

REGIONAL AND COMMUNITY TRANSPORTATION PLANNING ISSUES
- A SELECTED ANNOTATED BIBLIOGRAPHY

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INTRODUCTION

This memorandum is a by-product of the research effort currently being conducted under the topic, "The Influence of Interurban Transportation Systems on the Rural Environment." The first aim of the research is to produce two planning manuals, one for the use of the professional, the other for the lay person in small urban and rural communities. In order to develop these two documents, the research effort has been divided into several sub-areas, specifically including: planning resources and policies pertaining to rural areas and small communities; the growth potential of small communities in a regional context; the social and economic variables most relevant to interurban transportation planning; and the techniques currently used in the various stages of the planning process, including techniques for citizen participation.

The bibliography contained in this memorandum is a selected and annotated list of works reviewed by various members of the research team in the course of their separate investigations. It is divided into five sections, which reflect the areas of greatest relevance to the final planning documents. These are: I. Planning and Policy; II. Transportation and Regional Growth; III. Socio-Economic Variables in Transportation Planning; IV. Evaluation Techniques and Models; and V. Citizen Participation. The books and articles included do not constitute an exhaustive list, but rather a selected group representative of the diversity and of the state of the art in these five areas. These works were dealt with in some detail during the course of the research; it is hoped that the comments on each will be of use in guiding other researchers to works appropriate to their particular concerns.

It should be noted that the inclusion of a work in one section of the bibliography as opposed to another is sometimes a matter of subjective judgment. The areas of the bibliography overlap to some degree. For example, discussions of policy often include recommending that certain social and economic variables be included in future planning decisions, and attempts to define the social or economic factors relevant to planning may often require considerations of policy matters or of evaluation techniques. The final decision on classifying a particular work was based on its emphasis or on the value of its content to a particular concern of the research.

I. PLANNING AND POLICY

1. Altshuler, Alan. "The Values of Urban Transportation Policy." HRB Special Report 105, Highway Research Board, 1969, pp. 75-86.

The author first discusses the problems inherent in developing a national policy that can both reconcile different interests and offer sufficient scope for a variety of state and local preferences to make themselves felt. He offers three broad recommendations, two within the framework of existing policy and one involving a change in the current policy structure: 1) increase side-payments; 2) increase the opportunities for citizens to make their views count in decision making; 3) change policy to offer wider scope for imaginative side-payments and expression of local values in transportation planning. Focusing on the need for change, he offers five "key policy directions": 1) combining highway and transit finance; 2) making the highway program more flexible in the kinds of projects supported; 3) experimenting with street use pricing; 4) more widely applying the urban design concept team and the multi-purpose corridor development ideas; 5) offering more compensation to and participation for those directly affected by highways. Each of these suggestions is then discussed in detail.

2. Ashford, Norman. "The Planning Function in State Departments of Transportation." Traffic Quarterly, Volume 27, Number 1, January 1973, pp. 49-63.

The author describes the development of DOT's at state level, which may be a response to (1) urban needs (2) new social orientation at federal level (3) need for in-house reorganization. He states there are 2 kinds of organizations being legislated: equal status divisions and advisory staff agencies. He argues for strong DOT's with a mandatory review of sub-state regional plans by a state transportation agency, which is then integrated with plans for economic development, social services, etc., although the functions of policy planning, line level planning and research may be decentralized.

3. Beckman, Norman. "Toward the Development of a National Urban Growth Policy: Legislative Review 1971." American Institute of Planners Journal, July 1972, pp. 231-249.

The article examines growth policy legislation of 1971 to include transportation, manpower, revenue sharing, education, housing, land use and their intended impacts on both rural and urban areas. Special attention is given to legislative intent in rural development with reviews of the Appalachian Redevelopment Act, the Economic Redevelopment Act, and expenditures under the Public Works Act.

4. Beckman, Norman, and Susan Harding. "National Urban Growth Policy: 1972 Congressional and Executive Action." American Institute of Planners Journal, July 1973, pp. 229-243.

This article describes the "consolidation" of legislative action into 5 areas: (1) areawide planning, (2) urban-rural balance, (3) the future of the central city, (4) housing, and (5) environment. It outlines the projected impacts of the Rural Development Act of 1972.

5. Breur, Robert, and F. David Schad. Resource Paper on "Policy Planning." TRB Special Report 146, Transportation Research Board, Washington, D. C., 1974.

This paper gives an overview of the role of transportation policy as an instrument of planning, although the distinction between planning and policy planning is not always adhered to. Six groups of transportation policy issues are discussed: 1) Allocation of responsibilities for providing facilities and services; 2) Decision making process; 3) Integration of privately provided public transportation into the state system; 4) Changing the demand for facilities and services; 5) Funds for transportation; and 6) Charging for transportation. The discussion includes the historical background behind each group of issues as well as suggested directions for future policy developments.

6. Brown, Stuart, John Hoffmann and Leslie Pollock. "Public Investment Strategies for Regional Planning." Paper presented at the AIP Conference, October 1974.

This paper develops an overview of various strategies for planning and guiding the development of a region. It underscores the importance of perceiving present trends and understanding how these must be modified or strengthened. Goal identification and evaluation of progress are exemplified for selected strategies such as intensive economic development and intensive environmental protection.

7. Harkness, Glenn E. "The Changing Transportation Planning Evaluation Process." Paper presented at the AIP Conference, October 1974.

The paper describes the evolution of transportation planning and its changing scope and direction. After an increasing consolidation of decision making powers at higher levels, recent developments suggest more local participation with emphasis on citizen input and community needs.

8. Hoel, L. A. "Summary of Conference Proceedings." HRB Special Report No. 120, 1971, pp. 4-10.

Five summary sections which deal with (1) urban commodity flow, (2) public policy, (3) the role of federal government, (4) the planning processes and urban form including industry location, and (5) research.

9. National Research Council, "Issues in Statewide Transportation Planning." TRB Special Report No. 146, Transportation Research Board, Washington, D. C., 1974, 262 pp.

This is a summary of the proceedings of a conference held in February of 1974. It contains a series of reports, resource papers, and discussions covering a broad range of administrative, economic and social issues involved in developing transportation planning policy at the state, regional and substate level. (Several papers on specific issues are covered under the authors' names in this bibliography.) The report lists the findings of the conference's workshops, most of which bear directly or indirectly on the formulation of state and federal transportation policy.

10. Neumann, L. A., W. M. Pecknold, A. T. Reno and M. L. Manheim. "Integrating System and Project Planning for the Effective Programming of Transportation Investments." Transportation Research Record No. 499, 1974, pp. 83-93.

The purpose of this paper is to discuss the problem of integrating system and project planning to systematically include environmental and community concerns. The paper first identifies the major problems in the current system-project relationship (e.g., many system impacts are long-term and area-wide and therefore cannot be handled on a project basis.) Also, system impacts are difficult to predict because of a lack of understanding of complex cause-and-effect relationships. The paper then discusses a philosophy for integrating the activities at these different levels of planning. System and project planning must be integrated so that the "go/no-go" decision to implement any project or a particular design will not disrupt the ability to allocate funds smoothly to other high-priority projects. Finally, the paper presents some practical techniques for more effectively integrating system and project plans by changing the documentation requirements to support a continuous planning process. An example is strengthening the ties that exist between system planning and the programming process that focuses on near-term implementation of sets of projects or programs.

11. Raymond, George M. "Issues in Non-Metropolitan Growth." Urban Land, February 1973, pp. 4-8.

The author considers (1) areas near SMSA's impacted by urban growth and (2) declining rural areas. In the first case, attention is called to the need for social services (including transportation) and strong involvement in land use on all levels of government. In the second case there is a call for coordinated efforts at transportation and renewal within a "growth center" oriented policy.

12. Thomas, Nicholas P., and Jeffrey J. Orum. Resource paper on "State and Regional Development." TRB Special Report 146, Transportation Research Board, Washington, D. C., 1974, pp. 186-242.

This paper constitutes a wide review of existing regional agencies, their planning functions, and the policies which guide or have led to their development. Examining the many multi-state and substate regional organizations and their relation to state and federal policy and stated objectives, the authors make a great number of recommendations on transportation planning policy and its potential to coordinate the various aims of functional and comprehensive planning at regional, state and substate levels. While citing a variety of different approaches to organization and structure as models, the authors wish to see greater uniformity nation wide.

13. U. S. Department of Agriculture. Rural People in the American Economy. Agricultural Economic Report No. 101, Economic Research Service, Economic Development Division, U. S. Department of Agriculture, October 1966, 125 pp.

This is a study of the changing face of rural America and how public services and planning for economic activities must be supplied to rural areas. Factors affecting the participation of rural people in the nation's development are emphasized. Economic development to achieve three goals is emphasized: bettering the lot of rural people, increasing the number of job opportunities for rural people, and bettering the lot of all people. This work serves as a general text on the problems facing the rural population in the United States.

14. U. S. Department of Agriculture, Economic Research Service. "Transportation in Rural America: An Interim Report." U. S. Government Printing Office, Washington, D. C., April 1974, 18 pp.

This was prepared for the Senate Committee on Agriculture and Forestry. The report is a general attempt to identify the problems of rural transportation in order to develop a transportation policy that is integrated with that for other sectors. The report reviews recent experience in the inability of the existing transportation system to meet demand and takes note of the lack of sufficient data and the need for research in order to evaluate the system as a whole.

15. Walton, C. Michael. Mobility and Rurality: The Value of Transportation. May 1970, North Carolina State University, 101 pp.

This is a study of the need to develop a transportation model for the rural community. Increased transportation mobility for rural residents through a reorientation of transportation planning concepts is needed to help eliminate rural poverty.

16. Wingo, Lowdon. "A National Urban Development Strategy for the United States." Urban Studies, Volume 9, February 1972, pp. 3-27.

This article traces the decline in population and economic leverage of non-metropolitan areas in the U. S. and calls for an organized research approach in areas such as (1) optimum city size, (2) private costs and benefits as a function of city size, (3) externalities (pollution, social costs, economic advantages) as a function of city size, etc., which will lead to a better understanding of structural growth.

II. TRANSPORTATION AND REGIONAL GROWTH

1. Arianin, A. "Interregional and Intraregional Analysis of Location of Productive Forces." Regional Science Association Papers, Volume 24, 1970, pp. 163-170.

The study suggests a comprehensive multi-stage "intersectional" analysis (input-output variety) in conjunction with an intra-regional cost-of-production and resource availability model to predict optimal locations.

2. Berry, Brian J. L. "Approaches to Regional Analysis: A Synthesis." Annals of the Association of American Geographers, 1964, pp. 54 ff.

The author employs general systems theory to analyze geographic study, its approaches and bases for synthesis, and to detect those areas in it requiring development such that a substantial understanding of U. S. economic regionalization can be reached.

3. Cella, Francis R. "Highway Location and Economic Development." Highway Research Board, Bulletin 327, 1962, pp. 73-76.

This paper asserts that a highway's location along with other factors can affect an area's economic development. It regards transportation as an industry contributing to the area's per capita income. The author develops a mathematical model using historical data on highway locations to measure their impact on the area's development.

4. Chorley, Richard, and Peter Hagget (Eds.) Models in Geography. Methuen and Company, Ltd., London, 1967.

This is a text which identifies various uses of models in geography and includes a section on models of socio-economic systems. Various model approaches to industrial location are explored by F. E. Ian Hamilton beginning with Weber and covering briefly Monte-Carlo and Markov chain models, allocation-location models, and settlement hierarchies.

5. Duis, R. W., T. H. Dudgeon, et al. "Highway Transportation and Appalachian Development." Appalachian Regional Commission, September 1970.

This report deals with the early phases of social and economic impact of a highway project in a region. It includes a discussion of market areas both inside and outside the region, with some reference to industries which are located in the region.

6. Friedman, J. "Regional Development in Post-Industrial Society." American Institute of Planners Journal, 1964, pp. 84-90.

This article discusses the locational aspects of regional development, citing national policy as the major determinant given an economy like the U. S.'s "where service industries predominate and where spatial immobilities are progressively losing their importance." Additionally, it considers formative distinction between "developmental" and "adaptive" approaches to planning. Because of its predominant formative role, increased research is urged on the spatially differentiated effects of national policy.

7. Fulton, Maurice. "Problems and Advantages of Selecting Rural Areas for Plant Location." Coastal Plains Commission, March 25, 1970.

Pros and cons of industrial growth in rural areas are discussed. Rural areas have available utility services, are accessible to metropolitan areas by new freeway networks, consider personal amenities vital and offer property for unusual developments. On the other hand, in the city, industries offer easy access to the plant for customers, are accessible to unusual forms of shipment and are near technical advice and equipment. Other pros and cons are discussed.

8. Fulton, M., and E. Hoch. "Transportation Factors Affecting Location Decisions." Economic Geography, Volume 35, Number 1, 1959, pp. 51-59.

The article includes a general background discussion of location theory and the evolution of the part played by transportation in determining "optimal" locations. It suggests that transportation facilities are an integral part of the market-oriented view and suggests areas of further investigation.

9. Gauthier, W. L. "Geography Transportation and Regional Development." Economic Geography, Volume 46, Number 4, October 1970, pp. 614 ff.

This article discusses the failures in integrating geographic and economic theory in transportation planning. The problem of evaluating industrial commitment versus infrastructure commitment in inducing accelerated economic development is examined.

10. Guthrie, John. "Economies of Scale and Regional Development." Regional Science Association Papers, Volume I, 1955, pp. 1-10.

The article presents an economic approach to location factors. It breaks down locational pressures into impacts of internal and external economies. It also shows how the scale or size of the plant influences location choice. It suggests that at a point in the evolution of industries, they tend to disperse operations due to decreasing advantages offered by agglomeration.

11. Grossman, David A., and Melvin R. Levin. "Area Development and Highway Transportation." Highway Research Record No. 16, Highway Research Board, 1963, pp. 24-31.

This article briefly considers the extent to which highways can be employed in such economic development as is sought by the Area Redevelopment Act of 1961. The problems in different types of distressed areas -- including old textile cities, mining regions, and marginal farming areas -- are described, and the degree to which highway improvements would help is in each case noted. The article calls for a realistic appraisal of highway programs within a human resource-oriented framework in serious redevelopment efforts.

12. Hale, Carl W. "The Mechanism of the Spread Effect in Regional Development." Land Economics, Volume 43, Number 4, November 1967, 437 pp.

This article discusses mechanisms affecting spread between leading and lagging areas during periods of U. S. economic growth. Those mechanisms considered are: the geographic separation of economic functions of business firms, wage differentials, local industrial development subsidies, urban development and zoning, and localized investment in social overhead capital, and inter- and intra-regional migration. Systems of integrated communications and highway transportation are considered preconditions of growth patterns.

13. Hale, Carl W., and Joe Walters. "Appalachian Regional Development and the Distribution of Highway Benefits." Growth and Change, Volume 5, Number 1, 1971, pp. 3-11.

The authors discuss the long range regional impacts of the technological changes in Appalachia associated with highway construction programs. They describe the effect of highways on accessibility to cities within and on the periphery of the Appalachia region and predict the probable increase in the economic potential of smaller growth centers in the region as a result of changes in accessibility.

14. Kuehn, John A., and Jerry G. West. "Highways and Regional Development." Growth and Change, Volume 2, Number 3, July 1971, pp. 23-35.

After an initial "review of conflicting ideas about the impact of highways on regional economic development," the article summarizes a correlation survey of economic development and highway location in the Ozark region. It concludes that highways have only a "permissive" effect in such development.

15. Straszheim, Mahlon. "Researching the Role of Transportation in Regional Development." Land Economics, August 1972, pp. 212-219.

This article points out the problems in assuming the positive relationship between capital transportation investments or user pricing policies and regional economic development. Three approaches to evaluating the importance of transportation systems in regional development are outlined and criticized: (1) classical location theory, (2) statistical models, (3) large-scale systems simulation models. The author underscores the problems of data gathering within all three approaches but suggests the third as a fruitful method.

III. SOCIO-ECONOMIC VARIABLES IN TRANSPORTATION PLANNING

1. Bouchard, Richard J., E. L. Lehr, M. J. Redding, and G. R. Thomas.
"Techniques for Considering Social, Economic and Environmental Factors in Planning Transportation Systems." Highway Research Record No. 410, Highway Research Board, 1972, pp. 1-7.

A general discussion of the considerations which should be made in order to take community values into account at each stage of the planning process and facility construction. Noting that only at the project phase do community values become clearly identifiable, the authors attempt to categorize the relevant factors of social, economic and environmental values which could enter into the system and corridor planning stages as well as the project planning, construction, and operation phases of development. A list of eleven categories of impact factors is offered along with a discussion of the general techniques for identifying them and incorporating them into the separate stages of planning. The three categories most relevant to systems, corridor, and project planning are: 1) Economic (land values, tax base, employment, housing and public services, business, and income); 2) Socio-political (life style and activities, perception of cost and benefit by groups, personal safety, effect on government); and 3) Land Use (changes in density, usage, activity).

2. Boyd, J. H. "Research Needs in Economic and Financial Factors of Highway Transportation: In Search of Improved Strategy." Highway Research Record No. 356, Highway Research Board, 1971, pp. 158-167.

The report describes the scope and content of economic and financial research in highway transportation. It contains a discussion of methodologies, including those employed in impact and cost/benefit studies, and recommends separation of the two kinds of studies. The author is critical of the application of economic techniques in highway research. Particular emphasis is given to problems in the specification and quantification of travel demand and to the analysis of transferred benefits from users to non-users.

3. Burkhardt, Jon E. "Impact of Highways on Urban Neighborhoods: A Model of Social Change." Highway Research Record No. 356, Highway Research Board, 1971, pp. 85-94.

A "Neighborhood social interaction index" is developed for measuring highway improvement impact on neighborhoods. Behavioral patterns (e.g., personal interaction and participation in local organizations)

and perceptual patterns (e.g., identification with local area) were used to develop this index using factor analysis. Such data as mobility of population, land-use mix, and housing density are employed for predicting the NSII index. The NSII index could be used in making decisions regarding highway location and its impact within a certain neighborhood. The index has possible application to the measurement of impact on small communities.

4. Burkhardt, Jon E. A Study of the Transportation Problems of the Rural Poor. Volume I, January 7, 1972.

This work is an analysis of the transportation needs of poor persons in five rural areas of the U. S. along with recommended systems for each area. A significant portion of the rural poor have a dire or strong need for transportation. Considering such factors as area characteristics, transportation behavior of the population, and attitudes toward population, various systems are recommended. Such systems include: a bus-like service in several states, a transportation grant program in Arizona (i.e., cars for the poor), and a reorganized and coordinated taxi system in North Carolina.

5. Burkhardt, Jon E. A Study of the Transportation Problems of the Rural Poor. Volume II, January 7, 1972.

This work is an analysis of area characteristics, transportation inventories and present travel patterns and attitudes which document the systems proposed in Volume I. Each of the five study areas are characterized and discussed. Available transportation resources include school systems, commercial bus lines, taxi companies, and parcel delivery services. Use of such resources by the poor is restricted by legal limitations, scheduling problems and lack of concern by present operators. Travel patterns and behavior are described by trip purpose, mode of travel, trip cost, frequency, mode, distance time and purpose and origin-destination relationships.

6. Campbell, Wilson E. "Social and Economic Factors in Highway Location." Paper No. 4926, Journal of the Highway Division, ASCE Proceedings, October 1966.

The paper presents methods derived by the Chicago Area Transportation Study for quantifying certain economic and social aspects pertinent to alternate highway route and structure selection. For balanced highway network evaluation, a minimum cost/maximum benefit analysis is proposed traversing a variably weighted checklist of considerations including both user and non-user criteria, such as traffic flow in the former case and relocation in the latter.

7. Hennes, R. G. "Highways as an Investment of Economic and Social Change." National Research Council, Highway Research Board, Special Report 56, 1960.

The study summarizes the history of highway project evaluation and cites developments in highway utility to be reckoned with in subsequent evaluations and reflected in subsequent projects. It notes the relative simplicity of former vehicular oriented evaluations and indicates that distribution standards be developed for the economic and social benefits afforded communities by highway constructions.

8. Horn, John W., and James L. Coril. The Impact of Industrial Development on Traffic Generation in Rural Areas of North Carolina. North Carolina State College, June 30, 1962, 121 pp.

Characteristics of traffic generated by the rural inhabitants of North Carolina are examined and interpreted. Home interview data as well as industrial interview data reveal travel-influence factors and characteristics needed for planning. Home interview analyses show increase in trip generation comes with increase in number of registered vehicles per residence, increase in number of licensed drivers residing at a dwelling unit, and in the summer. Industrial interview data analyses show differences in travel and employee characteristics for the regional areas of the state. Variations were found as well between both travel and employee characteristics in rural as opposed to urban areas.

9. Horn, John W. The Impact of Industrial Development on Traffic Generation in Rural Areas of North Carolina - Part I. North Carolina State College, June 30, 1960, 143 pp.

An analysis of elements which affect traffic generation from the rural home is presented. Involved is the calculation of the relationship between family travel and numerous factors such as family, vocation and race. Results indicate that family, vocation and race are related to family travel. The part-time farm vocational is the most active. Work trips were found to account for 27.3% of total trips made. Per day, the average number of trips and miles per dwelling was 3.1 trips and 22.1 miles. Fifty-five percent of the people interviewed had members of the family living at home who worked in business or industry.

10. Horwood, Edgar M., Carl A. Zellner and Richard Ludwig. "Community Consequences of Highway Improvement." NCHRP Report No. 18, Highway Research Board, 1965, 37 pp.

A review of the existing body of literature on non-user or community consequences of highway improvements. The two largest bodies of literature concern by-pass routes and radial urban freeway studies. In the first case, the studies show that trade area boundaries are

altered differentially -- thus, a by-pass can substantially depreciate economic activity in one area and appreciate it in another. The consistent conclusion in urban radial freeway studies is that land values are materially enhanced through their proximity to an urban radial corridor. Gaps in knowledge are indicated through interviews which show that most people responsible for commissioning impact studies are uncertain about the nature of particular impacts and the approaches to measuring them.

11. Hurst, Michael E. Eliot. "Transportation and the Societal Framework." Economic Geography, April 1973, pp. 163-180.

The author gives an overview of the thrust of transportation geography but suggests its goals have been too limited. He argues for the inclusion of "sociopolitical" variables instead of the "all too frequent . . . treatment of conduits and units . . ." He outlines a tentative approach (Holistic) to the extension of transportation in a geographical context.

12. Lang, A. S., and Martin Wohl. "Evaluation of Highway Impact." Bulletin 268, Highway Research Board, 1960, pp. 105-118.

This article takes issue with available highway impact analyses, contending that they offer no substantial economic, let alone social, aesthetic or political justifications for highway location and design. It argues that differentials usually accounted as economic benefits, i.e., non-user benefits, can be generally more aptly considered secondary user benefits; it further suggests that since transportation renders benefit only as a means, expenditures on transportation facilities and what they afford should be measured against direct expenditures towards the desired objects. Some of the factors requiring consideration in a useable economic evaluation, such as production costs and highway costs, are noted.

13. Pillsbury, Warren A. "Economics of Highway Location: A Critique of Collateral Effect Analysis." Highway Research Record No. 75, Highway Research Board, 1965, pp. 53-61.

The article first classifies the methodologies used to measure and predict the economic effects of highways into three categories: 1) the engineering economy method based on primary user cost/benefit; 2) collateral effect method, which takes into account secondary or tertiary costs and benefits; 3) marginal analysis, based on marginal user benefits and costs. The author proceeds to a defense of collateral effect analysis as an adequate method for predicting the effects of different location proposals in spite of various conceptual problems associated with the method.

14. Robinson, John. Highways and Our Environment. McGraw-Hill, 1971, 340 pp.

A broadly illustrated survey of highway impact problems (such as pollution, land encroachment, signs), how they occur, and examples of failures and successes in dealing with them. With a view towards effecting more sensitive solutions, it includes appendices of highway lobbies and citizen action groups.

15. Robley, Winfrey, and Carl Zellner. "Summary and Evaluation of Economic Consequences of Highway Improvements." NCHRP Report No. 122, Highway Research Board, 1971, 324 pp.

The report combines the social, economic, environmental and engineering factors to be considered by officials responsible for decision, authorization, location and design of highways. Concentrations rest on the social and economic community changes brought on by highway improvements. Some consequences are: 1) traffic generation, 2) increases in spendable income or population, and 3) increase in land-use change. How people use their time and space provide an indication of their values and preferences. Changes in either of these brought on by highway improvement can be of social consequence.

16. University of Texas, An Introductory Set of Community Indicators. Pamphlet I of the Community Analysis Research Project, Lyndon B. Johnson School of Public Affairs, The University of Texas at Austin, Spring 1973.

"Community indicators" which would provide decision-makers with an "overview of the social and physical conditions" in a community are categorized into twelve basic groups. These include economic base, land use and recreation, public service delivery, and transportation. Specific measures are suggested for each indicator, and the value of the various indicators in different modes of analysis is discussed. In a useful appendix, data sources for each indicator are listed, and the limitations of the data described.

17. University of Texas, A Resource Handbook for Developing Community Indicators. Pamphlet II of the Community Analysis Research Project, Lyndon B. Johnson School of Public Affairs, The University of Texas at Austin, Spring 1973.

This pamphlet is designed to extend and complement that described above. In particular, it is meant to help identify the indicators most useful to specific communities with specific policies as well as identify and suggest ways of improving the initial set of community indicators.

IV. EVALUATION TECHNIQUES AND MODELS

1. Carter, E. C., J. W. Hall and L. E. Haefner. "Incorporating Environmental Impacts in the Transportation System Evaluation Process." Highway Research Record No. 467, Highway Research Board, 1973, pp. 1-11, Bibliography.

The report includes general discussion of evaluation techniques in choosing among alternatives. These techniques include: ranking method, rating method, rank-based expected value, value matrix, desirability rating (utility theory), and competitive decision-making (game theory).

2. Coyle, John H., H. Kirk Dansereau, John C. Frey and Robert Pashek. "Interchange Protection and Community Structure." Highway Research Record No. 75, Highway Research Board, 1965, pp. 62-74.

The paper first outlines a model for developing land-use planning at interchange communities. Through computer simulation of traffic patterns in an actual interchange area, incorporating a variety of possible land use changes, the article attempts to arrive at an "arrangement of land management units which will protect the highway against congestion and at the same time maximize the development of the interchange area." In a final section of the paper, the authors consider the relationship between community social structure and the potential for implementing land use plans that would minimize negative impact.

3. Dickey, John W., and Robert C. Stuart. "Implementation of Urban Transportation Decisions: A Simultaneous Category Model." Highway Research Record No. 348, Highway Research Board, 1971, pp. 16-34.

A "non-parametric simultaneous category" model, called IMPEM, is described in the article. The model deals with nominal variables, i.e., those measured in categories rather than continuums, and with dependent variables related to each other. The purpose of the model is to allow a planner to estimate the probabilities of implementing a plan given the complexity of the process. Using data from surveys sent to various public officials and eight dependent category variables relating to the planning process (including "technical complexity," "political complexity," and "time to implementation"), the model develops categorical relations among the variables which may then be used to estimate probabilities that various categories of the dependent variables will arise under a given set of conditions. In the creation of the model, it is found that the ease of communication created by the planner is related to the various implementation factors as well as to factors beyond his control (e.g., influence of state agency). Under the assumptions of the model, however, it turns out that the degree of planner influence through the communications factor is relatively small.

4. Haefner, L. E., and M. J. Redding. "An Analytic Structure of Community Public Works Decision Processes." EDRA Proceedings of the Annual Conference, Environmental Design Research Association, 1972.

In this article the authors formulate a strategy for resolving contentions over community public works into compromised decisions, using applied mathematics in linear programming and game theory. The relative values and costs (or results) involved in a given project are factored to produce a compatible program that reduces group-specific costs. Although admittedly limited, their conceptual approach was instrumentally applied in reaching a Pareto Optimal solution in a certain midwestern transportation project.

5. Harris, C. C., S. J. Hill, C. E. Olson and M. M. Stein. "Long Range Transportation Investment Planning." Highway Research Record No. 458, Highway Research Board, 1973, pp. 13-20.

The study suggests that cost-benefit analysis is not an adequate approach to evaluating proposed highway alternatives since it may not include "social" and "locational" impacts. A model is presented which incorporates population and industry factors to forecast impacts at a regional level.

6. Harvey, Thomas N. "A Method of Network Evaluation Using the Output of Traffic Assignment Process." Highway Research Record No. 238, Highway Research Board, 1968, pp. 46-63.

A study of some methods for determining the effect of change in a traffic network and who may benefit or lose from such a change. Consumer surplus was used as a measure of benefit.

7. Hejal, S. S. "An Economic Priority Model for Rural Highway Improvements." Purdue University and the Indiana State Highway Commission, December 1970.

This research develops an economic model to provide the highway planner with suggested construction projects whose priorities could be based on their economic merits. Using a benefit-cost ratio analysis, a final discretion can be made between improvement alternatives at the same site and a priority rank assigned for various sections. Road user costs and construction costs are estimated, using a travel time model and various regression models, respectively.

8. Kassoff, H., and D. S. Gendell. "An Approach to Multiregional Urban Transportation Policy Planning." Highway Research Record No. 348, Highway Research Board, 1971, pp. 76-93.

This article reports on a resource allocation study designed to predict economic and other consequences of alternative transportation

investments. The model includes user and non-user benefits and impacts. The model begins with land development, travel generation and a system of performance measures evaluated by economic investment-return analysis and "non-costable" constraints.

9. Mumphrey, Anthony and Julian Wolpert. "Equity Considerations and Concessions in the Siting of Public Facilities." Economic Geography, 1973, pp. 109-121.

The article presents a model which employs "allocative efficiency," "spatial equity," and citizen preference in the location of a bridge.

10. Rothman, Richard, "Access Versus Environment?" Traffic Quarterly, Volume XXVII, Number 1, January 1973, pp. 111-132.

This study uses the technique developed by Morris Hill and others to determine measures for evaluating potential impacts of transportation systems. The technique involves selecting a sample of those who might be affected and asking them to "vote" on the relative importance of various objectives of a transportation plan. The votes are averaged in order to determine "relative weights" for each objective. The relative weights are then used in combination with expert evaluation to score the various objectives of a particular plan. The study uses the method to evaluate Chicago's 1990 transportation plan and concludes that the plan "emphasizes access at the expense of environment."

11. Smith, William L. "Rational Location of a Highway Corridor: A Probabilistic Approach." Highway Research Record No. 348, Highway Research Board, 1971, pp. 42-60.

The article discusses a systems' approach to the location of a freeway corridor which included both rural and urban elements. In order to make the various elements in the analysis comparable, one criterion was chosen -- "least social cost." This is defined in terms of the resources (regardless of kind) that people would have to give up in order to obtain the facility. Separate models were developed to measure the supply and demand for the various human and natural resources involved. The location of least social cost for each element was then determined. The output of the individual models could then be used as input to form a composite model yielding the corridor for the facility with the least social cost.

12. Steinberg, Eleanor B. "Benefit-Cost Analysis and the Location of Urban Highways." Highway Research Record No. 348, Highway Research Board, 1971, pp. 35-41.

Noting that increasing opposition to freeway location is related to the problem of the distribution of costs and benefits, the author

questions the various attempts to introduce equity considerations into cost benefit analysis during the planning stages of a public project (e.g., a highway). "The root of the problem is that benefit/cost methodology assumes that a dollar's worth of any kind of benefit (or cost) has the same value for all of the individuals on whom the highway has a direct impact." Since other modes of analysis have not solved the problem, the author suggests that equity judgments be made by elected public officials rather than by technicians or appointed administrators. Thus, the final determination of a facility's location would be left to those who are directly accountable to the electorate.

13. Thomas, Edwin N., and Joseph L. Schofer. "Final Report Criteria for Evaluating Alternative Transportation Plans." NCHRP Project 8-4, Transportation Center, Northwestern University, Evanston, Illinois, July, 1967.

The report explores means for more comprehensive evaluation of alternative transportation plans that include social, aesthetic, political and other criteria not accountable by current evaluation processes. Decisional problems are analyzed and resolutions offered especially through open-ended "systems" analyses and modeling which consider transportation inputs, interfaces, and outputs, both functional and concomitant.

14. Turner, Christopher. "A Model Framework for Transportation and Community Plan Analysis." American Institute of Planners Journal, September 1972, pp. 325-331.

The author suggests a model for evaluation of the impact of transportation changes on various groups within a community. Groups are analyzed in terms of the "resources" to which they have access with "attraction" heights fixed to the resources. Transportation plans may be analyzed in light of the projected benefits which accrue to given groups.

15. Weiner, Paul, and Edward J. Deak. "Non-user Effects in Highway Planning." Highway Research Record No. 356, Highway Research Board, 1971, pp. 55-68.

The objective of the study is to "formalize potential community concerns regarding the relative importance of most commonly encountered non-user impacts." Using questionnaires sent to regional planners, state highway engineers and regional planning agencies, the authors develop a weighting system which indicates the relative importance of different factors of impact to different groups, as well as the degree of "stability," "variability," and "volatility," of the weights themselves. The authors conclude that relative weights for non-user impacts are useful to planners in determining trade-off ratios based on the actual attitudes of citizens.

V. PUBLIC ATTITUDES AND CITIZEN PARTICIPATION

1. Bishop, Bruce A., C. H. Oglesby and Gene E. Willeke. "Socio-Economic and Community Factors in Planning Urban Freeways." Project on Engineering-Economic Planning, Stanford University, September 1970.

The report discusses the need for a workable relationship between "change agents" in planning (e.g., highway engineers) and "change clients" (the community), a relationship that would legitimize and improve the chances of success for the planning process. It describes several strategies for community participation in the planning process: (1) strategy of information, (2) strategy of information with feedback, (3) the coordinator, (4) the coordinator-catalyst, (5) community advocacy planning, (6) arbitratative planning, and (7) rural planning. Each of these represents a different relationship between community and planners. Having reviewed community participation in highway planning in California, the authors recommend that improvement could be made by using the "coordinator-catalyst" strategy, where the planner works to both stimulate and coordinate community groups' and individuals' interactions.

2. Bleiker, Hans, John H. Suhrbier and Marvin L. Mannheim. "Community Interaction as an Integral Part of the Highway Decision-Making Process." Highway Research Record No. 356, Highway Research Board, 1971, pp. 12-25.

Defining "community interaction" as "all the formal and informal, direct and indirect mutual intercourse between the highway agency and the community," the authors proceed to identify the objectives of community interaction and the techniques to be used in accomplishing those objectives. Their methodology is based on an analysis of four highway decision-making cases which involved controversy and on concepts drawn from welfare economics, game theory and planning theory. Three main categories of community interaction are identified: (1) responsibility, (2) responsiveness, and (3) effectiveness. The objectives listed under these categories include maintaining agency and process legitimacy, exploring community values, maintaining credibility, and searching for consensus. Some 30 techniques are listed, though only three are discussed -- holding meetings, providing a build-in communication effectiveness test, and citizen's advisory committees. The article ends with a discussion of the management of community interaction and the need to coordinate the activities designed to meet the various objectives.

3. Burkhardt, Jon E. "Community Reactions to Anticipated Highways: Fears and Actual Effects." Highway Research Record No. 470, Highway Research Board, 1973, pp. 22-31.

This study evaluates a hypothesis that residents and businessmen within a highway corridor see themselves as victims of adverse effects of highway improvements. These fearful expectations lead to adverse effects even before the final route selection. The study distinguishes between effects resulting only from these preconceptions and those that would have occurred anyway. The author also develops procedures to alleviate the unnecessary concerns of residents and businessmen and to ease the strain of transition. Regression analyses of time-service data reveal that to offset unwarranted expectations, highway departments should take a much more active role in giving out information and in monitoring community reaction.

4. Cohen, A. R. Attitude Change and Social Influence. New York Basic Books, 1964.

The author presents the operational principles of attitude change and social influence as deduced from experiments conducted in psychology. Data obtained through general survey processes, however, are excluded from the discussion. The book examines the components involved in persuasion -- the individual subject, the communication and communicator, and the given environment -- and it notes what variations in these components affect the process, according to current cognitive theory.

5. Culford, Frank C., Jr. "Transportation and Political Culture." Highway Research Record No. 356, Highway Research Board, 1971, pp. 32-42.

The author discusses conflicts and agreements between various groups involved in the transportation planning process, both urban and inter-urban. He compares European and American "systems," and categorizes types of American cities by the degree of conflict between planners and citizens.

6. Dansereau, H. Kirk, John C. Frey and Robert D. Pashek. "Highway Development: Community Attitudes and Organization." Highway Research Record No. 16, Highway Research Board, 1963, pp. 44-58.

This is a survey of three Pennsylvania sites seeking to measure community and community leader views of highway development, changes in population characteristics, and changes in the complexity (planning functions) of local government. Quantification shows views to be favorable and complexity to develop independent of size.

7. Dansereau, H. Kirk. "Attitude and Economic Climate." Highway Research Record No. 187, Highway Research Board, 1967, pp. 21-32.

A study of the influence of public relations efforts of planners on the attitudes of community leaders and citizens. Highway-community relationships are approached by predicting economic development, the design of land use plans for highway protection, and the determination of protective measures for interchange sites. Attitudes toward planning and zoning are correlated with professional and socio-economic characteristics of the respondents. In general, the authors find a favorable attitude towards planning and zoning.

8. Hahn, Alan J. "Planning in Rural Areas." American Institute of Planners Journal, January 1970, pp. 44-50.

The article describes resistance of local officials and inhabitants to planning efforts and attempts to explain that resistance. Observations are drawn from experience in a regional developmental education project in rural counties in upstate New York. Education projects through extant agencies is suggested as the correct approach.

9. Kemp, Barbara H. "Social Impact of a Highway on an Urban Community," Highway Research Record No. 75, Highway Research Board, 1965, pp. 92-102.

The article reports on a study conducted for the National Capital Planning Commission to determine the possible social effects of a proposed major highway link on three neighborhoods in Washington, D. C. Neighborhood residents were interviewed, and each was shown three alternate proposals and asked to give his/her views on the possible effects of the different alternatives. The general attitudes of the respondents are summarized; these include: resistance to personal relocation, concern for the elderly who would be displaced, and hopes that there would be adequate aid in helping people to relocate. The article concludes with four "propositions" concerning the general social effects of highway location and with a set of recommendations for highway and urban planners designed to minimize the negative effects of dislocation and maximize the positive social consequences of new transportation facilities.

10. Klatzmann, Joseph, Benjamin Y. Alan and Leir Yair (Eds.). The Role of Group Action in the Industrialization of Rural Areas. 1971.

This is a collection of papers presented and discussions held during a 1969 international symposium of the same title. Included in the materials are arguments on the desirability and form of rural industry, analysis of the agriculture co-operative as a means for development, and employment of cooperative or group action concepts for the integration, from village to center, of rural regional industrialization.

11. Mason, Joseph Berry, and Charles Thomas Moore. "Development of Guides for Community Acceptance of Highway Location, Development and Construction." Highway Research Record No. 356, Highway Research Board, 1971, pp. 43-54.

The basic objective of this research was to develop and test a methodology for determining goals that have the highest priority in terms of both desirability and importance as perceived by public officials and private citizens. Through attitude surveys of public officials and private citizens, areas of agreement and disagreement between the two groups were identified. Of particular interest are the differences in priorities placed on "aesthetic" vs. "economic" goals. Private citizens tend to place higher priorities on the former than do public officials. In general, citizens want a greater say in planning procedures for any major investment that would affect their lives. The authors conclude that the survey developed in the study represents one way of increasing public participation.

12. Ryan, Charles. "A Review of the Public Hearing Process as a Means of Obtaining Citizen Views and Values." Highway Research Record No. 467, Highway Research Board, 1973, pp. 24-25.

A follow-up study contrasting results of a community attitude survey with expression at public hearings. It was found that opposition is much higher (95%) at public hearings than in the community as a whole (45%).

13. Ryan, Charles R., Brian P. Nedwek and Edward A. Beimborn. "An Evaluation of the Feasibility of Social Diagnostic Techniques in the Transportation Planning Process." Highway Research Record No. 410, Highway Research Board, 1972, pp. 8-23.

The article presents results of a questionnaire survey conducted coincident with the proposal of a Milwaukee freeway, and evaluates the feasibility of the practice. It finds demographic, attitudinal, etc., analysis of freeway support/opposition yields information useful in transportation considerations. Fractional costs for insights yielded suggests implementation and standardization into the transportation planning process.

14. Shaffer, Margret T. "Attitudes, Community Values, and Highway Planning." Highway Research Record No. 187, Highway Research Board, 1967, pp. 55-61.

The article gives a brief summary and analysis of different techniques used in designing instruments used for measuring public attitudes and values in order to anticipate potential responses to highway development. Three techniques evaluated are: (1) word association, (2) sentence completion, and (3) semantic differential. The author

argues that techniques of identifying attitudes are more important than surveys of opinion. The responses to attitude items may be correlated with socio-economic characteristics and then the values of a given community determined.

15. Ueland and Junker, Architects and Planners. A Manual for Achieving Effective Community Participation in Transportation Planning. Prepared for Pennsylvania Department of Transportation, Harrisburg, Pennsylvania, 1974.

A comprehensive, step-by-step guide for planners to use in obtaining citizen participation in the planning process. It contains an outline of the basic planning procedure, identifies the points where citizen input becomes necessary or valuable, and describes techniques for eliciting and evaluating citizen input at each stage of a project. Alternative techniques are suggested for different groups of citizens and for different planning and community situations.

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