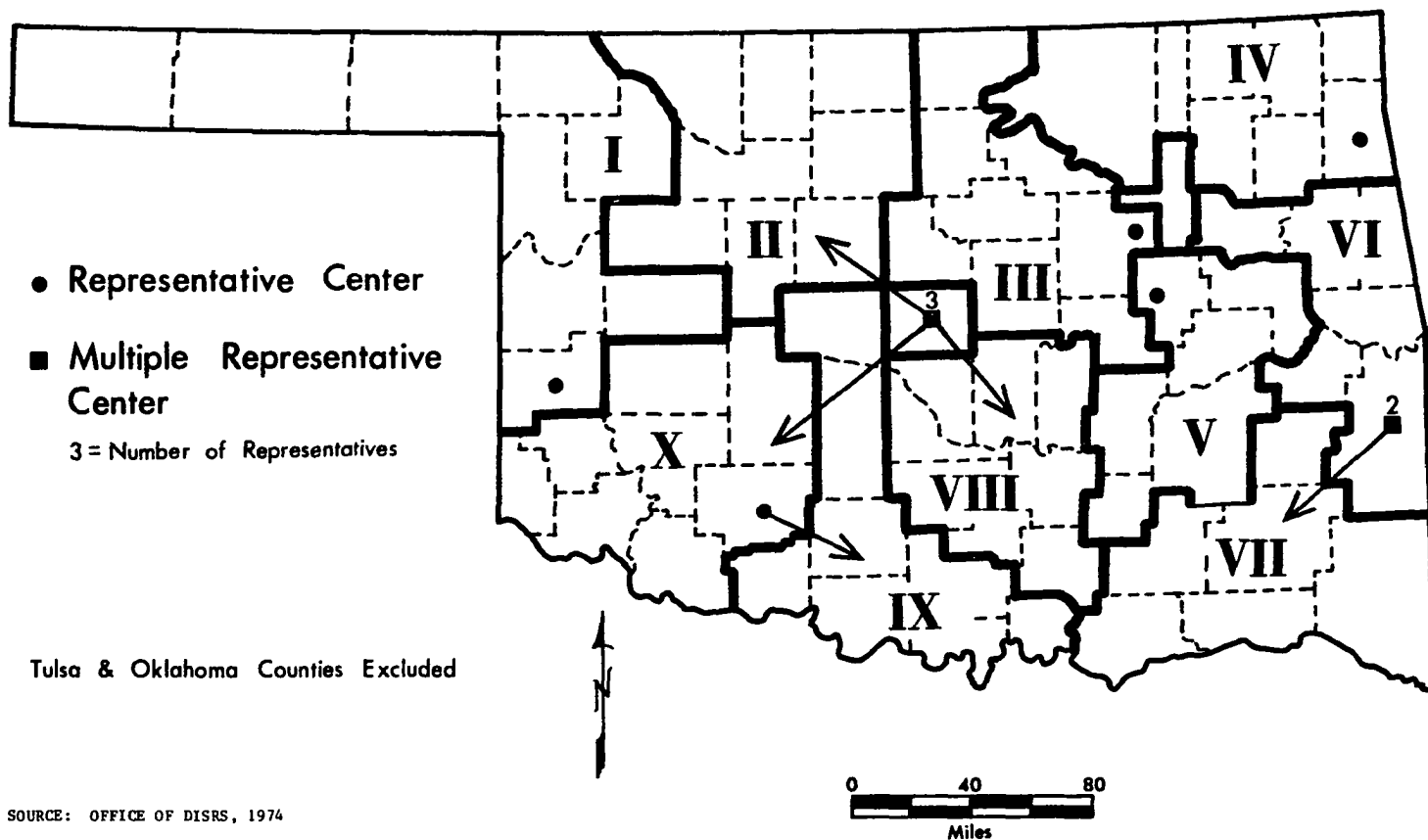
In 1972 seventy five of the state's seventy seven counties were grouped into ten regions. The two large urban counties, Tulsa and Oklahoma, were administered directly from the State Office which constituted an eleventh eligibility representative.

Location of Representatives.

In examining the regional framework it is apparent that relocation of the field representatives would minimize travel costs. Only in Region VI is the field representative situated close to the geographic center of his service area (Fig. 8).

In five of the ten regions representatives do not reside in the region they serve (Regions II, VII, VIII, IX and X). Two factors are responsible for this situation. First, as employees of the Merit System, they have the opportunity to designate the area(s) of the state in which

SOCIAL SERVICE REGIONS



SOURCE: OFFICE OF DISRS, 1974

Figure 8.

they are willing to work. A field representative can specify he or she is willing to work anywhere in the state, thus they are eligible for any available state position.

Also, the regions have been created to accommodate the field representatives. The DISRS does not feel there are enough people in the state qualified for these field representative positions. Consequently, the State Office's organization of its eligibility regions is strongly influenced by the location of the representative.

Representatives living outside their service region travel to their respective districts with the benefit of travel expense allowances. The Merit System/State Department pays mileage for travel from the field representative's headquarters office to the regional offices (counties) and does not stipulate that the headquarter's office has to be within the region served. Mileage allowances, however, are not permitted for travel from home to the headquarters office; therefore, the headquarter's office is conveniently located in the county seat nearest the representative's home without regard to the location of the region served.

Caseloads Per Region

A major inequity in the system is the discrepancy between caseloads per region. Equalizing the caseload per representative appears to be only a secondary aim of the regional scheme. An examination of the existing regions and a comparison of the caseload per region shows that equalization is more on the basis of number of counties served than number of actual cases. Since caseloads denote workloads, they should be approximately equal among the representatives if each is to provide the same level of service to their constituents. Examples of this misallocation

can be seen in Table 8. Under the present regional organization Region

TABLE 8

Caseload for Existing Eligibility Regions

Region	% of Total Caseload	Average Caseload*	Number of Counties
I	3.4	10,519	9
II	3.0	9,463	8
III	10.0	30,819	8
IV	9.9	30,585	8
V	15.3	47,138	6
VI	15.2	46,761	6
VII	11.9	36,747	6
VIII	12.4	38,354	8
IX	9.1	28,160	8
X	9.4	29,053	8

Source:

*Caseload reflects five-year average (1967-71) and has had the number of AFDC cases doubled due to eligibility verification requirements.

II has an average of 9,463 cases (3 per cent of total caseload) whereas Regions V and VI each have over 45,000 cases (15 per cent of caseload). It is unlikely that a field representative can give the same level of supervision to a 45,000 caseload as to a 10,000 caseload.

It is difficult to justify having representatives live outside their regions. This existing situation incurs travel expenses and loss

of working time which can be decreased by the representative living within the region. At the same time this author fails to comprehend any rationale for the variation of caseloads among the representatives.

Visitations Per County Unit.

It can be assumed that those counties having the higher caseloads also require a greater number of visits. There probably would be more applicant files to review and thus a higher probability of problems demanding interpretation and advisement. During the fiscal year 1970-71 however, the average number of trips made to each county from each head-quarter county or the caseload in each county was 14.5. Those counties closest to the field representative were not visited any more frequently than those farthest from the representative. Those with high caseloads received no more visits than those with small workloads. Consequently, those people seeking social services in counties with high caseloads do not have equal access to the services of the eligibility representative.

It can be assumed that representatives living considerable distances from their regions consume substantial amounts of visit time in travel. Minimizing travel time could promote more frequent trips to the individual counties and, for most trips, allow more time to be spent in the county office. This becomes more germane when one considers the fact that the majority of the field representative visits have been only for one day. Most do not frequently stay overnight.

Peripheral counties then experience discrimination in that a portion of their service is lost to travel. With regard to spatial justice, outlying counties are denied equal service due to their location.

Communications.

An aspect of the present system that is difficult to measure but equally important is the decrease in communications that stems from the field representative living outside the region. The counties cannot interact effectively with someone a considerable distance away who visits their office approximately once a month. County staffs feel a representative outside the area is unaware of the nature of the caseload and its problems. A close "working" relationship between state field representatives and county staffs is essential to efficient administration. Disclosure of new programs available, proper use of new programs, and correction of any eligibility rulings made in error by the county staff are all vital functions of the field representative.

The inequities mentioned as existing in the present social service regionalization scheme are justification for revamping the social service delivery network, i.e., field representative location. First, if field representatives are to exam all new, open, and closed files, they must correlate the number of trips to a county with its caseload. Second, to promote achievement of the above file examination the practicality of equal caseload per representative becomes obvious. Third, a rearrangement of the representatives to minimize travel distances and expenses would create a more economically efficient system. Fourth, savings realized on travel expenses could be utilized elsewhere in the system.

Alternative Regionalization

To strive for a better system of regionalization two approaches have been utilized; one involves changing the district boundaries only, and the second requires moving the representative's headquarters.

Regionalization Based on Existing Representative Locations

The first objective in designing a new system is to devise a scheme which will (1) minimize travel distances and (2) equalize case-loads per region as much as possible within the constraints of political (county) boundaries.¹ In the first solution the existing representative locations are utilized as the starting configuration of supply points. The total state caseload, excluding Oklahoma and Tulsa Counties, is divided among ten representatives, signifying the supply capacity of each representative. Utilizing the transportation model, this first solution does not alter the location of the field representatives, only the regional boundaries. The object is to show that more efficiency can be achieved without having to increase the number of representatives or altering their locations (Tables 9 and 10). It is a plan which causes a minimum of change in existing policy and is termed the proximal solution (Fig. 9). This solution does not confront the question of the number of visits needed, a problem approached later. Also, four representatives are still outside their regions.

Regionalization Based on Relocating Representatives

Following this proximal solution minimum aggregate travel points were located. These represent the center of the region based on the weight of the caseload. Minimum aggregate travel points are located instead of the geographic center due to the idea that greater caseloads require greater amounts of service. Therefore, the aim is to place the representative near the heaviest workload in order to minimize travel.

Federal regulations require administration by county unit. Counties cannot be divided when allocating to regions.

TABLE 9

Regional Caseloads Using Proximal Solution

Region	Caseload	Number of Counties
I	32,747	19
II	28,649	11
III	25,041	6
IV	33,271	6
V	32,236	3
VI	28,513	5
VII	33,412	3
VIII	29,453	6
IX	27,879	8
X	36,370	8

Source: By Author

Once these points are located, regions are then constructed based on the mean aggregate travel points as supply centers. The iterative process of the transportation model is again employed and the iterative process continues until mean aggregate travel points cease to move with successive iterations. The resulting regionalization is termed the optimal solution and has essentially equal caseloads per region (Fig. 10). This is the optimal solution based on the starting configuration of supply points. Optimal, in this case, infers that this is the best solution based on

REGIONALIZATION – PROXIMAL SOLUTION

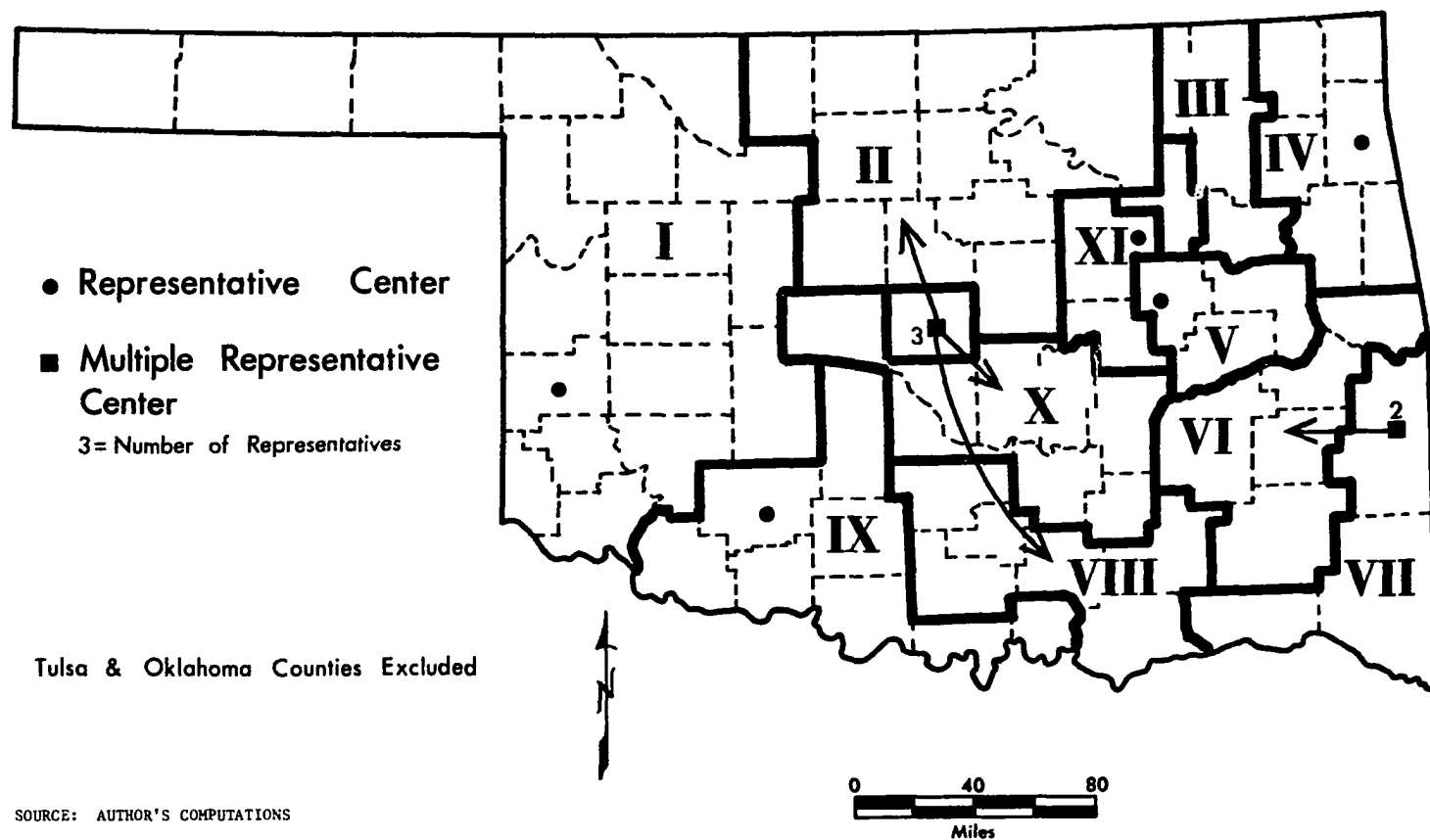


Figure 9.

REGIONALIZATION – OPTIMAL SOLUTION

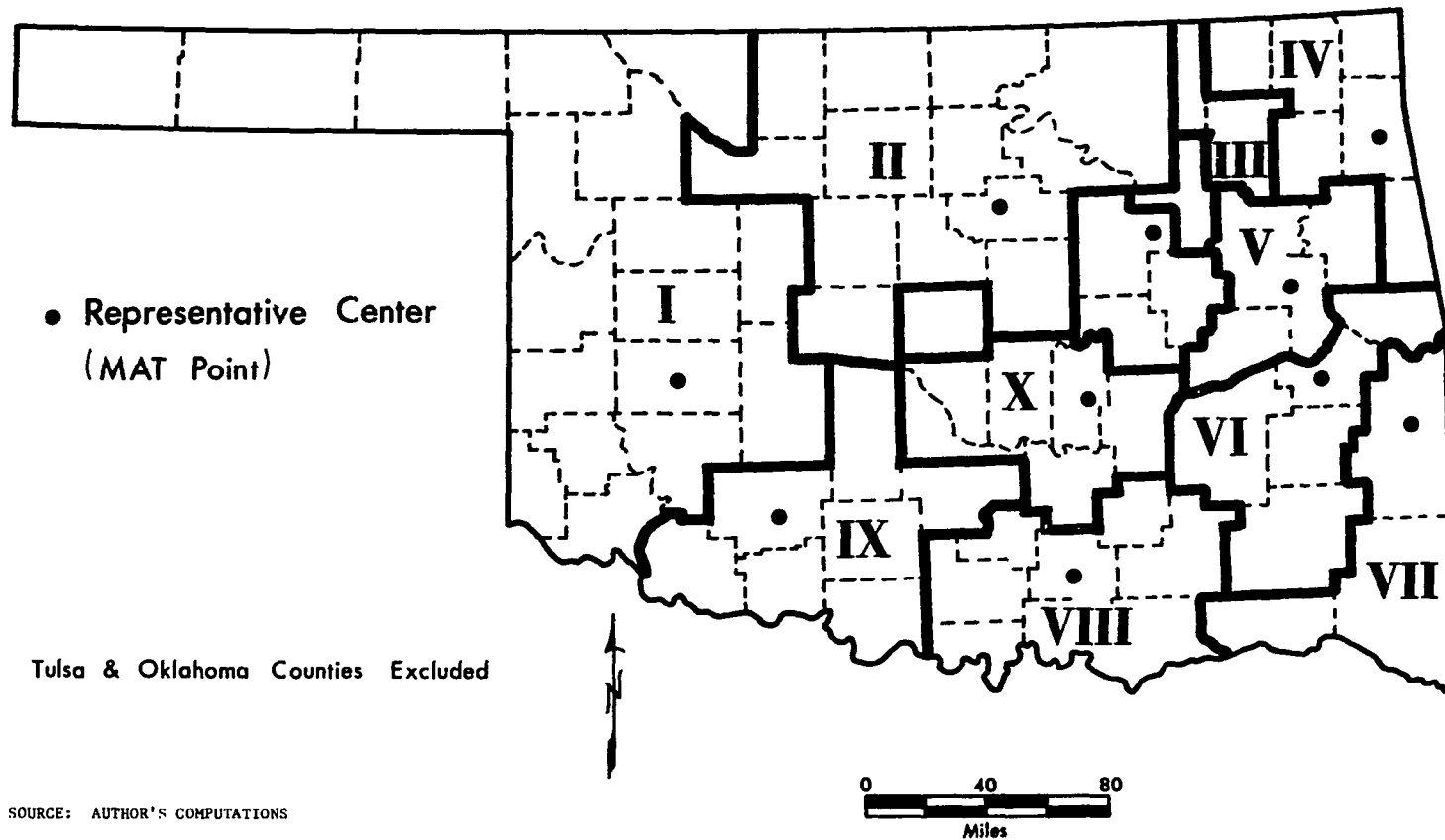


Figure 10.

existing constraints (political boundaries, starting points, etc.). It should not be interpreted as an ultimate global solution or one in which supply and demand totals are exactly equal. The final solution would cost approximately \$9,000 less than the present system and about \$6,000 less than the proximal solution (Table 10).

The proximal and optimal solutions create drastic boundary changes in the present system. Every region in the present system is altered. However, the proximal and optimal solutions are not in such contrasts to each other. In fact, Regions VI and VII are the same in both solutions. In other regions only one or two counties are exchanged. Under the optimal solution the maximum caseload is 33,412 and the minimum caseload is 28,392. Recall that for the proximal solution these figures were 36,370 and 25,041. The proximal and optimal solutions are more socially efficient than the present system because caseloads have been equalized. The optimal solution requires relocation of representatives which reduces costs and should increase service.

TABLE 10

Economic Costs of Regional Systems:* Using Eleven Existing Centers As Starting Points

Solution	Salary Expense	Transportation Costs	Loss of Work	Per Deim	Total Costs
Present System	\$121,000	\$16,605	\$9,156	\$2,730	\$149,491
Proximal	121,000	14,669	8,274	2,310	146,253
Optimal	121,000	11,518	7,056	1,050	140,624

Source: By Author

*For method of calculation of costs see Appendix II.

Regionalization Based on Theoretical Distributions

The above optimal solution applies only to an initial distribution of field representatives. Two alternate solutions were obtained to ascertain the effect of starting point configurations. Using the same number of suppliers, eleven field representatives with one automatically allotted to Oklahoma and Tulsa counties, solutions were devised based on centers which were, at first, randomly located and with centers distributed in a hexagonal lattice. In each solution mean aggregate travel points were located following each iteration (Figs. 11 and 12).

The optimal solutions to the two alternate configurations are improvements with the system devised from the initial hexagonal distribution being the most efficient (Table 11). Again, this solution will not be designated the optimal global solution for it is apparent that the starting location pattern influences the solution obtained. The regionalization based on the hexagonal lattice has, however, the lowest cost of all solutions. The savings, over \$9,000, is almost enough to hire an additional representative and further improve the service and illustrates the improvement which could be accomplished within the constraints of available personnel.

REGIONALIZATION – RANDOM CENTERS

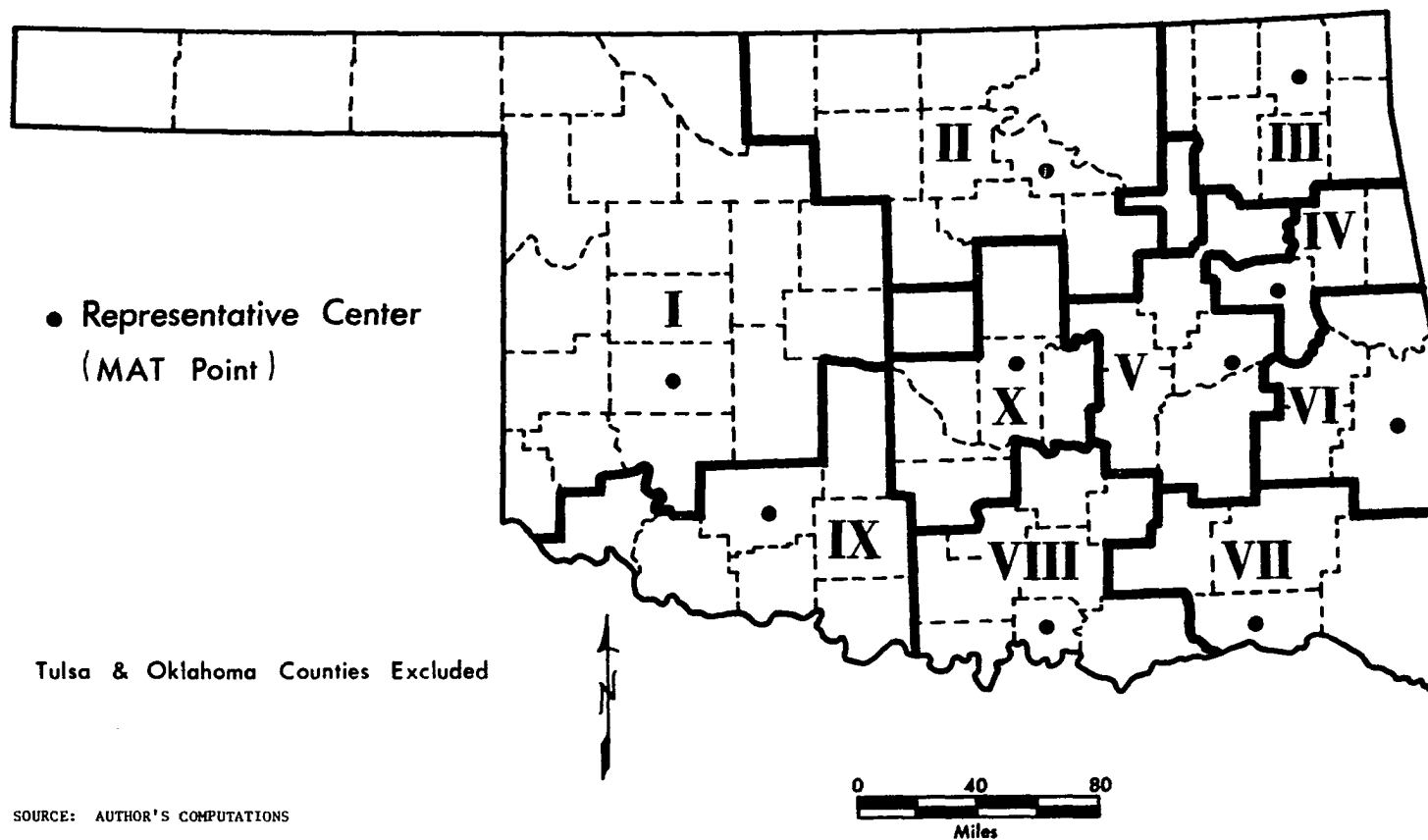


Figure 11.

REGIONALIZATION – HEXAGONAL CENTERS

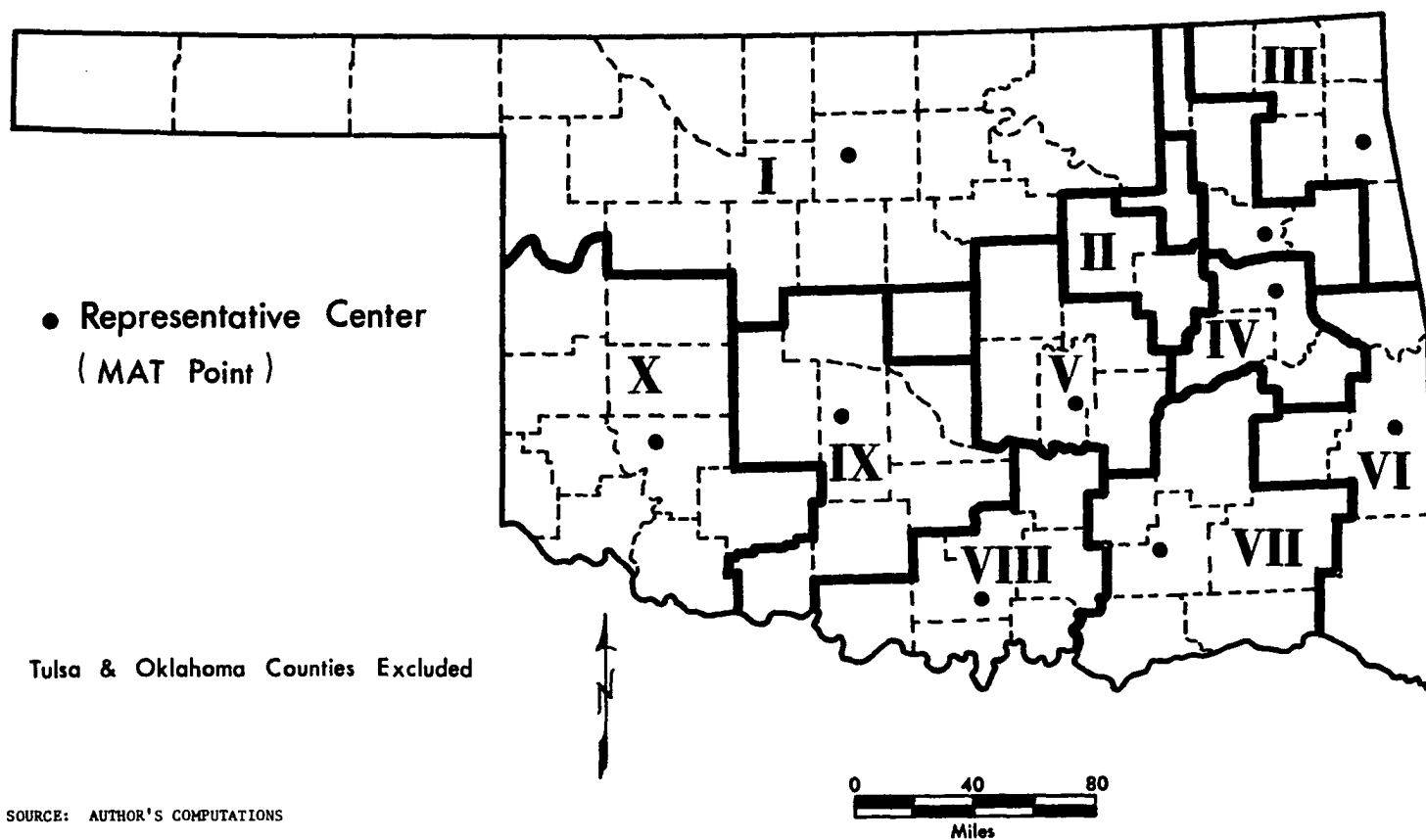


Figure 12

TABLE 11

Economic Costs of Regional Systems Utilizing Eleven Field Representatives

Solution	Salary Expense	Transportation Costs	Loss of Work	Per Deim	Total Costs
Present	\$121,000	\$16,605	\$9,156	\$2,730	\$149,491
Optimal Based on Present Centers	121,000	11,518	7,056	1,050	140,624
Optimal Based on Random Locations	121,000	11,448	6,720	1,470	140,638
Optimal Based on Hexagonal Lattice	121,000	11,216	6,678	1,260	140,154

Source: By Author

CHAPTER V

ALTERNATIVE REGIONALIZATION THROUGH EXPANSION

The preceeding chapter indicated considerable savings could be realized simply by re-arranging field representatives and their respective regions. The outstanding aspect of these solutions is their increased economic efficiency, which would be politically popular. There is also a movement toward social efficiency through the equalization of caseloads. However, additional modifications are necessary to improve the system to a point of being more equitable to the people seeking eligibility status.

Considering the enormous number of cases to be examined in Oklahoma, even with equal cases per representative, it is impossible for the representative to adequately review applications. With the eleven representatives the DISRS now employs each field representative must handle more than 30,000 case files each year. The representative allotted Oklahoma and Tulsa counties has over 80,000 cases! If the workers are unable to adequately serve their clients, the program does not fulfill its intent. Expansion of the DISRS staff commensurate to the welfare caseload, then, is necessary as a means of improving the delivery of the service to which the clients are entitled under the provisions of the various social service programs.

To methods have been employed to estimate the number of representatives needed to fulfill specified duties. In the previous solutions,

two outstanding inequities were present. First, the combining of Oklahoma and Tulsa counties into one region places an excessive caseload on one representative, and adding one representative seems imperative. Second, the representative in western Oklahoma whose territory included the Oklahoma panhandle has an unusually large territory. The loss of working time and service due to long trips is significant in preventing adequate service delivery. Thus an additional representative is required to reduce this region in size. This means a total of two representatives will be added to the existing eleven in an attempt to overcome inequities of previous solutions.

Regionalization Utilizing Thirteen Representatives

Allotting Tulsa and Oklahoma counties one representative each requires only formal designation. Since caseloads cannot be divided this means one (Oklahoma County) representative has approximately 50,000 cases and the other representative some 30,000 cases. However, the placement of the second of the two additional representatives requires that the transportation model again be employed to locate the eleven remaining representatives and establish the regional boundaries of their respective districts.

To reduce the physical size of the region in western Oklahoma and, at the same time, to compensate for the long travel distances involved in servicing this region, several adjustments were sought. The great amount of travel is primarily a result of small caseloads, therefore, the supply capacity of this representative was designated to be one-half that of the other representatives. This means the representative in western Oklahoma would have approximately 15,000 cases, compared to 30,000 for other representatives, but would have to visit a greater number of counties than the others.

Since beginning with a hexagonal distribution in previous solutions resulted in the lowest cost, this type of starting configuration was utilized again. Mean aggregate travel points were located after each iteration. The final locations, which were designated the field representatives' headquarters, were realized after the fourth iteration.

The results are regions which are more uniform in size than were previous regions (Fig. 13). Regions in the eastern part of the state are still small and Region I remains the largest (fifteen counties), but not as large as before. Due to political boundaries, it has 15,393 cases. The average for the others is 28,000.

By reorganizing regions to minimize travel expenses the cost of adding two new representatives is only \$10,000 more than the present system costs (Table 12). The improvement of service possible with this solution certainly appears to justify such an expenditure.

TABLE 12

Comparative Costs of Regional Systems

System	Salary Expense	Trans. Cost	Total Costs
Present (11 Reps.)	\$121,000	\$16,605	\$149,491*
13 Reps.	143,000	9,005	158,599**

Source: By Author.

*Includes loss of work and per diem costs.

**Includes loss of work and per diem costs.

REGIONALIZATION – 13 CENTERS

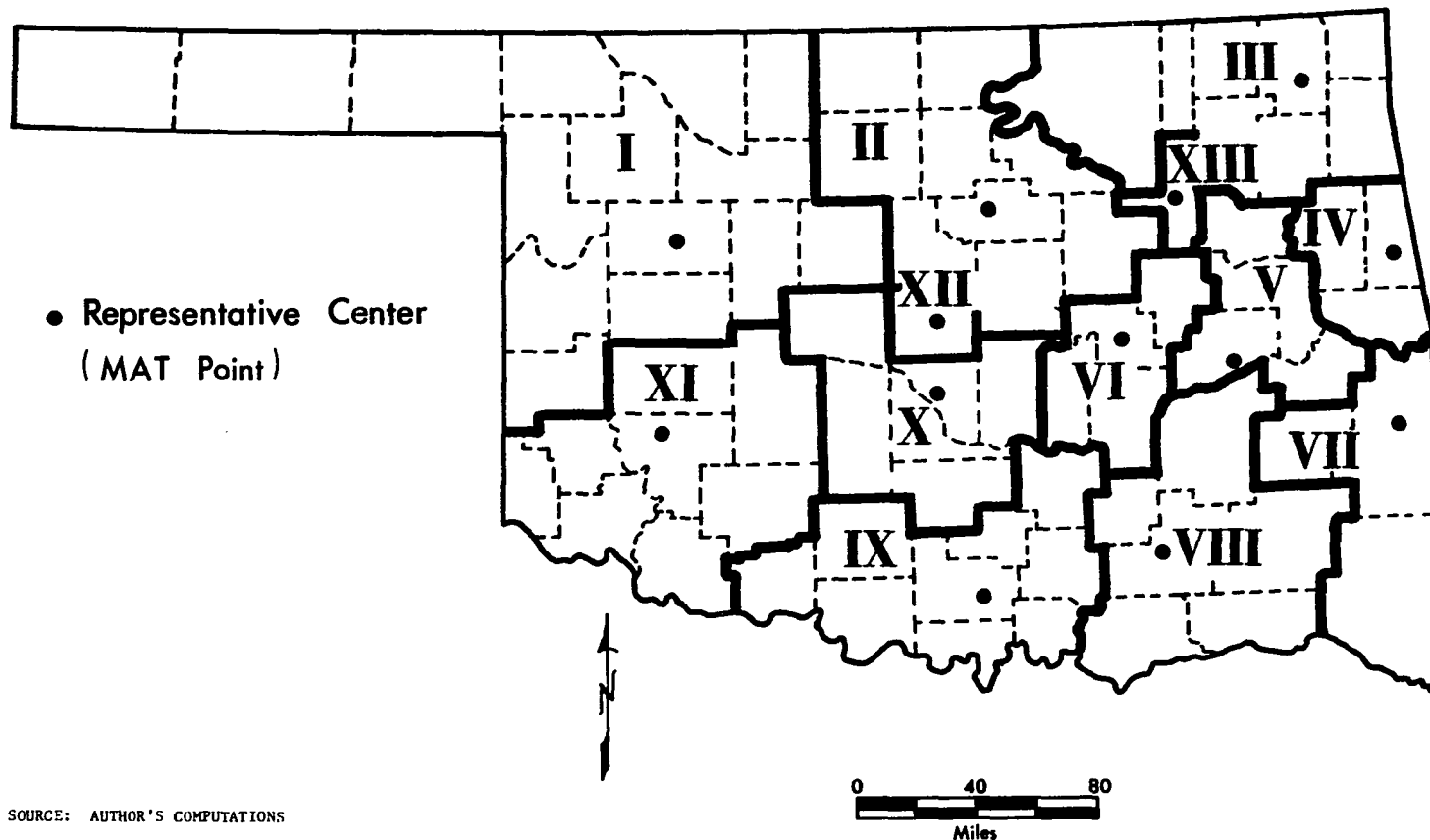


Figure 13.

With this solution most of the spatial inequities of the existing social service system have been eliminated; representatives all are located within their regions and caseloads are more nearly equalized. Region I has a smaller caseload but this is justified by the region's size. Reduction of this representative's caseload is necessary to promote equal service. However, the caseloads of the representatives serving Tulsa and Oklahoma counties remain excessively high. One question not heretofore confronted is that of number of visits required by a county based on its caseload. The costs of all previous solutions have been based on fourteen trips per year since this is the average number currently made by the existing representatives. Use of this number of trips merely allows cost comparison and should not be interpreted as the desired number of visits.

Number of Visitations as Basis for Regionalization

In previous solutions most representatives had approximately 30,000 cases to review and costs were based on a service flow of fourteen trips to a county per year. Based on these statistics, achievement of the goals of the social service system would require a representative to review over 2,000 cases per day. To assume such a feat is possible is purely speculative, but to imagine that any degree of fair and adequate eligibility verification can be accomplished is unrealistic.

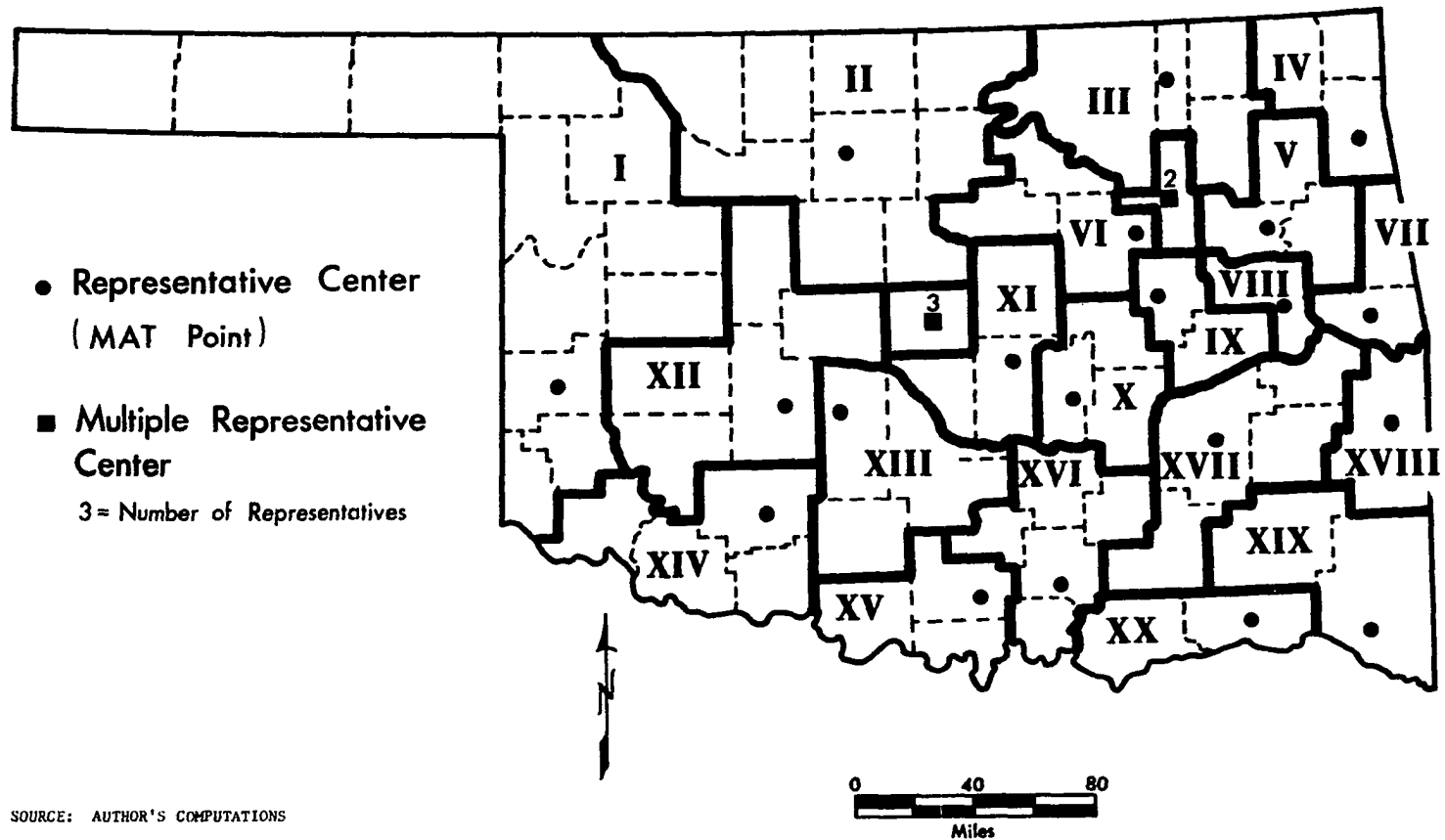
By travelling sixteen days per month (the present representatives travel approximately five to eight days per month) and examining 75 case files each travel day, a representative can review 12,000 files per year. With over 300,000 cases in the state, a minimum of twenty-five field representatives would cause the caseload per representative to be approximately

15,000 half that present representatives attempt to serve. One representative per 15,000 cases would warrant placing three in Oklahoma County and two in Tulsa County, leaving twenty to be distributed throughout the remainder of the state.

With 15,000 as the supply capacity, several county seats could likely be automatically designated as headquarters for field representatives due to the number of cases in those counties (Muskogee, LeFlore, Sequoyah and Pittsburgh). However, to be consistent with prior allocations, a hexagonal distribution of twenty centers served as the initial configuration for beginning the transportation model's iterations. Three iterations were required. Each iteration was followed, as in previous solutions, by location of the field representatives at points of mean aggregate travel.

Due to the large increase in number of representatives, the resulting regions (Fig. 14) are naturally smaller than in any other solution. Muskogee and LeFlore counties become regions in themselves due to their high caseloads. Muskogee has over 16,000 cases so this is an expected result. LeFlore has 13,000 but there are not any nearby counties with small caseloads with which LeFlore can combine to more closely approximate a total caseload of 15,000. Therefore, it remains a single-county region. Regions VII, IX, XIX and XX consist only of two counties. Region I is reduced in size to include twelve counties (it had fifteen in the solution using thirteen representatives). In this system it has a caseload equal to that of other regions instead of one-half the average as in the solution based on thirteen representatives. Field representative centers, besides being mean aggregate travel locations, also appear to be near the geographic center in several regions.

REGIONALIZATION – 25 CENTERS



SOURCE: AUTHOR'S COMPUTATIONS

Figure 14.

Once regions for the twenty-five representatives are formulated, the next step entails establishment of the number of visits needed by each county in a region. This is based on the assumption that a representative can examine 75 case files per day. Dividing a county's case-load by 75 yields the total number of visits a county needs during a year. Utilizing sixteen days per month as travel days means a capacity of 192 trips per representative per year. Since all regions do not have exactly 15,000 cases, some adjustment must also be made regarding number of visits. For example, Region XVII encompasses 18,453 cases. At a rate of 75 cases per visitation, 246 trips would be necessary. Therefore, in some regions more or longer visits would be necessary. These individual regional adjustments have to be assumed by the representative. Appendix III illustrates the number of visits allotted to each county in the state under this regionalization plan.

Calculation of costs for this system varies somewhat from that previously undertaken. Due to the number of representatives and smaller regions, there is much less working time lost in travelling. Also, per diem expenses (especially overnight stays) are greatly reduced. Therefore, these categories have been omitted from the cost estimates (Table 13). Although regions are smaller, transportation costs are greater than in the system using only thirteen representatives. This is due to the tremendous increase in number of trips to each county. However, use of the transportation model allows the number of visits to be doubled while keeping transportation costs within the range of those of the present system. The primary item in elevating total costs in this system is the salary category.

TABLE 13

Economic Costs of Expanded Regional Systems

Number of Representatives	Salaries	Trans. Costs	Total Costs
11 (present system)	\$121,000	\$16,605	\$149,491
13	143,000	9,005	158,599
25	275,000	17,596	292,596

Source: By Author

Alternative Visitation Plan.

This final solution was derived in a manner similar to the above solution except the number of case files examined by the field representative per day was reduced from 75 to 50. Using the state's total case-load as a basis, 38 representatives would be needed with each having a capacity of 10,000 cases. Five representatives would serve Oklahoma County, Tulsa County would be allocated three representatives and thirty would assume the remainder of the state.

Based on the regions that had evolved from all other solutions, no attempt was made to arrange hexagonally the initial representative locations. Employing a total of 38 representatives, the eastern half of the state would obviously be an area of numerous small regions. Therefore, 20 of the 30 representatives to be allotted were randomly placed in this part of the state. Counties which have consistently served as mean aggregate travel points in the foregoing plans were chosen as starting

centers (Muskogee, LeFlore, McCurtain, Choctaw, Sequoyah, Delaware, Okmulgee, Seminole and Pittsburgh).

Only two iterations of the transportation model were required. Several factors account for this small number of changes. One, the initial location of centers in counties with approximately 10,000 cases, quickly enclosed ten regions. With supply capacity being a total caseload of 10,000 it becomes very difficult to equalize caseloads per region since several counties have caseloads greater than this amount. Also, in instances where a county has many cases but less than 10,000, the addition of another county may put it over the capacity by a significant amount. For example, a county with 7,000 cases can be coupled with another one with 7,500 cases for a total of 14,500 (exceeding the capacity) or left by itself to form a region of only 7,000 cases. Since counties cannot be divided, another region will have to pick up the difference of 3,000.

The results obtained by this scheme (Fig. 15) consist of eight regions composed of only one county and eleven regions which enclose two counties each. The number of trips required by each county (Appendix III) are calculated in similar fashion as before: 50 cases examined per day with a maximum of 192 visitation days per year per representative.

Again, costs are significantly increased (Table 14), particularly salary expense. However, this may represent the economic costs required to achieve social justice through adequate service if field representatives cannot adequately examine more than fifty cases per day. The economic costs, on the other hand, might not seem excessive if there is great need or desire to achieve social justice. Recall that social injustice incurs costs too.

REGIONALIZATION – 38 CENTERS

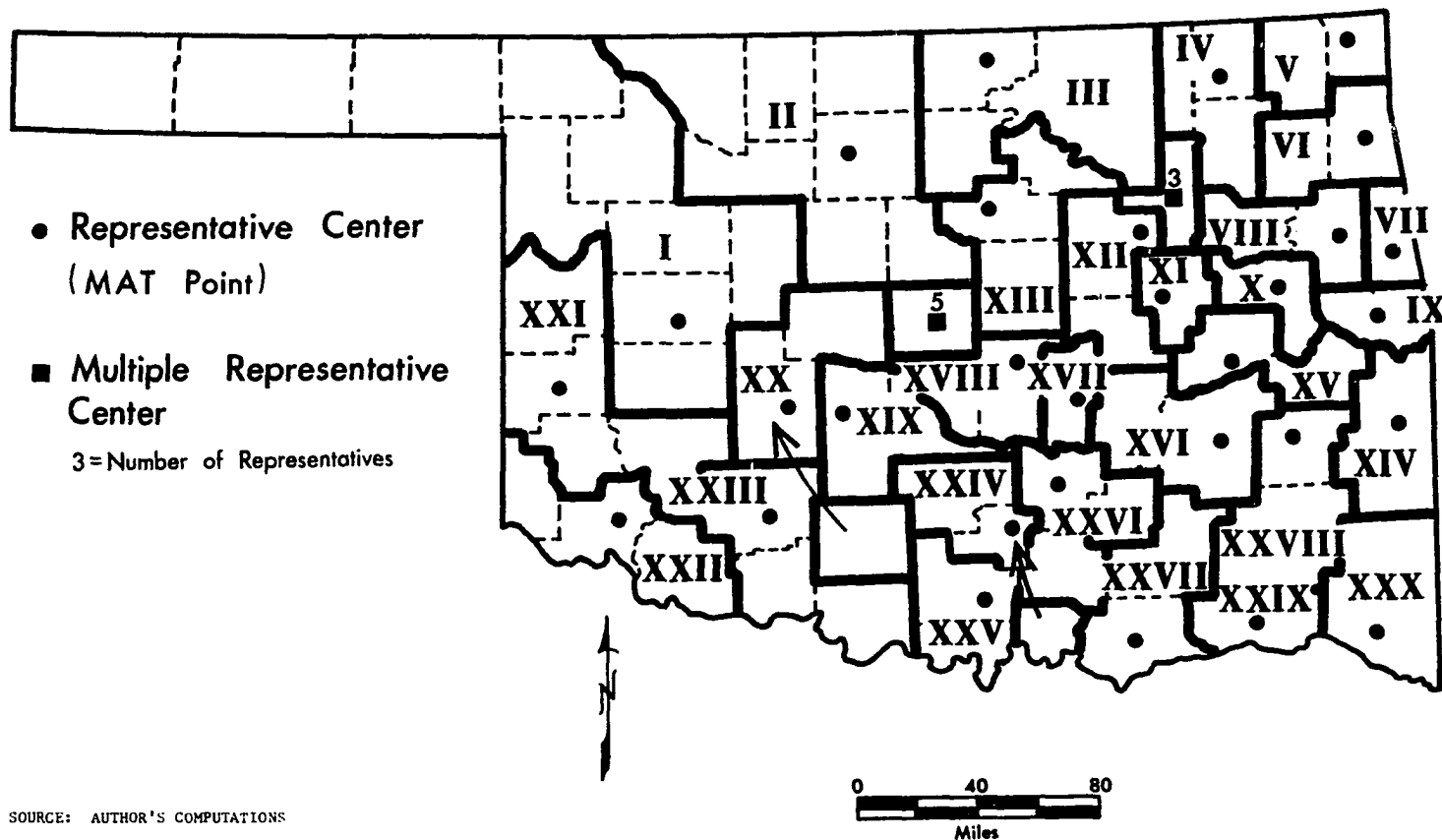


Figure 15.

TABLE 14

Economic Costs of Expanded Regional Systems

Number of Representatives	Salaries	Trans. Costs	Total Costs
13	\$143,000	\$9,005	\$158,599
25	275,000	17,596	292,596
38	418	15,478	433,478

Source: By Author

In reviewing the plans which called for expanding the field representative staff, the solutions for 25 and 38 representatives might prove to be politically unpopular due to the costs of employing these numbers of personnel. The system utilizing 38 representatives might even be termed politically infeasible. If economic costs are the criteria on which changes are to be implemented, and so often political changes are viewed from this perspective, then the first expansion utilizing 13 representatives would most likely be favored. The solution with 25 representatives contains more benefit for the clients. Based on philosophy and goals of a social service system, it is an impressive, as well as justifiable, system. However, the politically feasible system based on 13 representatives offers a compromise between the totally inadequate existing system and those that are socially more efficient but very expensive.

Should the regionalization of 13 representatives be adopted more trips per month must be advocated for every representative in order to be effective in the accomplishment of the system's goals. This increase in the number of days spent in the field each month should be politically easy to implement since transportation costs do not comprise a large percentage of total costs. It might require some policy changes by the DISRS administration. If the eleven representatives, excluding Tulsa and Oklahoma counties, travelled 192 days per year (16 days per month) and examined 100 cases each visit, it would be possible for them to adequately handle the state's public assistance applications. The cost of this system as set forth in Table 14 would have to be changed to \$170,000 to reflect this increased number of trips by the representatives. The number of trips to each individual county would be calculated as before. Table 15 depicts the transportation costs of individual regions in the system utilizing 13 representatives compared to the costs of the present regions. The significance to be pointed out is that transportation costs are comparable while number of visits vary a great deal. Under this system Beaver County would require only two visits but Muskogee County warrants 100 visits per year in order to meet the caseload demand.

Administrative changes within the social service system seem imperative in order to improve service delivery. Under the present system the field representative, in addition to file examinations, holds staff meetings to inform county personnel of program and policy changes. The author advocates that the State Headquarters designate one individual for this job and that all such staff meetings be held in Oklahoma City. The senior staff member of each county would travel to State Headquarters for

TABLE 15

Regional Transportation Costs

Region	13 Representatives*	Present System
I	\$2,186	\$2,735
II	2,522	2,258
III	2,503	1,042
IV	996	1,132
V	751	746
VI	718	1,042
VII	1,494	1,445
VIII	2,524	1,431
IX	2,034	1,620
X	1,805	2,812
XI	2,202	343
	<u>\$19,780</u>	<u>\$16,606</u>

Source: By Author

*Regions XII and XIII are not included since they do not involve travel (Tulsa and Oklahoma counties).

this meeting; surely not more than one meeting per month would be required. This would leave the field representative the sole task of eligibility verification and would eliminate the necessity of visiting every county when policy changes occur. The result would be a more efficient communications system and a greater opportunity for the field

representative to achieve the goal of reviewing 100 case files per visit.

In summary, achievement of a changeover to a more efficient and just system is largely political. The need for a new system must be deemed politically important and/or popular. Once a new system receives such political backing, implementation should be relatively easy. However, the success of any of the regional systems, which includes the fulfillment of duties and goals, is largely dependent on the service-yielding institution (DISRS) and its employees -- the field representatives.

CHAPTER VI

SUMMARY

The quality and quantity of services provided by a government is important to the well-being of a society. The efficiency with which these services are provided to the user population is influenced in part by the spatial discontinuity of the suppliers and users. Geographers can play an important role in assessing the spatial efficiency of service systems.

Even a cursory examination of the present social welfare eligibility determination service shows a spatial arrangement that is uneconomical, inadequate, and spatially inefficient. The solutions designed to correct such problems have been proposed herein.

Summary

In the search for an equitable spatial arrangement for the social service delivery system for Oklahoma, several propositions were tested. It has been illustrated that the location of supply/service centers directly corresponds to the economic costs of the system. Furthermore, these locations influence the degree of societal benefit which can be attained by the system.

The location of service supply centers which would impose the lowest costs while maximizing service availability is the primary objective of this research. This system has other traits too: no region or county should experience discrimination or loss of service due to its location;

the needs of the clients for service should be met by the system, regardless of intensity of need (caseload density), geographic location, or political atmosphere. This implies that adequate service personnel be available.

It was stated that the proposed plan must noticeably improve the present system. Devising a better plan often is not as difficult as formulating one that is feasible. An unimplemented system serves the betterment of none: feasibility therefore was an important final feature.

Results

Several regionalization plans produced numerous schemes with varying qualities. The existing system was rearranged to reduce economic costs and improve the level of service. Most plans, however, were more expensive than the existing system since it was discovered that adequate service was impossible without additional personnel.

Plans which expanded services through increased personnel were justifiable based on their improved social service. Yet it became apparent that an optimum level of services could not be attained due to the economic costs incurred. The present system costs \$149,000, but this can be reduced to \$140,000 by rearranging regions. Expanded systems ranged from \$170,000 (13 representatives) to \$433,000 (38 representatives) in cost. A compromise system was therefore proposed which is slightly more expensive than the present one (\$149,000) but improves on the amount of service, the efficiency of regions, and the centrality of representatives. All representatives are within the region they serve and are located at points of minimum aggregate travel. Also, the number of cases handled by a given representative is now approximately equal to that of all other representatives.

Conclusions

The solutions and regions suggested in this study are by no means the optimal or ultimate answers to improved social service. There are many systems which are probably better than the one Oklahoma now has. Nevertheless, a major conclusion drawn from all the resulting plans is that the DISRS should seriously reconsider the method of regionalization. While there are many criteria and techniques, the advantage of the methodology presented here is that it can easily be updated to reflect caseload growth factors. As changes in the total caseloads occur, employment of the spatial model used herein would re-design corresponding regions.

If the system of thirteen representatives as set forth here is adopted, the next step is government implementation. In addition to economic costs and net social gain, a criterion for implementation may be the losses imposed on society. The only inconvenience which can be foreseen is the relocation of field representatives. Such rearrangements are the duties of the administrative organization and do not have to become barriers to adoption. Representatives who are unwilling or unable to relocate might have to assume some other duties within the DISRS and be replaced by new recruits. The crucial decisions for re-arrangement and improvement of the system rest with the political system.

The overall objective of the new system should be fairness to all interested parties in attaining the best possible service for society. By emphasizing fairness to clients and efficiency in cost-control, perhaps these factors can jointly have a greater role in planning decisions concerning the social service system.

REFERENCES

- BRANDT, R. B. (1962). *Social Justice*. Englewood Cliffs.
- BUTTIMER, Sister Annette (1974). Values in Geography. *Commission on College Geography, Resource Paper #24*.
- CARVER, Thomas N. (1922). *Essays in Social Justice*. Cambridge.
- CHRISTALLER, W. (1933). *Die zentralen Orte in Sudddeutschland: Eine okonomisch-geographische Untersuchung uber die Gesetzmassigkeit der Verbreitung und entwicklung der Siedlungen mit stadtischen Funktionen*. Jena.
- DEPARTMENT OF PUBLIC WELFARE (1968). *Annual Report 1967-68*. Oklahoma City.
- DEPARTMENT OF PUBLIC WELFARE (1970). *Annual Report 1969-70*. Oklahoma City.
- DEPARTMENT OF INSTITUTIONS, SOCIAL AND REHABILITATIVE SERVICES (1972). *Job Description for Field Representative*. Oklahoma City.
- FORNBY, Ruth (1972). Personal Interview.
- FRITTS, Doug (1972). Personal Interview.
- GODLUND, S. (1961). Population, Regional Hospitals, Transport Facilities and Regions: Planning the Location of Regional Hospitals in Sweden. *Lund Studies in Geography, Series B*, 21.
- GOODCHILD, M. F. and B. H. Massam (1969). Some Least-cost Models of Spatial Administrative Systems in Southern Ontario. *Geografiska Annaler*, 52B, 86-94.
- GOULD, P. R. and T. R. Leinbach (1966). An Approach to the Geographic Assignment of Hospital Services. *Tijdschrift Voor, Econ. en Soc. Geografie* 57, 203-206.
- HAIG, R. M. (1926). The Assignment of Activities to Areas in Urban Regions. *The Quarterly Journal of Economics*. Cambridge.
- HARVEY, David (1972). Social Justice. *Antipode Monographs in Social Geography*, I, 87-106.
- HARVEY, David (1973). *Social Justice and the City*. Baltimore.

- HITCHCOCK, F. L. (1941). *The Distribution of a Product from Several Sources to Numerous Localities*. *Journal of Mathematics and Physics* 20, 224-230.
- HOOVER, E. M. (1948). *The Location of Economic Activity*. New York.
- ISARD, W. (1956). *Location and Space-Economy -- A General Theory Relating to Industrial Location, Market Areas, Land Use, Trade and Urban Structure*. New York.
- KUEHN, A. and M. Hamburger (1963). A Heuristic Approach for Locating Warehouses. *Management Science* 9, 643-666.
- LORD, J. Dennis (1972). Interregional Competition and Locational Advantage in the United States Broiler Industry: A Linear Programming Approach. *The Professional Geographer* 24, 330-334.
- LOSCH, A. (1954). *The Economics of Location*. New Haven.
- MARANZANA, F. (1964). On the Location of Supply Points to Minimize Transportation Costs. *Operational Research Quarterly* 15, 261-270.
- MASSAM, Bryan (1969). *An Approach to the Analysis of Spatial Administrative Patterns: Ontario Hydro-Electric Power Commission*. Hamilton, Ontario.
- MASSAM, Bryan (1972). The Spatial Structure of Administrative Systems. *Commission on College Geography, Resource Paper* 12.
- MORRILL, R. L. and M. Kelley (1970). The Simulation of Hospital Use and the Estimation of Location Efficiency. *Geographical Analysis* 2, 283-300.
- OLSON, Gunnar (1974). Servitude and Inequality in Spatial Planning: Ideology and Methodology in Conflict. *Antipode* 6, #1, 16-21.
- PEET, Richard (1972). Poverty. *Antipode Monographs in Social Geography* 1, 1-16.
- PUBLIC WELFARE COMMISSION (1956). *Compilation of Social Security Laws*. Oklahoma City.
- ReVELLE, C. and R. Swain (1970). Central Facilities Location. *Geographical Analysis* 2, 30-42.
- ReVELLE, C., D. Marks, and J. Liebman (1970). An Analysis of Private and Public Sector Location Models. *Management Science* 16, 20-31.
- RUNCIMAN, W. G. (1966). *Relative Deprivation and Social Justice*. Berkley.

- RUSHTON, Gerald (1971). Map Transformations of Point Patterns: Central Place Patterns in Areas of Variable Population Density. *Papers of Regional Science Association* 18, 111-129.
- SCOTT, Allen (1971). An Introduction to Spatial Allocation Analysis. *Commission on College Geography, Resource Paper* 9.
- SMITH, David (1973). *The Geography of Social Well-being in the United States*. New York.
- STEINER, Gilbert (1966). *Social Insecurity*. Chicago.
- TEITZ, M. (1968). Toward A Theory of Urban Public Facility Location. *Papers of the Regional Science Association* 21, 35-52.
- THUNEN, J. H. von (1826). *Der isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie*. Rostock.
- TORGAS, Constantine and C. ReVelle (1971). Optimal Location under Time or Distance Constraints. *Papers of the Regional Science Association* 28, 133-143.
- TORNQVIST, G., P. Gould, S. Nordbeck and B. Rystedt (1972). *Locating Multiple Facilities*. Lund, Sweden.
- WEBER, Alfred (1928). *Theory of the Location of Industries*. Chicago.
- Yeates, Maurice (1963). Hinterland Delimitation -- A Distance Minimizing Approach. *The Professional Geographer* 15, 7-10.

APPENDIX I

CASELOADS FOR OKLAHOMA COUNTIES

Adair	8939	Harmon	587	Osage	3784
Alfalfa	640	Harper	408	Ottawa	5010
Atoka	3678	Haskell	4254	Pawnee	1933
Beaver	129	Hughes	5030	Payne	3733
Beckham	3698	Jackson	4707	Pittsburgh	7451
Blaine	2013	Jefferson	1915	Pontotoc	5298
Bryan	5882	Johnston	3340	Pottawatomie	7455
Caddo	7474	Kay	4844	Pushmataha	3832
Canadian	2121	Kingfisher	886	Roger Mills	729
Carter	8333	Kiowa	2975	Rogers	3633
Cherokee	5935	Latimer	3070	Seminole	7949
Choctaw	7399	LeFlore	13,127	Sequoyah	9906
Cimarron	307	Lincoln	3470	Stephens	4673
Cleveland	3958	Logan	3423	Texas	1058
Coal	2421	Love	1594	Tillman	3870
Comanche	6303	McClain	2138	Tulsa	34,477
Cotton	1328	McCurtain	12,886	Wagoner	4601
Craig	2160	McIntosh	5293	Washington	2659
Creek	8040	Major	227	Washita	1232
Custer	2827	Marshall	2381	Woods	399
Delaware	6286	Mayes	4941	Woodward	912
Dewey	709	Murray	2741		
Ellis	451	Muskogee	16,912	TOTAL	395,854
Garfield	4144	Noble	1347		
Garvin	5479	Nowata	2079		
Grady	5815	Okfuskee	4029		
Grant	445	Oklahoma	53,778		
Greer	1905	Okmulgee	10,031		

APPENDIX II

METHOD FOR CALCULATION OF REGIONAL SYSTEMS COSTS

Transportation Cost:

Distance $\times$ 2 (round trip) $\times$ \$0.12 $\times$ Number of trips

Loss of Work Time:

One-way travel distance less than 50 miles = \$6.00 $\times$ number of trips

One-way travel distance 50-75 miles = \$9.00 $\times$ number of trips

One-way travel distance 75-100 miles = \$12.00 $\times$ number of trips

Per Diem:

One-way distance exceeding 100 miles = \$5.00 per diem $\times$ number of trips.

Number of Trips:

For all solutions except those for twenty-five and thirty-eight centers, the number of trips is assumed to be fourteen. For solutions of twenty-five and thirty-eight centers actual number of trips needed is used to calculate costs.

APPENDIX III

NUMBER OF VISITS REQUIRED BY EACH COUNTY PER YEAR

(25 Representatives)

Region II:		Region IV:		Region IX:	
Cimarron	4	Osage	50	McIntosh	70
Texas	14	Rogers	48	Okmulgee	122
Beaver	2	Nowata	27	Region X:	
Harper	5	Washington	67	Adair	92
Ellis	6	Region V:		Sequoyah	100
Woodward	12	Mayes	65	Region XI:	
Dewey	9	Cherokee	79	Blaine	26
Custer	37	Wagoner	48	Canadian	28
Roger Mills	10	Region VI:		Kiowa	39
Greer	25	Craig	28	Washita	16
Harmon	8	Ottawa	66	Caddo	83
Beckham	50	Delaware	98	Region XII:	
Region III:		Region VII:		Cleveland	52
Woods	5	McClain	20	Lincoln	46
Alfalpa	8	Garvin	73	Pottwatomie	94
Garfield	32	Stephens	62	Region XIII:	
Day	64	Grady	37	Hughes	53
Major	3	Region VIII:		Okfuskee	67
Noble	18	Pawnee	25	Seminole	72
Kingfisher	11	Payne	49		
Logan	45	Creek	118		
Grant	6				

APPENDIX III (Continued)

Region XIV:

Pittsburgh	80
Latimer	30
Haskell	50
Atoka	32

Region XVI:

Jefferson	25
Love	21
Carter	146

Region XVII:

Jackson	62
Tillman	51
Cotton	17
Commanche	62

Region XVIII:

Pontotoc	75
Coal	25
Murray	30
Marshall	25
Johnston	37

Region XIX:

Bryan	78
Choctaw	114

Region XX:

Pushmataha	51
McCurtain	141

*This based on 192 trips per year (16 per month), reading 75 case files each travel day. Regions I and XV contain only one county and therefore would receive the entire 192 visits.

(38 Representatives)**

Region VII:

Love	32
Carter	160

Region IX:

Okfuskee	80
Creek	112

Region X:

Hughes	92
Pittsburgh	100

Region XI:

Cleveland	80
Pottawatomie	112

Region XIII:

Woods	8
Alfalfa	13
Grant	9
Major	4
Kingfisher	18
Logan	68
Garfield	72

APPENDIX III (Continued)

Region XIV:		Region XXI:		Region XXVII (Cont'd)	
Noble	27	Haskell	85	Woodward	18
Osage	76	McIntosh	107	Dewey	14
Kay	89			Blaine	40
		Region XXII:		Washita	24
Region XV:		Harmon	11	Custer	50
Washington	53	Tillman	77		
Rogers	73	Jackson	104	Region XXVIII:	
Nowata	66			Atoka	73
		Region XXIII:		Bryan	119
Region XVI:		Cotton	26		
Mayes	95	Jefferson	38	Region XXIX:	
Delaware	97	Comanche	128	McClain	42
				Grady	150
Region XVII:		Region XXIV:			
Roger Mills	14	Garvin	100	Region XXX:	
Greer	38	Murray	92	Craig	43
Kiowa	59			Ottawa	149
Beckham	81	Region XXV:			
		Coal	48		
Region XVIII:		Johnston	66		
Pawnee	38	Pontotoc	78		
Lincoln	69				
Payne	85	Region XXVI:			
		Latimer	61		
Region XIX:		Pushmataha	131		
Wagoner	92				
Cherokee	100	Region XXVII:			
		Cimarron	6		
Region XX:		Texas	21		
Canadian	42	Beaver	2		
Stephens	80	Harper	8		
Caddo	70	Ellis	9		

**This based on 192 travel days per year (16 per month) reading 50 cases per travel day. Regions I, II, III, IV, V, VI, VIII and XII consist of only one county which would receive the entire 192 visits.