

ALTERNATIVE METHODOLOGICAL APPROACHES TO NATURAL
RESOURCE POLICY ANALYSIS: AN ILLUSTRATION OF AN
INSTITUTIONAL APPROACH TO LAND USE POLICY ANALYSIS

by

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ABSTRACT

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(ABSTRACT)

Policy economists are increasingly called upon to participate in the institutional design of natural resource policies, interpret impacts of alternative policies, and predict the direction of future policy formulations. However, many of the forces influential in the current reformulation of these policies extend beyond the exchange oriented scope of the traditional mainstream methodological perspective of contemporary economics. In particular, the inability of mainstream economics to analytically incorporate concepts of institutional change, as well as the analytical limitations imposed by its predictive epistemolo-

gical basis suggest the need for an alternative analytical framework for use in policy analysis.

This study explores the potential contribution of an alternative, institutional approach to policy analysis. Certain properties of the institutional approach identified in this study, including its nonpredictive epistemological orientation, focus on institutions as the unit of observation, reliance on behavioral analysis, and ability to incorporate a wider array of disciplinary perspectives are evaluated with respect to their contribution to policy analysis. The primary analytical technique of institutional economics, development of a pattern model, is analyzed in some detail and compared with traditional mainstream analytics.

An illustration of an institutional approach to policy analysis is developed to examine policy considerations raised by the farmland retention issue. A pattern model is constructed to provide the framework for the institutional analysis. Primary components of the model, the policy environment and the actors within that environment, structure the qualitative and quantitative analysis. The pattern model is designed to increase policy economists' understanding of issues fundamental to the development of natural resource policies, e.g., Why is a particular policy chosen from the menu of possible policy options?, What motivates

individuals to participate in a policy?, What is the process underlying policy formulation?, and, What is the institutional evolution of a policy?

The conclusions to the study are two-part: first, conclusions and policy recommendations are offered for the specific case of the farmland retention issue. Second, for the more general case of natural resource policy analysis, an evaluation of the potential analytical contributions of an institutional approach or a blend of approaches is offered.

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Chapter I

METHODOLOGICAL ISSUES IN THE ANALYSIS OF NATURAL RESOURCE POLICIES

1.1 INTRODUCTION

Many current public policies designed to influence the use and allocation of natural resources, particularly soil and water, are philosophically linked to agricultural policies developed during the Depression era (Paarlberg). However, in response to changing social, ethical, political and economic environments, these policies have evolved over time beyond the original goal of maintaining farm income levels to encompass a broader agenda of social objectives. In this environment of change, policy analysts are increasingly called upon to participate in the design of natural resource policies, interpret impacts of alternative policies, or predict the direction of future policy formulations.

Economists involved in the design, interpretation and analysis of natural resource policies, general rules which limit the range of explicit choice in specific situations, acknowledge the importance of analyzing the institutions which govern natural resource use and allocation. Institutions have been described by Commons as the "going concerns"

of a society. These going concerns include the laws, constitutions, traditions and ethical and moral protocols which define the social, political and economic behavioral norms of society. As the framework within which humans interact, institutions establish the cooperative and competitive relationships which constitute a society (North).

Agricultural and natural resource policies have experienced two major periods of policy redefinition, or institutional change (Batie, Shabman, and Kramer). The first, during the New Deal era, was precipitated by calamitous economic events, and the second, still in progress, which has resulted in part from a shift in the ethical basis of public support for these policies (Shabman). As these policies undergo redefinition over time, the value of insightful policy analysis will increase. However, many of the forces influential in the current reformulation of agricultural and natural resource policies extend beyond the exchange oriented scope of the traditional mainstream methodological perspective of agricultural economics, challenging the analytical abilities and relevance of the agricultural economics profession (Kuttner).

As a result of the significant role played by institutions in natural resource use and allocation, natural resource economists have often conceptually acknowledged the

importance of including the institutional component in their analysis. As Castle, Kelso, Stevens and Stoevener note

While it is true that most resource economists work "with" institutional change, they do so primarily in terms of appraising allocative distributional outcomes of alternative institutional arrangements (p. 466).

Working "with" institutions as described by Castle, et al., is but one of a number of approaches to institutional analysis in natural resource policy which are suggested by neoclassical economic theory. In addition to omitting institutional considerations from the analysis entirely, or vague specification of institutions in the ceteris paribus assumption of the analysis, in an attempt to work "with" institutions, economists have proposed inclusion of institutions as explicit endogenous components in the analysis.

While acknowledging the conceptual and empirical limitations of natural resource analyses that omit consideration of institutions, it is the thesis of this study that efforts to incorporate institutions and institutional change endogenously within the body of mainstream economic theory will not be successful for two related reasons:

1. The structure of neoclassical economic theory is not consistent with the evolutionary nature of institutions and institutional change.

2. The received methodological basis for inquiry in contemporary economics, logical positivism, does not acknowledge the predictive limitations inherent in the analysis of institutions and their change.

The inability of mainstream economics to incorporate institutions and institutional change in a methodological consistent research program raises a number of issues for policy analysts who increasingly recognize the importance of addressing institutions in policy analysis.

1.2 METHODOLOGICAL ISSUES FOR AGRICULTURAL AND NATURAL RESOURCE POLICY ANALYSIS

Agricultural and natural resource policies have evolved into complex economic and social institutions with a philosophical basis and supporting political power. The dynamic nature of these policies along with the multi-dimensional sources of policy change pose three problems for the public policy analyst. First, the methodological approach and methods used must be capable of acknowledging and addressing the concept of change in public policies. As suggested earlier, change in agricultural and natural resource policies, though often incremental, has been the rule rather than the exception. This history of policy change is characterized by both marginal and nonmarginal changes in objectives, methods and philosophy.

Second, the sources of change and redirection of these policies have included more than economic forces. Although an economic crisis of major proportions motivated the nonmarginal policy changes of the New Deal era, change in these policies was also influenced by ethical, political and social considerations. More recently, changes in public policies dealing with agriculture and natural resources (such as those inspired by the environmental movement) have also been influenced by social, ethical and economic factors. Omission of these often significant, noneconomic factors in the analyses of public policies can result in a research product that lacks explanatory power, robustness, and relevance (Kuttner).

Third, in recent years, heightened social consciousness of agriculture's contribution to environmental degradation has resulted in policy proposals designed to essentially redefine property rights in the area of natural resource use (Batie, Braden). Changes in property rights for natural resource use can create welfare gains for some, welfare losses for others. A related result of this is the emergence of political interest groups intent on influencing the reallocation of property rights (Rausser). The inability of a methodological approach to address the issue of a change in the assignment of property rights, or the relegation of

this issue to a *ceteris paribus* assumption, again is an omission of a relevant part of the analytical product.

The choice of methodological approach will significantly influence both the sorts of questions asked as well as the kinds of results generated. Inability to conceptually accommodate notions of change, a variety of noneconomic contributing factors of change, and the resulting property rights redistributions of these changes can seriously limit and qualify analysis of public policies related to agriculture and natural resource use. This problem exists for analyses of individual commodities or natural resources, as well as for policy analyses of broader scope.

1.3 THE RESEARCH PROBLEM

Economists wishing to contribute to the policy process have at their disposal a more varied methodological opportunity set than is commonly recognized. Use of an alternative to mainstream neoclassical economics, e.g. an institutional approach, is one of a number of options. However, choosing an appropriate methodological perspective and associated analytical technique from the menu of alternatives involves evaluation of trade-offs in areas typically thought of by many economists as given.

As natural resource policies undergo review and reformulation, the demand for insightful policy analysis will probably increase. Within the environment of the policy process, different methodological perspectives will generate different research agendas, significantly influencing the content of the analytical product. Policy analysts familiar with alternative approaches to policy analysis and the relative contributions of these alternatives may find that they can contribute a more meaningful product to the policy process. However, policy economists trained in the mainstream methodological perspective of neoclassical economics are often unaware of alternative methodological approaches or the trade-offs associated with the use of alternative analytical approaches.

To assist policy analysts unfamiliar with these alternatives in making a meaningful evaluation, additional information on the contributions of alternative methodological approaches to policy analysis is necessary. With more knowledge of the trade-offs involved in using alternative methodological approaches, policy analysts may better tailor their analysis to incorporate relevant factors that may otherwise be relegated to the informational vacuum of a *ceteris paribus* assumption.

After identifying basic methodological issues related to the analysis of public policies, this study analyzes and illustrates an alternative method of policy analysis based on an institutional perspective. Focusing on the area of land use policy, the methodological basis of this institutional approach, along with its complementary methods of inquiry, are explored and illustrated in this study. Characteristics of the institutional approach identified in this study suggest that it may prove to be especially valuable in the analysis of a changing environment characteristic of contemporary agricultural and natural resource policy.

1.4 RESEARCH OBJECTIVES

The general objective of this study is to identify, analyze and illustrate methodological issues associated with the analysis of agricultural and natural resource policies. In particular, this study seeks to identify the potential contributions of the institutional approach to public policy analysis. Instrumental in realizing this general research objective are the following specific research objectives:

1. To compare and contrast alternative methodological approaches, mainstream neoclassical and institutional, to the analysis of agricultural and natural resource policy.

2. To develop and illustrate an institutional approach to the analysis and design of politically acceptable and effective farmland retention land use policies.
 - a) To identify societal benefits to be obtained from farmland retention policies.
 - b) To identify the type and approximate magnitude of costs of farmland retention policies.
 - c) To relate the implications of the type and magnitude of costs and benefits of alternative farmland retention policies to probable political acceptability in the Southeast.
 - d) To analyze the evolution of farmland retention policy design, implementation and participation in Virginia.

The research objectives of this study are selected and structured to provide an orderly inquiry into methodological issues relevant to agricultural and natural resource policy analysis. Information generated from the first objective yields a basis for comparing selected alternative methodological approaches to policy analysis. By comparing and contrasting alternative methodological approaches, this objective serves to highlight differences in underlying epistemological assumptions, and the implications of these assumptions for the analytical product. In addition, this information can be evaluated in light of perspectives of the policy process that ultimately utilizes this information for a variety of purposes.

The second objective explores the potential contributions of the institutional approach to policy analysis by utilizing this approach in an analysis of farmland retention land use policy activities in the Southeast. Information generated by this illustration will be of interest to policy analysts unfamiliar with an institutional approach to policy analysis, in particular its underlying assumptions, epistemological perspective, analytical techniques and validation procedures.

1.5 RESEARCH PROCEDURES

The procedures used in this study to achieve the research objectives outlined above include both qualitative and quantitative methods. The comparison and evaluation of alternative methodological approaches, objective one, is structured to review the common heritage of the neoclassical and institutional approaches and to identify relevant points of divergence: disciplinary scope, analytical methods and epistemological foundations.

Particular emphasis is placed on reviewing the underlying epistemological assumptions of the neoclassical and institutional approaches. These assumptions are then analyzed with respect to their relative adaptability in

addressing the issue of institutional change. The disciplinary scope of the approaches is also analyzed in terms of their ability to incorporate relevant extra-disciplinary sources of information. Analytical methods associated with these approaches are outlined and compared in terms of analytical product.

The illustration of the institutional approach to policy analysis, objective two, involves analysis of an agricultural land use policy representative of the farmland retention policy issue. The method of inquiry used in this analysis is the development of a pattern model, the primary analytical technique of institutional economics (Fusfeld). Pattern models attempt to explain human behavior in the context of an institutional environment. The case study is the most common context for development of a pattern model. In this inquiry, institutions rather than individuals form the basic unit of analysis, and behavior, viewed in the context of its institutional constraints, is assumed to be inherently predictable. Understanding rather than prediction becomes the goal of the pattern model.

Development of an economic pattern model facilitates analysis of issues fundamental to the analysis of land use policies, e.g., Why is a particular policy chosen for implementation?, What motivates individuals to participate in a

policy?, What is the process underlying policy formulation?, and, What is the institutional evolution of a land use policy? Consideration of these institutionally derived questions provides a basis and direction for the pattern model. The pattern model developed in this study links an examination of perceptions of the farmland retention issue, development of institutions that address the issue and form the policy environment, and an accounting of public and private costs of farmland retention policies, with an examination of the behavioral response to participation in a particular farmland retention policy.

The farmland retention issue and the institutions that have emerged in response to this issue has been selected as a representative land use policy issue for this illustrative analysis. The specific land use policy selected for analysis in the illustration of the institutional approach is Virginia's Agricultural and Forestal District Act (AFDA). Virginia is currently reviewing this policy in terms of its original objectives, its success to date in achieving these objectives, and the need for modification of the policy. In addition, because farmland retention land use policies have been adopted at other levels of government as well as in other states, a comparison of institutional design, policy participation, and relationship to existing land use institutions is made possible by this analysis.

Lessons learned from Virginia's experience with design, implementation and participation may be especially valuable as this particular policy is one of a number of farmland retention policies gaining the attention of land use decision makers in the Southeast U.S. ¹ Information generated from this research may therefore be useful to two different audiences. First, at a theoretical level to policy analysts seeking exposure to the epistemological basis and analytical process of an alternative approach to policy analysis. Second, at an applied level, the analytical product of the institutional analysis of the farmland retention issue may be of interest to land use decision makers confronting this issue in Virginia and the Southeast.

1.6 DISSERTATION OUTLINE

Chapter I presents the basic research problem of this dissertation. Recognizing the changing nature of policies designed to address issues in the area of natural resources, concern about the conceptual limitations and effectiveness of the conventional methodological basis of mainstream policy analysis is expressed in terms of the

¹ The area referred to as the Southeast includes the following 12 states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

research problem this study addresses. The specific research objectives of this study are presented in this introductory chapter, along with the methods of inquiry used.

Specific methodological issues raised in Chapter I are examined in a theoretical context in Chapter II. The relationship between perceptions of the policy process and selection of a research methodology is discussed with particular emphasis on the potential contribution of the resulting analytical product. Emphasis is placed on identifying and comparing the relative contributions of the neoclassical and institutional approaches to agricultural and natural resource policy analysis.

Drawing on insights suggested by the comparative analysis in Chapter II, Chapter III begins the illustration of an institutionalist approach to a policy analysis of a land use issue of specific interest in Virginia and general interest to the Southeast. After identifying some of the factors influencing the growing demand for land use policies in the Southeast, the farmland retention policy response is examined. An economic pattern model is developed to increase understanding of this issue and the institutions which emerge in response to this issue. The preliminary structure of the pattern model is developed in Chapter III, emphasizing the interaction between components comprising

the policy environment, and the actors constrained by, but operating within, that environment.

Using the analytical framework of the pattern model Chapter IV begins the analysis of the policy environment of the farmland retention issue. The problem of issue identification as it relates to definition of policy objectives and determination of societal values and goals is first explored. After reviewing a number of possible interpretations of the farmland retention issue, as well as factors influencing alternative issue definitions, Chapter IV discusses the policy process and the farmland retention issue. Beginning with the national level, recent federal farmland retention policy initiatives are presented and related to similar state and local efforts. State and local farmland retention policies are then presented and analyzed in terms of their political acceptability in the Southeast, the role of government in these policies, their primary policy objective, and given their objectives, their known costs.

Chapter V parallels the analysis of the policy environment by focusing on the behavioral response of actors within that environment. Virginia's primary farmland retention institution, the Virginia Agricultural and Forestal District Act, was selected as a representative farmland retention

policy for the analysis. The institutional history of this act is reviewed, as well as its relationship to existing land use policies. In addition to identifying characteristics of institutional design which may influence the effectiveness of this policy, factors hypothesized to influence public and private participation in the policy are presented. After identifying the public and private actors in the Virginia AFDA policy process, a behavioral analysis of the public and private policy participation process is developed conceptually as an institutionally constrained qualitative choice process.

Chapter VI presents the survey procedures developed to obtain the information used in the behavioral analysis. Procedures used in conducting a telephone survey of Virginia county administrators, and procedures used in design and administration of mail surveys of Virginia county supervisors and Culpeper County landowners are explained in this chapter. Summaries of landowner survey responses and county supervisor survey responses are then presented.

Using data obtained from the mail surveys of Culpeper County landowners and Virginia county supervisors, Chapter VII presents an empirical analysis of the public and private behavioral response to the AFDA adoption decision. Hypotheses developed in Chapter V are tested using qualita-

tive choice models for the case of landowner participation, and county supervisor adoption of the AFDA. Within the framework of the pattern model, results of this empirical analysis are integrated with the information generated in earlier chapters to increase understanding of the factors involved in developing land use policy.

Chapter VIII summarizes development of the pattern model and its principal conclusions. A general summary of the dissertation and its results are included in Chapter IX. In addition to general agricultural land use policy implications suggested by the institutional analysis, the final chapter presents suggestions about the consequences of using alternative methodological approaches to agricultural and natural resource policy analysis. An evaluation of analytical trade-offs made during the course of developing the pattern model is presented, and suggestions for future uses of this approach are outlined.

Chapter II

METHODOLOGICAL PERSPECTIVES AND THE ANALYSIS OF NATURAL RESOURCE POLICIES

Through the 18th century, the analysis of the development, implementation, and effect of public policies was considered the disciplinary subject matter of political economy. In response to theoretical (primarily the ordinalist revolution) and methodological developments (widespread acceptance of logical positivism), the eclectic discipline of political economy has since given way to two specialized yet complementary fields of inquiry: neoclassical economics and political science. In its evolution from political economy, neoclassical economics has limited its focus of inquiry in order to examine a more narrow range of economic phenomena, and adopted a methodology of inquiry for the examination of this phenomenon (Blaug).

While one result of this evolutionary process has been unprecedented scientific credibility among social sciences, contemporary economists engaged in natural resources public policy analysis are increasingly aware of the limitations the disciplinary constraints of scope and methodology impose on their analytical process and product (Fusfeld). This has especially been the case in the area of natural resource

policy analysis, an area in which traditionally noneconomic factors have historically been influential in the development, implementation and impact of these policies.

Efforts to step beyond the neoclassical market oriented solutions to analyze the sources of preferences (and by implication, the distributions of property rights which result in a given market solution) are limited by the conceptual framework of our discipline (Shabman). In the case of natural resource policy analysis, one approach to this problem has been the conceptualization of natural resource policies within an institutional framework. Rausser suggests that subsequent attempts to modify mainstream economic theory to incorporate the effects of institutions and their change have, however, met with little success.

This chapter identifies some reasons for this relative lack of success, reasons that trace to definitional limitations of neoclassical economics and to its methodological heritage. In the first section, the scope and methodological perspective of traditional neoclassical economics are reviewed in terms of their effect on problem definition and appraisal. Analytical approaches to the analysis of institutions and institutional change in the area of natural resource policy are discussed in the next section. A parallel discussion of the institutionalist approach to policy

analysis is then offered with particular emphasis on potential contributions to natural resource policy analysis. The chapter concludes with a brief discussion of some implications of diverging from methodological monism in the economic analysis of natural resource policies.

2.1 METHODOLOGICAL PERSPECTIVES: DIFFERENT QUESTIONS--DIFFERENT ANSWERS

Underlying the neoclassical economic approach to the analysis of natural resource policies is a methodological perspective that directs the analysis in terms of the kinds of questions asked, as well as the methods used to answer these questions. By working definitionally within a framework of existing income distributions, known production costs and stable preferences, the neoclassical approach is intentionally limited in scope. In this context, the central and organizing behavioral construct of exchange constrained by scarcity becomes a powerful approach to questions of resource allocation for most analytical purposes.

However, as the history of natural resource policy formation suggests, economists must increasingly deal with changing property rights, changing preferences, and a multitude of noneconomic factors when analyzing these policies. Without addressing the sources of preferences and distribu-

tions of property rights which dictate market solutions, such an analytical perspective is of limited value in these instances.

Recognition of the nature of the public policy process as an incremental choice process which, rather than being goal oriented, seeks solutions by movement away from problems, further complicates traditional efforts to analyze policy choices in a traditional exchange framework. Lindblom has suggested that choices made in this process are best described as happening--often the result of partisan mutual adjustments rather than the product of rational analytical problem solving (Lindblom). Shabman has nonetheless noted that incremental choices and the public policies that result are not random.

Incremental politics is directed by an institutional context--norms to govern acceptable choices reflected in formal and informal rules and compliance procedures. Perceptions of broad social goals, often termed ideology, define the appropriateness of both problem definitions and acceptable solutions. Public choice is governed more by rules which define appropriateness of a particular action than by a continuous evaluation of consequences of choices being considered.

Problems involving the conceptually limited range of subject matter identified above are additionally compounded by the way most neoclassical economists choose to explain

economic phenomena. The accepted method of investigation of neoclassical economics, logical positivism, along with the falsificationist method of proof together influence the sort of questions to be addressed and the method of addressing them.

2.1.1 PREDICTION AS EXPLANATION--THE SYMMETRY THESIS

From the perspective of other social scientists, there is an almost enviable homogeneity among mainstream economists when it comes to how they explain economic phenomena. Fusfeld (p.1) has identified four methodological developments in economics in the early part of this century which gave rise to this homogeneity:

1. Professional acceptance of logical positivism.
2. Mathematical modeling using symbolic logic.
3. Specification of a general equilibrium model of economic phenomena.
4. Empirical testing of hypotheses using econometric methods.

Of primary interest here is the widespread adherence to logical positivism demonstrated by the economics profession since the middle of this century.

Logical positivism embodies three interrelated steps as a method of inquiry: construction of a theoretic model, derivation of hypotheses about reality based on this theory, and tests of these hypotheses against empirical data (Fusfeld). A major conceptual contribution to this process was made by Popper when he recognized that hypotheses can not be proven correct by empirical tests, rather, only proven false. Popper's insight led to the adoption of falsification as an approach which acknowledged that science only gradually progresses toward truth by "eliminating provable error" (Fusfeld, p.3). ²

Of particular interest to economists engaged in policy analysis is the extension of logical positivism in terms of Friedman's concept of positive economics. Positive economics places a premium on predictive ability as model evaluation is based solely on predictive performance. The relative "realism" of underlying assumptions is of little concern as long as the predictive ability of the model is satisfactory. Explanation is assumed to be offered from the axioms and premises which lead to a non-falsified hypothesis.

² Criticisms of this approach focusing on assumptions about antecedent conditions, tests of logical propositions, and naive falsificationism are legion in the literature. See Blaug, Feyerabend, Fusfeld, Lakatos or McCloskey for further comment.

Within this construct, prediction and explanation are treated as symmetrical constructs. Blaug, in discussing this symmetry thesis, notes that:

Prediction only requires a correlation, whereas explanation cries out for something more.it is only too obvious that it is perfectly possible to predict well without explaining anything. Suffice it to say that prediction, even from a highly systematic and rigorously axiomatized theory, need not imply explanation (p.4).

The widespread professional acceptance of positive economics and its emphasis on prediction as explanation presents a problem for policy analysts who address natural resource policies in terms of institutions and institutional change. As a result of the nearly simultaneous interaction of institutions and the incremental policy process, institutional change has been characterized as evolutionary in process (Boulding, Shabman, Fushfeld). This choice of terminology is deliberate as evolutionary theory is inherently nonpredictive. In rejecting the symmetry thesis, emphasis is placed on explanation without reliance on prediction. Carrying this evolutionary analogy to its logical limits suggests that the conventional predictive analysis of positive economists has limited usefulness in the analysis of public policies of natural resource use or allocation.

This brief review of the scope of mainstream economics as well as the received means of explaining economic phenomena suggest serious conceptual limitations in our ability to adequately address the unique issues posed by natural resource policy analysis. As mentioned earlier, efforts to expand the traditional economic framework to include institutional factors has been one approach. The following section illustrates how mainstream economists, within their conceptual framework, traditionally deal with institutions and institutional change.

2.2 INSTITUTIONS AND ECONOMICS: THE MAINSTREAM APPROACH

Analytical approaches to the treatment of institutions and institutional change suggested by the scope and methodological basis of mainstream neoclassical economics can be described by the three following categories:

1. Approaches that exclude analysis of institutions as irrelevant to the economic system.
2. Approaches that include institutions as an element of the *ceteris paribus* assumption.
3. Approaches that attempt to make institutions explicitly endogenous to the economic system.

2.2.1 EXCLUDING INSTITUTIONS

The first approach, essentially ignoring institutions and their effects in the economic system, is consistent with the effort of neoclassical economists to more narrowly define their domain and range of intellectual inquiry. The evolution from classical political economy to today's orthodox economics is characterized by this narrowing of focus and analytical limitation to "economic" phenomena. Traditions, laws, ethics, Commons' going concerns, considered to be at the heart of political economy, are in this approach excluded as elements of the economic system.

Although conceptually limiting, this approach has gained acceptability with the increasing quantification of economic phenomena in our analytical products. The recognized measurement problems inherent in quantification of these extraeconomic variables has led to justification of their exclusion. However, omission of these conceptually relevant variables leads to recognized conceptual and analytical pitfalls. In summary, although conceptually limiting, and potentially empirically flawed, this approach to the treatment of institutions can be theoretically justified by the scope of orthodox economic theory.

2.2.2 THE CETERIS PARIBUS CLAUSE

The second approach, the use of the ceteris paribus clause as a limiting assumption, involves isolating a single problem by assuming that all variables other than those under investigation are held constant. As a simplifying assumption, use of this approach is not unique to economics. Natural scientists who specify auxiliary hypotheses present in tests of scientific laws mirror the intellectual experiment conducted by economists who formulate hypotheses held to be true given the satisfaction of the ceteris paribus assumption. ³

The ceteris paribus assumption reduces theoretical propositions to what Blaug has described as tendency laws (p.66). Although a common procedure in natural and social sciences, Blaug has noted a distinct difference in the use of tendency laws in economics.

In the social sciences, however, and in economics in particular, it is quite common to encounter tendency statements with unspecified ceteris paribus clauses--a sort of catchall for everything that is unknown--or if specified, specified in qualitative rather than quantitative terms (p.67).

³ Boulding has suggested that such an approach is an attempt to emulate (by substituting intellectual for actual experiments) scientific disciplines with subject matter that more readily facilitates the experimental method.

No theory can claim completeness or closure in its specification. While use of the *ceteris paribus* assumption is therefore a practical necessity, unless the meaning of the assumption is restricted by definition of "counteracting causes" (Blaug, p.68), attempts to generate refutable predictions are of questionable validity.

This second approach, recognizing and including institutions in the *ceteris paribus* assumption of the analysis, is in essence, the approach referred to by Castle, Kelso, Stevens and Stoevener as working "with" institutions. In the case of institutions, this approach intellectually acknowledges their existence but often assumes them to be fixed and exogenous to the economic system being analyzed. Thus, even when explicitly included as an element of the *ceteris paribus* assumption, the role of institutions in the analysis is limited to that of unchanging, exogenous phenomena fixed in time and form.

Assuming that the institutional components of the *ceteris paribus* clause have been specified in falsifiable terms, this approach still constitutes the equivalent of a comparative static exercise. The limited information added by this approach comes through assuming changes in levels of institutions, ignoring the process and the factors which generate the changes.

The inability of these approaches to address the analysis of changes in institutions or offer insights into the workings of the extraeconomic forces influencing these changes is readily apparent. Indeed, the indirect treatment (or total lack of treatment) of institutions typified by these approaches appears to beg some significant questions related to institutions and their role in natural resource policy analysis. However, as limited as these approaches appear, it must be recognized that until recently, they constituted the conventional wisdom of orthodox economists working "with" institutions in the analysis of natural resource policy.

2.2.3 INSTITUTIONS ENDOGENOUS TO THE SYSTEM

In response to the obvious conceptual and empirical limitations of the standard approaches for addressing institutional change and institutions described above, some economists have challenged the orthodoxy by attempting to explicitly incorporate institutions as elements of the neoclassical approach. ⁴ Castle, Kelso, Stevens and Stoevener have identified making institutional change endogenous

⁴ See Livingston as well as Castle, Kelso, Stevens and Stoevener for a summary of this literature in the area of natural resource economics.

to the mainstream economic framework as one research frontier in natural resource economics. Efforts that have been made to conceptualize and quantify institutions and institutional change within the neoclassical paradigm range from specification and econometric estimation of binary variables (Perryman) to the attempted reformulation of neoclassical theory to explicitly include institutions and their change (Livingston).

The use of binary variables as proxies for institutional factors can conceptually enhance the analysis of natural resource policies but only in a limited way. The dichotomous formulation of the variable only distinguishes the presence or absence of institutional factors, ignoring changes in the factors as well as interaction with other phenomena. A binary conceptualization and empirical specification simply does not allow sufficient flexibility for the modeling of most social and political institutions which constitute the framework of our economic system. Perryman has, as a result, labeled this use of binary variables to reflect the presence or absence of institutional factors as "simply naive" (p.565).

Alternatives to the simplistic dummy variable approach include reformulations of neoclassical theory such as that developed by Livingston and North. In these efforts, main-

stream economics is conceptually supplemented by inclusion of social goals and circumstance, as well as the political policymaking process within an interdependent framework. Alternatively, the standard efficiency approach underlying benefit-cost analysis is utilized with specific attention to nonpecuniary sources of costs and benefits.

Attempts such as Livingston's and North's are conceptually superior to the simplistic binary specification of institutional phenomena. However, clarification of the specification of institutions and attention to interaction between institutions and other economic factors focuses attention on the underlying methodological incompatibility of blending institutions into the neoclassical economic framework.

As mentioned earlier, mainstream economics evolved from the conceptually far reaching school of political economy. However, as mainstream economics distinguished itself from political economy by refining its method of inquiry as well as its methodological perspective, the institutionalist school continued on in the tradition of classical political economy. The alternative methodological basis and broader scope of inquiry typified by this institutionalist approach suggests a potentially valuable role for policy analysts using this approach.

The following section elaborates on the genesis of the institutionalist approach from a methodological as well as methods perspective. Rejection of the symmetry thesis and presentation of the pattern model as the primary vehicle for analysis are reviewed in terms of their potential for contribution to the analysis of natural resource policies.

2.3 INSTITUTIONS AND ECONOMICS: THE INSTITUTIONALIST APPROACH

The institutionalist approach to economic analysis, like mainstream neoclassical economics, traces its heritage to 18th century political economy. However, mainstream and institutionalist economics have evolved down different paths of inquiry. Unlike mainstream economics, institutionalist economics has maintained an eclectic orientation reminiscent of its intellectual roots. ⁵ Institutional economics has retained a broader scope of inquiry than neoclassical economics in addition to adopting an alternative epistemological basis for inquiry. (Wilbur and Harrison).

⁵ Institutionalists share a perspective which Petr has described as values driven, process oriented, instrumental, evolutionary, activist, holistic, nondogmatic, democratic and fact based.

With respect to the scope of inquiry, institutionalist economics has been characterized as holistic, systemic and evolutionary.

Institutionalism is holistic because it focuses on the pattern of relations among parts and the whole. It is systemic because it believes that those parts make up a coherent whole and can only be understood in terms of the whole. It is evolutionary because changes in the pattern of relations are seen as the essence of social reality. These characteristics of institutionalism, combined with the appreciation for the centrality of power and conflict and the recognition of the importance of nonrational human behavior, differentiate institutionalism from standard economics. Formal models simply cannot handle the range of variables, the specificity of institutions, and the nongenerality of behavior (Wilbur and Harrison, p.71).

In developing an alternative explanation of social phenomena, rather than the neoclassicist's firm or maximizing individual, institutionalists have focused on the institution as the unit of analysis. Within this framework, the analysis of institutions is done from the psychological perspective of behavioralism. Human action is therefore based on and seen in the context of institutional structures rather than the neoclassical basis of preferences, which are considered unreliable due to their subjective nature (Dugger).

The choice of subject matter for analysis by the institutionalists influences how they explain, both in terms of methodology and method. With institutions recognized as the elemental unit of analysis, a dynamic, evolutionary context is introduced into the inquiry, a context not readily amenable to the formalist methods and methodology of neoclassical economics. A fundamental philosophical adherence to a holistic perspective additionally redefines the explanatory goals of institutionalists, leading them toward an alternative interpretation of understanding as explanation.

2.3.1 UNDERSTANDING AS EXPLANATION

The widespread acceptance of logical positivism along with its emphasis on prediction as validation dismisses the need for realism in assumptions. Explanation and prediction are viewed as symmetrical explanatory concepts. While this symmetry thesis of prediction as explanation serves as a methodological cornerstone for the formalist analysis of contemporary neoclassical economists, for the institutionalist pursuing a holistic approach, the symmetry thesis gives way to understanding as explanation.

The holist conception of reality (that adopted by institutionalists) is based on the belief that characteris-

tics of a part are largely determined by the whole to which it belongs and by its particular location in the whole system. The belief that human systems tend to develop a characteristic wholeness or integrity suggests that parts of the system are at once conditioning and conditioned by the whole. As a result, "reality" is viewed in the context of an evolutionary dynamic driven by interaction between the parts and the whole (Wilbur and Harrison).

The structure of institutionalist explanations, influenced by the holist perspective, tends toward concatenated theories composed by linking together relatively independent parts (Kaplan). Alternative, hierarchical analytical approaches which seek to isolate economic phenomena from the whole are antithetical to the explanatory goals of the institutionalist who aspires to descriptive realism. The analytical product of the institutionalist explanations, understanding rather than prediction, is analogous to that of Darwinian evolutionary theory.

Darwinian theory can tell us much about the evolutionary process once it has occurred, but almost nothing about the process before it occurs. It is not simply that Darwinian theory cannot spell out the initial conditions required for the operation of natural selection, but that it cannot provide definite universal laws about the survival rates of species under different environmental circumstances. Insofar as the theory predicts at all, it predicts the possibility of a certain outcome conditional on other events actually occurring and

not the likelihood of that outcome if those events did occur (Blaug, p.7).

In similar manner, the behavior of individuals is not precisely determined by institutions, the basic unit of analysis. The institutional structure delimits a range within which constituent parts can vary, generating a number of acceptable alternatives from which individuals can choose. The resulting behavior is not viewed by the institutionalist as predetermined; hence it is inherently unpredictable (Wilbur and Harrison).

This distinction between goals of explanation is at the heart of the methodological approaches: the institutionalist seeks to understand (know) something by explaining its place in the whole; the neoclassicist understands (knows) something by predicting its occurrence. The institutionalist assigns epistemological value to being able to explain phenomena by understanding them rather than predicting their occurrence. For the neoclassicist, one can only explain, and hence can only know, what one can predict.

The alternative epistemological goal of understanding derived from the institutionalist's holistic world view requires an alternative mode of inquiry, as well as an alternative measure for evaluating the truth value of the inquiry. Therefore, in place of the formalist hierarchical

models designed to yield predictive results, institutionalists have come to rely on concatenated pattern models of understanding.

2.3.2 PATTERN MODELS OF UNDERSTANDING

Pattern models, the received mode of institutionalist inquiry, seek to explain human behavior by considering it in the context of its institutional and cultural milieu (Dugger). Pattern models are formed by linking validated hypotheses or themes in a network or pattern.

A pattern model is, in one sense, analogous to a jig-saw puzzle: It involves putting pieces together to form a meaningful whole. There is a consistent logic that permeates the whole and enables the scientist to develop an understanding of both the whole and the relationship among its parts (Fusfeld).

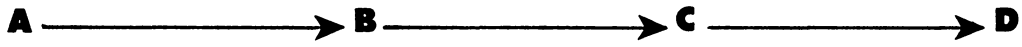
The most common context for pattern model development is the case study, preferably fleshed out with surveys or other means of primary data collection.

The logical process which creates an understanding of the parts and the whole utilizes deductive reasoning but in a manner different from that found in formalist models of explanation. In a formal model, conclusions are deduced from

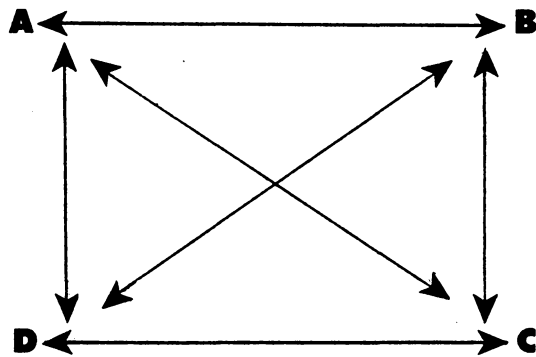
premises in an essentially linear process. By contrast, pattern models have been described by Fusfeld as recursive and multicausal in process. Figure 2.1. illustrates the different processes involved in these alternative logical approaches.

The formal deductive model in Figure 2.1 creates a chain of logic from premise to conclusion (A to D) by way of B and C. In contrast, the pattern model does not begin with a premise and end with a conclusion. The logical relationships among the parts (A, B, C, D) form "an interconnected web" (Fusfeld, p.29) which is in essence the conclusion. Logical movements from A to D, C to A, etc., are recursive and in total represent the multicausal relationships of the pattern that eventually emerges.

Although both models depicted in Figure 2.1 utilize a logical deductive mode of inquiry, the goals and analytical products of the models are distinctly different. The formal model allows the development of testable, falsifiable hypotheses, with the eventual goal of prediction, while the pattern model is designed to achieve understanding of the phenomena studied.



FORMAL MODELS OF EXPLANATION



PATTERN MODEL OF EXPLANATION

FIGURE 2.1 FORMAL AND PATTERN MODELS OF EXPLANATION

SOURCE: FUSFELD

2.3.2.1 PATTERN MODEL SUBJECTIVITY

The process of constructing a pattern model involves the development of a holistic structure that underlies the model. As a concatenated theory, this structure links relatively independent parts into a whole. In the development of the theory, the parts are independently tested and interpreted. Wilbur and Harrison (p.81) note that as each part is likely to be composed of other independent parts, the resulting concatenated theory yields "a many-sided, complex picture of the subject matter". The structural evidence yielded by this complex picture gives some indication of how well the pattern model fits the set of human relations under investigation (Dugger). However, interpretation and verification of these sorts of models must address the relativity and subjectivity incorporated into the model design.

The inherent subjectivity of the understanding achieved through the development of a pattern model is recognized by institutionalists. Institutionalists however accept this condition as an integral part of the psychological process of understanding the whole in terms of the parts. In justifying this acceptance, institutionalists frequently turn to principles of Gestalt psychology for insights on perceptions

of reality and the learning process. ⁶

Gestalt psychology proposes a learning process in which new ideas and information are integrated with other ideas and information in a pattern of relationships of meaning to an individual. The pattern and each of its parts is understood as a whole rather than as isolated elements (Fusfeld). In addition, individual perception of patterns is believed to differ as some individuals are able to perceive and understand more complex patterns than others.

The importance of the relationship between the understanding derived from a pattern model and the previous experiences, background, and mental state of the individual is also recognized by the Gestalt school of psychology. These personal influences can culminate in different levels and kinds of understanding across individuals. The resulting lack of interpersonal verifiability that characterizes the product of pattern models together with the explicitly open design of the models call for a validating process quite different from that used in the validation of formal models.

⁶ Fusfeld (p.29) has gone so far as to suggest that pattern models are best described as Gestalt models.

2.3.2.2 PATTERN MODEL VALIDATION

Like all analytical models, the neoclassical formalist model is an open model by definition. The potential for movement across levels of the logical analysis as well as the potential for introduction of additional variables define these models as open. Although formalist models commonly employ the *ceteris paribus* assumption discussed earlier in an attempt to develop some degree of closure in the model, they remain open, tentative and relative (Fusfeld).

Pattern models are also designed as open models of inquiry. However, because the inherent openness of pattern models is explicitly recognized by institutionalists, the relativity of results and tentativeness of conclusions is of less concern. Conclusions drawn from a typical pattern model are always qualified by the limitation of variables, amount and reliability of available data, and placement of the model in a time-space continuum (Fusfeld). The resulting relativity and subjectivity of the conclusions or the understanding gained from the pattern model suggest that, as with the formalist model, all results are tentative and subject to continual revision.

Institutionalists working with pattern models of understanding appreciate the need for a model of infinite scope

in order to provide total understanding of any phenomenon. They also clearly appreciate the logical impossibility of creating such a model of understanding. In working with pattern models as open models, institutionalists avoid pretenses of model universality and focus validation on the given relative, tentative contribution to understanding. Model validation, to the extent it is pursued, involves primarily contextual validation.

This technique is a process of cross-checking different kinds and sources of evidence, and it serves as an indirect means of evaluating the plausibility of one's initial interpretations. The validity of a piece of evidence in support of a particular statement can be assessed by comparing it with other kinds of evidence (historical studies, questionnaires, and case studies) on the same point (Wilbur and Harrison, p.76).

The validation of the entire pattern model requires expansion of the model through addition of further detail. These results will in turn be subject to further contextual validation through model expansion. This iterative validation process is therefore an open, ongoing process, which, consistent with the admittedly open nature of the pattern model, never really ends.

2.4 METHODOLOGICAL MONISM

In summary, while both schools of economics trace a common ancestry to political economy, their independent evolution has resulted in distinctly different accepted approaches to the analysis of economic phenomena. The difference between these approaches lies at the most fundamental epistemological level as their methodological basis for inquiry differs sharply in terms of preconceptions, psychological foundations and accepted measures of truth value.

The theoretical structures used by these approaches to describe economic phenomena involve use of open analytical models of a deductive logical form. However, the design, scope and intent of the models differ fundamentally. Neoclassicists employ hierarchical theories which yield predictive results as an analytical product, while institutionalists rely on concatenated pattern models of inquiry designed to provide understanding rather than predictions. While the scope of contemporary neoclassical economics has been limited to a well defined domain of economic phenomena focused on the consumer and the firm, institutionalist economics analyses a much broader, more loosely defined range of phenomena encompassed by the concept of institutions.

These models and the theories that shape them additionally reflect differences in the psychological perspective of the approaches. Institutionalists accept a behaviorist approach and analyze a range of possible alternative behavioral outcomes from the perspective of the institution. Neoclassical economic analysis is in contrast grounded in subjectivism (methodological individualism) and focuses attention on individual behavior based on preferences.

The evolutionary characteristics of the institutionalist models interpreted in a holistic, Gestalt framework lead institutionalists to evaluate the truth value of their models with tentative, contextual validation procedures. An inherent subjectivity of the models is acknowledged in the validation process, leading institutionalists as social scientists

to be objective about those aspects of their work which are subjective, involve implicit or explicit value judgements or derive from the position of the observer in the space-time continuum (Fusfeld, p.35).

Neoclassical economic analysis is equally as subjective as institutionalist analysis yet is commonly portrayed and interpreted as positive, i.e., objective science. Validation of the positivist neoclassical analytical products revolves around predictive accuracy as the causal explanation.

These very basic differences between the neoclassical and institutionalist approaches to investigating economic phenomena suggest the following conclusions. First, efforts to integrate these forms of analysis are contrary to the spirit of both approaches. Differences in preconceptions, psychological foundations, and accepted measures of truth value contribute to fundamental epistemological incompatibilities. Second, as mentioned earlier, these different perspectives give rise to different questions, and by virtue of differences in scope and method, different answers.

Public policy analysts who therefore attempt to enhance a traditional neoclassical analysis of a natural resource policy issue by designating institutions as endogenous must address the incompatibilities identified above. For example, inclusion of an institutional variable in an analysis that proposes to yield predictive results fails to acknowledge the evolutionary and essentially unpredictable essence of that variable. In a similar manner, neoclassical analyses of institutional change that attempt to predict change are inconsistent with the concept of the evolutionary nature of institutions and the notion of a range of possible outcomes permitted by the institutional structure.

The incompatibilities arise primarily from neoclassicists' attempts to work "with" institutions in the context

of their research paradigm. In general, it appears that institutionalists, realizing the extent of the conceptual incompatibilities, rarely attempt the marriage of paradigms. Institutionalists may borrow freely of neoclassical economic concepts such as marginalism the role of incentives or opportunity cost in order to enhance the descriptive realism of their pattern models. However, acceptance of a holistic philosophy and the intellectual properties that accompanies it dictates a mode of inquiry that is distinct from the formalist neoclassical mode of operation.

In recognizing the differences in the two approaches analyzed here, relative analytical strengths and weaknesses become evident. However, recognizing the differences in these approaches may suggest an appropriate time and place for their application. Neoclassical economics is designed for a specific application within a given set of property rights, and within that context it has served economists adequately. Institutional economics also appears to have an appropriate applicability in asking and answering questions beyond the traditional scope of neoclassical economics.

One obvious recommendation might be the use of an either/or approach as dictated by the research question at hand. Institutional economics in particular, as a result of the

holistic perspective, argues for a primacy of subject matter over method (Wilbur and Harrison). While this may initially seem a plausible solution to the problem of competing research methodologies and methods, it challenges the concept of methodological monism, and as a result, the claim of economics as a science.

Simply stated, the doctrine of methodological monism claims that all theorizing or generalizing sciences should make use of the same method. ⁷ Distinctions are not made on the basis of disciplinary subject matter. For example, physicists and economists attempting to explain very different phenomena would nonetheless explain the phenomena by the same methodology and methods. The concept of a universally applicable epistemology serves to link diverse fields of inquiry and at the same time lends credibility to the "softer", primarily social sciences.

A philosophical and practical challenge therefore arises for the public policy analyst who seeks to employ neoclassical analysis for some purposes yet at the same time appreciates the appropriateness of the institutionalist perspective for other analytical tasks. The challenges

⁷ Blaug (p.46-52) makes an especially strong case for methodological monism in his review of the historical development of this issue. The reader is referred to Feyerabend, a methodological anarchist, for an equally strong opposing philosophical stance.

presented are threefold: first, methodological monism is a difficult issue to resolve when considered across the range of disciplines seeking status as a science. However, when raised as an issue within a discipline, it is perhaps more unsettling.

The importance of a shared epistemological basis for the inquiry pursued within a discipline becomes apparent when considering evaluation of the truth value of results. As discussed earlier, different methods require different canons of evaluation, while comparisons across methods are often methodologically inappropriate. The ability of a scientific discipline to evaluate its own contribution to knowledge may therefore be compromised by not subscribing to a common approach to scientific inquiry.

Second, a question of comparability and compatibility of evidence across disciplines arises. This is the generally recognized basis for the argument supporting methodological monism described above. The belief that a single epistemological approach has applicability across fields of inquiry serves to unify otherwise diverse disciplines into science. An appearance of methodological unity among disciplines therefore lends credibility to science in its ability to further knowledge.

Third, the policy analyst who recognizes more than one approach to the analysis of public policies jeopardizes a loss in credibility of those outside the scientific community. Policy analysts, by nature of their subject of inquiry, often find themselves in close contact with the nonscientific community when dealing with the evaluation and application of their research. Explanations that alternative approaches exist and that they are in some cases equally meritorious highlight an indeterminate characteristic of science which may not be readily understood by the lay community.

Simultaneous acceptance of alternative approaches or acceptance of a heterodox approach within the economic discipline by the policy analyst can potentially lead to a loss of credibility for the researcher within the economics discipline, within the broader scientific community, and with the nonscientific community. Credibility in the research product from the perspective of scientists and nonscientists is the cornerstone of purpose for those purporting to contribute to human knowledge. Without credibility in the process, it is difficult to demand credibility in the product.

2.5 SUMMARY

This chapter has compared and contrasted two alternative approaches to working "with" institutions in the context of natural resource policy analysis: the neoclassical approach and the institutionalist approach. While this analysis has recognized the common historical heritage of these approaches, significant differences in the epistemological foundations of these approaches were identified and explored.

The neoclassicists' philosophical acceptance of logical positivism and its economic expression through positive economics was reviewed, emphasizing the implications for analytical scope and methods. In particular, reliance on the symmetry thesis of prediction as explanation was examined in terms of assessing the truth value of analytical products. Neoclassical approaches to working "with" institutions, including exclusion of institutions, use of the *ceteris paribus* assumption, and making institutions endogenous to the economic system, were identified and reviewed with respect to their potential contribution to public policy analysis.

A parallel analysis of the institutionalist approach to policy analysis similarly highlighted its epistemological

basis and alternative approach to explanation. The use of understanding rather than prediction as the basis for explanation in the institutionalist framework for inquiry was examined in relation to its underlying holistic philosophy. The primary mode of inquiry utilized by institutionalists, development of concatenated pattern (Gestalt) models, was discussed and contrasted with neoclassical hierarchical formalist models of inquiry. In addition, model validation and the issue of recognition and response to analytical subjectivity were discussed with respect to both approaches.

The availability of two alternative, methodologically incompatible approaches to the economic analysis of public policy raises the issue of methodological monism at both a philosophical and a practical level. The associated potential for an erosion of credibility within the economics profession, within the scientific community, and across the range of nonacademic public policy clientele was identified as a significant consideration for policy analysts interested in alternative approaches to their work.

If a central conclusion is to be drawn from the considerations in this chapter, it is that neither approach to the analysis of public policy issues is right at the expense of the other approach being wrong. They differ significantly in terms of scope and method and as a result generate very

different sorts of analytical questions, and provide very different kinds of answers to these questions. Therefore, policy analysts who recognize the possibility of analytical alternatives and are more consciously involved in this choice process, must weigh the analytical trade-offs, e.g., prediction versus understanding, in terms of their perceived usefulness in the public policy environment.

While the choice of either analytical approach may reflect a particular philosophy or world view, in this instance, the education that economists receive influences their decision making process. However, as mainstream neoclassical economics dominates the education of the contemporary western economics profession, many public policy analysts have limited exposure to alternative approaches and, as a result, are ill-prepared to evaluate the analytical trade-offs which may arise. The following section therefore describes an illustrative application of institutional analysis to a natural resource policy issue.

2.6 AN APPLICATION OF INSTITUTIONAL ANALYSIS

As this chapter has demonstrated, the theoretical foundations of institutional economics are well developed and documented. However, recognizing the typically limited expo-

sure mainstream economists have to institutional economics, the next chapter begins development of an illustrative example of an institutional analysis of a natural resource policy issue. The general natural resource issue analyzed in this illustration, development of a land use policy for the retention of farmland in the Southeast, is characteristic of other natural resource policy issues currently challenging natural resource and public policy economists.

For example, in participating in this process of institutional change through the design of improved land use policies, economists may be called upon to address, among other considerations, cost effectiveness of policies, the political acceptability of policies, the ability of policies to reflect the values and goals of society, and determine an appropriate role for government in achieving these goals. This analysis therefore includes these and other aspects of policy design as they relate to efforts to develop appropriate farmland retention policies, emphasizing lessons learned from the evolution, design, implementation, and participation in Virginia's Agricultural and Forestal District Act.

In addition to limited professional exposure to the institutionalist approach to policy analysis, Randall (p.89) has further suggested

Unfortunately, however, the details of a satisfactory holistic methodology--"the nuts and bolts" of how to do it and how to evaluate its quality when done--are not well developed.

Therefore, this illustration takes special care to describe not only the theoretical foundation of the institutionalist approach which structures this analysis, but also the procedures used in development of the pattern model, and the validation process used. By providing policy economists a practical illustration of the "nuts and bolts" of pattern modeling done in the context of a familiar problem setting, they can better evaluate many of the analytical trade-offs which occur in the course of the analysis.

Following the institutional analysis presented in Chapters III-VIII, Chapter XI identifies and summarizes analytical trade-offs which appear to have occurred as a result of adopting such an alternative approach to policy analysis. Possible implications of these trade-offs are evaluated not only in terms of the specific case study, but also in broader terms applicable to the general area of natural resource public policy analysis. Suggestions of an appropriate role for institutional analysis of natural resource issues are also presented.

Chapter III

LAND USE POLICY ANALYSIS IN THE SOUTHEAST: A PATTERN MODEL OF INSTITUTIONAL CHANGE

3.1 INTRODUCTION

Public discontent with recent land use trends, including the conversion of prime agricultural lands to non-agricultural uses, can be associated with several events of the 1970's--the environmental movement, increased growth and disillusionment with that growth, attendant decline in some rural amenities, and the loss of much small scale agriculture. Farmland retention interests have been characterized as but one subset of this renewed interest in land use reform that can trace its roots to these events (Popper).

Concern with land use trends in the Southeast appears to be similarly motivated. Continuing urbanization of the region, an expanding forestry industry, introduction of new crops and cropping patterns, and expansion of the cattle grazing industry are some of the factors combining to intensify the competition for agricultural land in the Southeast (Healy). These competing demands provide an opportunity for development of land use policies designed to address a wider range of issues and capable of satisfying a broader constituency than has historically been the case in the Southeast.

Current farmland retention research by mainstream economists has been influenced by the taxonomy developed by Gardner to summarize potential benefits to be gained by society from enactment of farmland retention policies:

1. Sufficient food and fiber to satisfy both domestic and foreign demand;
2. Local economic benefits generated by a healthy local agricultural industry;
3. Environmental amenities associated with open space;
4. Urban development that is fiscally sound, relatively more orderly and efficient.

The central, consistent conclusion of this area of research has been that an unfettered land market system could obtain most of these objectives, or that, even where the market outcome is deemed undesirable or inefficient, farmland retention policies may not be the best vehicle for providing these benefits (Gardner, Hite and Dillman, Mulkey and Clouser). These conclusions have in turn brought into question the need for farmland retention policies at any level of government.

However, in spite of these criticisms, farmland retention activity is increasing rather than decreasing (Hiemstra and Bushwick). This increase in farmland retention policy activity suggests that many previous studies of farmland

retention have not adequately identified the issue or the resulting demand for farmland retention that has generated some form of institutional change in every state. It may therefore well be that the demand for farmland retention is more a reflection of a particular land use ethic, a response to perceived threats to a quality rural environment, an effort to slow growth and limit its detrimental effects, or an attitudinal response as opposed to a specific desire to "protect agriculture". As a result, ignorance of the factors influencing the conversion of agricultural lands and the impacts of such conversions can be compounded by an incomplete understanding of the factors underlying the demand for policies designed to protect farming, potentially resulting in adoption of inappropriate policy mechanisms.

3.2 MODELING THE FARMLAND RETENTION POLICY ISSUE

This chapter begins the development of an institutional analysis of the farmland retention issue, focusing on institutional change as reflected in the development of and participation in a representative farmland retention policy. In addition to its general illustrative role, this analysis is designed to address the following research objective presented earlier in Chapter I:

1. To develop and illustrate an institutional approach to the analysis and design of politically acceptable and effective farmland retention land use policies.
 - a) To identify societal benefits to be obtained from farmland retention policies.
 - b) To identify the type and approximate magnitude of costs of farmland retention policies.
 - c) To relate the implications of the type and magnitude of costs and benefits of alternative farmland retention policies to probable political acceptability in the Southeast.
 - d) To analyze the evolution of farmland retention policy design, implementation and participation in Virginia.

The discussion of alternative analytical approaches presented in Chapter II provides the basis for development of an institutional pattern model which describes the farmland retention policy environment and the behavior of actors within that institutional environment. Development of a pattern model, as the primary means of inquiry in institutional economics (Wilbur and Harrison, Dugger), facilitates analysis of issues fundamental to the development of land use policies, e.g., Why is a particular policy chosen?, What motivates individuals to participate in a policy?, What is the process underlying policy formulation?, What is the institutional evolution of a land use policy? Understanding gained through an analysis of these and related questions

can provide a basis for the development of public policies needed to address land use trends in the Southeast.

The principal research procedure used in this analysis involves development of a pattern model of institutional change at the local level. Pattern models attempt to explain human behavior in the context of its institutional environment. The case study is the most common context for pattern model development. In this inquiry, institutions rather than individuals form the basic unit of analysis, and behavior, viewed within the context of its institutional constraints, is assumed to be inherently unpredictable. Understanding rather than prediction becomes the goal of the pattern model. Pattern models are recognized to be inherently subjective, structurally open models (Dugger).

The basic unit of analysis in the pattern model developed in this study is a farmland retention land use institution, the Virginia Agricultural and Forestal District Act. Individual behavior, in this case, the behavior of Virginia land use decision makers in both public and private spheres, is studied in the context of this institutional environment. Behavior is assumed to vary within the constraints imposed by the institutional environment, and therefore is considered unpredictable. The pattern model is, as a result, constructed to provide descriptive rather than predictive information about a wide range of factors.

The Virginia AFDA was selected as the representative land use institution in this analysis because it is the first major land use institution in the Southeast designed explicitly to address the issue of farmland retention. As a pioneering effort in the area of land use policy in Virginia as well as the Southeast, the AFDA has generated debate over its political acceptability, its cost effectiveness, the determination of land use goals, and definition of a role for government in local land use issues. In addition, interest in the factors influencing decisions regarding private and public participation in the program has heightened in Virginia as existing agricultural districts approach required review dates, and as plans are made for a ten year review of the state enabling AFDA legislation.

The Virginia AFDA was also selected for analysis because the existing institutional structure of land use policies in Virginia is similar to that of many states in this region. For example, all the states in the Southeast authorize some form of differential assessment of agricultural land, and all but one currently maintain right to farm legislation. Lessons learned from Virginia's efforts to develop a farmland retention policy able to complement existing land use legislation, e.g., use value assessment and right to farm legislation, may therefore be especially

valuable to future land use policy developments in the Southeast.

3.3 OVERVIEW OF THE PATTERN MODEL

The pattern model developed in this study links insights gained from an analysis of interpretations (and the factors shaping those interpretations) of the farmland retention issue, and an overview of the institutional environment of farmland retention policies at the national, state and local levels, with information obtained from a survey and econometric analysis of public and private behavior in the adoption of a new land use policy. Figure 3.1 presents a schematic which identifies major components of the model and traces the logic of the institutional analysis structured by the pattern model. The analysis focuses on the interaction between the institutions which shape the institutional policy environment and the actors, who while constrained by the environment, function as agents of change in that environment.

The policy environment analyzed includes but is not limited to existing land use institutions considered relevant to the farmland retention policy issue. These policies

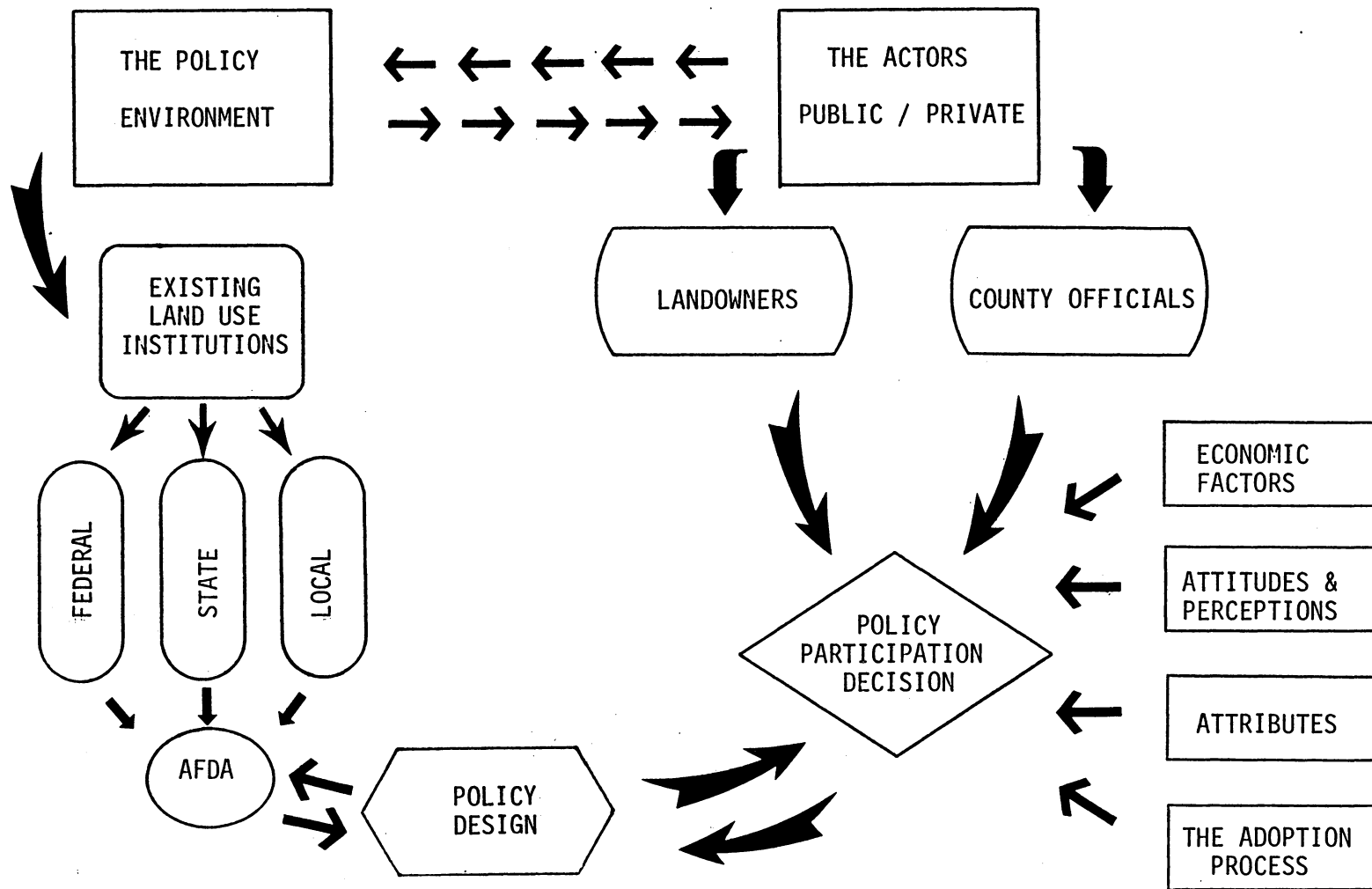


Figure 3.1: PATTERN MODEL OF INSTITUTIONAL CHANGE: THE FARMLAND RETENTION ISSUE

differ in objectives, e.g., provision of open space, or maintenance of farm income, means of achieving the objectives, e.g., incentives or regulation, targeted participants, e.g., farmers, rural landowners, landowners at the rural urban fringe, effectiveness in achieving objectives, and relationship to other land use policies. Associated with these land use institutions are benefits and costs of implementation (at the public level) and of participation (at the private level). These factors are further differentiated in the analysis by level of government, i.e. federal, state or local.

The actors identified as relevant to the analysis include, at the public level, locally elected government officials (county supervisors) who consider adoption of the Virginia AFDA as a local land use option at a county level. At the individual, private level, the analysis includes a subset of Virginia landowners who consider adoption of the AFDA through enrolling land in a district.

The behavior of the actors is analyzed in the context of their institutional environment in terms of actions within and constrained by that environment, as well as in terms of their role in the evolutionary change of that environment. A number of factors hypothesized to influence the behavior of these public and private land use decision

makers are identified in the analysis and conceptually categorized as economic factors, attitudes, beliefs, and perceptions, individual attributes, and the adoption process.

The analysis of components of the pattern model includes qualitative and quantitative analyses. The policy environment is analyzed using a historical-descriptive approach. The behavior of the actors also relies on a historical-descriptive approach but in addition, includes an empirical analysis of the behavioral decision.

Selection and analysis of components of the pattern model rely on an eclectic theoretical foundation. Insights from political science, especially the characterization of the disjointed incrementalism of public decision making processes, shape the analysis of the policy process. Behavioral psychology adds to the discussion of the role of attitudes, perceptions and beliefs in the decision making process leading to change, while the disciplines of sociology and anthropology contribute to hypotheses underlying the discussion of the adoption process. Economic theory, used throughout the inquiry, is the basis for hypotheses dealing with investment, consumption, and personal attributes as they influence adoption decisions.

The following chapter begins the analysis of the policy environment. The farmland retention issue is first

presented in its many variations, highlighting differences between what can be characterized as public versus private interpretations of the issue. Potential benefits to be gained by society by enactment of a farmland retention policy are then reviewed. The policy process and its influence on interpretation of farmland retention issues, as well as its effect on the formation of policies is discussed. Chapter IV then identifies some of the land use institutions which have evolved at different levels of government in response to the complexity of the farmland retention issue.

Chapter IV

THE POLICY ENVIRONMENT

4.1 IDENTIFYING THE FARMLAND RETENTION ISSUE

From an analytical perspective, the farmland retention issue has presented a challenge to economists who have participated in land use policy development and analysis at a variety of governmental levels. Apparently varying objectives underlying the development of recent national, state and local farmland retention policies have increased the complexity of the political motivations influencing policy design and adoption. As a result, the farmland retention issue incorporates a wide range of economic and noneconomic factors that together shape perception of the issue, the choice of policies selected to address the issue, and participation in the policies by those immediately affected by the issue.

The farmland retention issue is therefore, at best, an amorphous one. At the national level, the issue often revolves around a central concern for adequate supplies of food and fiber (Gardner), while at the state and local level, the issue often subsumes a number of closely related land use issues, often with different constituencies, with

often competing agendas (Libby, 1985). For example, in densely populated Northeastern states the issue may be defined as one of farmland preservation, as efforts are made to prevent the transfer of agricultural land to nonagricultural uses (Plaut). In other regions, the issue may be defined as one of farmland retention, i.e., retaining land in agriculture until an orderly transfer occurs to higher valued uses (Marshall, 1982).

In either case, farmland preservation or farmland retention, it is not clear, nationally or locally, which land is sought for retention. Commonly, the term "prime agricultural land" appears, apparently as a result of the propensity for development preferences to be biased toward prime agricultural land (Dillman and Cousins). However, the by now familiar caveats associated with the use of this primarily physical land description cause many to question if this is in fact the land that is to be targeted by retention efforts (Gibson, Raup, Libby (1974), Brewer and Boxley). Is the five acre "prime land" hobby farm to be retained before the 150 acre dairy farm that may operate on class III or IV land?

Related to this is the farm structure question--do preferences exist for retention of certain kinds of enterprise mixes or organizational structure? Communities desir-

ing to maintain agriculture as a healthy component of the local economy may favor larger, commercially oriented farming operations over smaller, "family farms". Alternatively, a community may express a strong preference for what are identified as family farms, hoping to preserve the positive rural ambiance associated with the Jeffersonian tradition of a nation of small farms (Hite and Dillman).

Minority and limited resource ownership of agricultural land can also be intertwined in the farmland retention debate, especially in the Southeast. While the declining number of black farmers in the Southeast may be indicative of broader structural changes in the agricultural sector, this decline in numbers can be influenced by the farmland retention issues described here (Brooks, Libby, 1985).

For many, the farmland retention issue is one of environmental degradation. Growing environmental constituencies have raised issue with the disruption of the visual order caused by the conversion of agricultural land to nonagricultural uses. For others, something approaching an existence or option value is at issue--the knowledge that rural America is alive and well matters to many (existence value), while for others the future option of becoming a part of our rural society is an issue (option value) (Bergstrom and Dillman).

The level of policy formation and administration (local, state or national) is an integral component of the farmland retention issue. Preference for local control of local land use issues has been a tradition in American land use policies since Colonial times (Giesler and Martinson, Platt). However, recognition of the often negative externalities associated with modern commercial agriculture has led some to argue for a broader role for society in determining land use management strategies for the retention of farmland.

While not an exhaustive list of farmland retention issues, those mentioned above serve to indicate the variety and complexity of the issues with which national, state and local land use decision-makers (private and public) must grapple. Changes in local revenue structures, changes in employment patterns, changes in farm structure and tenure, changes in environmental amenities, and the ability to target policies and relative effectiveness of policies (with respect to stated goals) are only a few of the significant consequences that may occur upon adoption of a farmland retention policy.

4.2 THE POLICY PROCESS AND FARMLAND RETENTION

Critical to understanding any farmland retention policy is an understanding of the incremental policy process within which many land use decisions are made. As those familiar with the formation of policy can attest, recommending use of a rational deductive policy formation process is suggesting a nonmarginal change from the way most policies actually are formed and adopted (Shabman, 1984).

An evaluation of current farmland retention land use institutions made in light of many of the issues identified here may find existing policies inadequate. However, policy makers typically receive little in the way of clearly specified objectives from constituents with which to design goal oriented policies (Popper). The lack of identified objectives is characteristic of an incrementalist policy formation environment which has been described as embodying a nonlinear process often involving movement away from identified problems rather than movement toward identified solutions (Lindblom).

In this environment, clear distinctions are often not made between objectives and the exact relationship of policies to these objectives. Additionally, the increasing heterogeneity of rural populations and their apparently

differing land use agendas make the development of consensus building public land use policies a difficult task.

Given this sort of policy formation process and environment, national, state and local policy makers and their constituents are frequently faced with choices among a number of options, including adoption of a new set of land use institutions, modification of existing institutions, some combination of both, or no action, without a clear, common understanding of issues, policy alternatives, or consequences of their actions.

One conclusion that can be drawn from this discussion of the issues underlying the demand for public policies designed to influence land use trends is that identification of the goals to be achieved by enactment of a policy is an important first step in the development of improved land use policies. However, identification of issues will probably occur in a policy environment that is more likely to foster deliberate obfuscation of issues rather than a rational deductive clarification.

In the case of farmland retention policies, as this discussion has illustrated, some goals, such as maintaining the right to pursue normal farming practices, may conflict with other more general societal goals, such as those related to environmental concerns. Efforts to identify the

values underlying both goals may lead to development and adoption of land use policies able to satisfy both objectives. In other cases, the objectives may be irreconcilable.

Farmland retention emerges as an issue which subsumes a number of related land use issues which may vary in terms of public and private land use goals. The farmland retention policies developed to address this diversity of goals also vary in terms of the goals addressed, the manner in which they address these goals, and their effectiveness in addressing land use goals. In light of the policy environment described above, as well as varying interpretations of the issue itself, the following section explores how national, regional, state and local levels of government have defined and addressed the farmland retention issue through the development of new land use institutions. The ability of these land use policies to meet a variety of objectives is reviewed, as well their political acceptability in meeting these objectives. In addition to the types and approximate magnitudes of costs of farmland retention policies, societal benefits to be obtained from these policies are identified and evaluated in terms of potential political acceptability in the Southeast.

4.3 NATIONAL FARMLAND RETENTION POLICY

Efforts directed toward national level land use planning legislation have met with little popular or Congressional support in the United States. This is not surprising, since Americans have historically eschewed direct national government intervention in land use choices (Luzar and Batie). Bultena et al., have identified one explanation for this pattern, the pervasiveness of what they refer to as our traditional land use agrarian creed--the belief that farmers (or rural land owners) have an inviolate right to use their land as they please. From this perspective, the public purpose is best served when individual property owners, without government intervention, pursue their own self interest (Nowak, Bultena, and Hoiberg)

The resulting American tradition of governmental noninterference in land use decisions differs markedly from the European tradition of national land use planning. Many European nations have implemented nationally directed land use plans aimed at dual goals of retaining land in agriculture and restructuring the agricultural sector into larger, more economically viable units. Nationally operated land banking institutions are used with apparent success in achieving these goals in France, The Netherlands, and Sweden (Lapping, Strong).

Congressional willingness to favorably entertain proposals directed toward farmland retention has followed repeated efforts to develop more comprehensive land use management legislation (Deal). Carriker, in tracing the recent national legislative initiatives in the area of farmland retention, has suggested that by narrowing the focus to a single issue, Congress has been more willing to take affirmative action. In addition, by focusing the issue on this single dimension of land use, the "favorable climate toward farmland protection" at the USDA was exploited (Carriker, p.8).

The pro-farmland retention sentiment of the USDA was reflected in Secretary Bergland's 1978 land use memorandum which called for an information and technical assistance role for USDA in limiting federal agency contributions to conversion of farmland. In addition, the USDA and the Council on Environmental Quality jointly sponsored the National Agricultural Lands Study (NALS) in 1979. This comprehensive study of agricultural land use issues was charged with

determining the nature, rate, extent, and causes of farmland conversions; evaluating the economic, environmental, and social consequences of these farmland conversions; and recommending administrative and legislative actions, if necessary, to reduce farmland conversion (Carriker, p.9).

The now controversial results of the NALS (Brewer and Boxley, Fishel, Raup, 1982) were received by the 97th Congress as a mandate for legislative action. Farmland protection bills were introduced by both parties and in both Houses of Congress, and by Fall 1981, two politically acceptable versions were available for inclusion in the farm bill. In 1981 the Farmland Protection Policy Act (FPPA) ⁸ was signed into law.

The FPPA was designed to reduce the effect of federal activities on the conversion of farmland. In addition, the legislation was intended to comply with existing state and local farmland protection legislation. Carriker (p.9) has summarized the thrust of the FPPA as

1. USDA development of criteria for identification of the effects of federal programs and agencies on the availability of farmland, and
2. Requirement that federal agencies (except the Department of Defense) evaluate and propose revisions in rules, procedures, and programs in order to comply with the act.

In addition to stated actions to be implemented as part of the act, the FPPA also defines a technical assistance and information role for USDA, a duty primarily assumed by the Soil Conservation Service. The Secretary of Agriculture is

⁸ Subtitle I of Title XV of the Agricultural and Food Act of 1981 (PL 97-98).

expected to implement the FPPA with "existing facilities and funds otherwise available" (Carriker, p.10).

The FPPA is, by design, a largely symbolic piece of legislation. Action is limited to Federal agencies and they are only responsible for evaluation and proposed program changes. With such wording, little action can be expected from the agencies involved. Recent efforts to amend the FPPA by adding specific agency requirements to the legislation have to date been unsuccessful (Hiemstra and Bushwick, 1985).

While the product of national farmland retention legislative efforts may be described as symbolic but ineffectual, proponents of farmland retention take some consolation in realizing that the political constraints placed on national level government intervention in land use policies dictate that meaningful policy development will occur at the state or local level. As the following summary suggests, patterns regarding regional preferences are evident for farmland retention policies.

4.4 STATE AND LOCAL FARMLAND RETENTION POLICIES

Although the population dense areas of the coastal regions have been the source of many farmland retention techniques, other regions such as the Southeast have begun to consider these policies or variations for adaptation to local political climates and needs. A review of farmland retention activities in the Southeast (summarized in Table 4.1) indicates that as a region, the Southeast relies primarily on two retention mechanisms: tax relief programs and right to farm legislation.

The apparent regional preference for policies that increase farm income such as differential assessment rather than policies that restrict property rights to farmland conversion can be attributed in part to the region's dominant political philosophy which prescribes local involvement in land use decisions through incentive mechanisms rather than regulatory mechanisms. That is, farmers have been given the rights to develop their land as they see fit, while the public provides financial inducements to obtain different development patterns.

In addition to abstaining from the use of regulatory techniques such as exclusive agricultural zoning, the Southeast has not yet experimented with the relatively costly

TABLE 4.1

FARMLAND RETENTION ACTIVITIES IN THE SOUTHEAST: 1984

STATE	RIGHT TO FARM LAW	TAX RELIEF	PDR	TDR	AGRIC. DISTRICT	AGRIC. ZONING
ALABAMA	X	X				
ARKANSAS	X	X				
FLORIDA	X	X				
GEORGIA	X	X				
KENTUCKY	X	X			X	
LOUISIANA	X	X				
MISSISSIPPI		X				
N. CAROLINA	X	X				
S. CAROLINA	X	X				
TENNESSEE	X	X				
TEXAS	X	X				
VIRGINIA	X	X			X	
TOTAL SOUTHEASTERN STATES	11	12	0	0	2	0
TOTAL STATES	45	49	11	5	12	22

Source: NASDA Research Foundation Farmland Project, 1984

technique of purchasing the rights of development from farmers, a technique used with varying degrees of effectiveness in other regions.

The following sections describe some of the state and local level land use institutions developed in response to the farmland retention issue. As the Southeast moves to develop improved land use policies, it is likely that these existing policies will be considered in one form or another. Therefore, in addition to identifying which aspects of the issue these policies address, the mechanics of policy design are also discussed to give an indication of the potential political acceptability in the Southeast. Where possible, practical experiences with the policies are documented.

4.4.1 AGRICULTURAL ZONING

Exclusive zoning for residential, commercial and industrial use of land is a common practice in many localities. In addition, exclusive zoning of land for agricultural use is authorized as a farmland retention technique in 22 states. Usually either a particular zone is designated exclusively for agricultural use or minimum lot sizes are established. Exclusive zoning for agricultural use can be a response to environmentally related land use issues such as preservation

of open space. Frequent use of this technique is seen in the Northeast, an area with relatively intense competition among nonagricultural uses of farmland.

Although exclusive agricultural zoning is a low cost farmland retention mechanism, the regulatory nature of the technique opens it to political criticism and legal contention, usually concerning the constitutionality of zoning restrictions. (Batie and Looney). The regulatory characteristics of the policy's design do not appear to be compatible with the Southeast's prevailing political philosophy of minimizing governmental involvement in local land use issues.

Wisconsin has included exclusive agricultural zoning as an integral part of its farmland preservation program. As of 1982, local governments in Wisconsin must have adopted either an agricultural preservation plan or exclusive agricultural zoning in order for landowners to be eligible for tax credits against their state income tax. Localities are not required to participate, but eligibility for tax credits depends upon adoption of one of the two options (Barrows). Wisconsin's blend of incentives and regulatory power through exclusive agricultural zoning has resulted in a uniquely effective farmland retention program. The use of incentives has appeared to counteract much local resistance to the

regulatory aspects of agricultural zoning and resulted in what is rapidly becoming a model farmland retention program.

4.4.2 PURCHASE AND TRANSFER OF DEVELOPMENT RIGHTS

Associated with the ownership of land is a bundle of property rights, including development rights, which can be severed from the land as a separate article of private property. This concept of separable rights associated with the ownership of land underlies the farmland retention technique of purchasing, separately, the development rights of land.

As a farmland retention technique, the purchase of development rights (PDR) recognizes the distinction between the value of land in agriculture and the value of the right to develop the land. Public (less than fee) purchase of development rights leaves the landowner the right to use the land in its current agricultural use but transfers via the market the right to develop the land to the local or state government.

The transfer of development rights (TDR) relies on the same concept of separable property rights but shifts the activity from the public to the private sector. Development densities for rural areas are first determined by a local government and then allowed to increase or decrease through private transfers of development rights.

Although conceptually very popular, these relatively new farmland retention techniques have experienced only limited application, primarily in the northeastern states. Currently 11 states authorize the purchase of development rights and only five states allow the transfer of development rights. Neither program is found in the Southeast. Evaluation of the effectiveness of these programs is difficult due to their relative newness, but based on limited observations the following potential advantages have been identified:

1. Preservation of farmland is guaranteed once the development right has been purchased.
2. Pride in ownership is maintained as the farmer retains title to the land.
3. The landowner receives immediate compensation for the development rights.
4. Public expenditure for the right is less than the fee simple purchase of farmland (House, Quenemoen, and Hill).

In spite of these potential positive characteristics, the principal drawback to these farmland retention instruments is the cost of acquiring farmland. For example, in New York's Suffolk county 3,883 acres were acquired in 1977 at a cost of approximately 21 million dollars, with farmers often receiving over \$6,000 per acre for their development rights.

A similar policy in King County, Washington designed to protect a "critical mass" of 30,000 acres paid an average of \$8,000 per acre in 1984 for purchase of development rights. Present costs of the King County PDR program are \$47 million dollars, funded through the sale of bonds (Hiemstra and Bushwick, 1985). Potentially high acquisition costs and the need for extensive local government involvement in the development of operating criteria must therefore be traded off against these positive characteristics in future implementation decisions.

The transfer of development rights offers most of the same benefits with the additional quality of removing the acquisition role from the public sector to the private sector. However, although public cost is reduced, local government involvement is increased through the need for development and administration of a comprehensive local land use plan.

Rather than use regulatory approaches such as exclusive agricultural zoning or expensive techniques such as public purchase of development rights, states in the Southeast have relied on those techniques that either protect the farmer from public or private actions that may raise production costs or those that increase farm income. Thus, as Table 4.1 indicates, the retention tools of choice throughout the

Southeast are right to farm legislation and tax relief programs. The fundamental contention is that more profitable farming will mean fewer land conversions.

4.4.3 RIGHT TO FARM LAWS

Variations of right to farm legislation are currently in effect in 45 states, including 11 Southeastern states. In general, right to farm laws are designed to protect farmers from legal actions taken against accepted agricultural practices (Grossman and Fischel). While these laws protect farmers from a variety of nuisance suits related to the negative externalities of commercial agriculture, critics charge that they can also constitute a license to pollute.

Right to farm legislation is a politically popular, low cost farmland retention activity which, however, yields little in the way of desired results. As these laws usually apply across a state and override local ordinances, they have little potential targeting ability for addressing specific land use objectives.

4.4.4 TAX RELIEF

Tax relief programs are by far the most popular farmland retention activity in the country. Currently Kansas is the only state not offering some form of tax relief either through differential or preferential assessment of agricultural land. Since Maryland first adopted a differential assessment policy in 1956 to aid farmers, a number of variations in differential taxation have emerged. Preferential assessment requires assessment of land at its present use value with no associated penalty for conversion to non-agricultural use. Deferred taxation involves use value assessment with a rollback stipulation if land is converted to non-agricultural use. Restrictive contracts also provide for differential assessment if the landowner agrees not to change land use for a specified time.

These modifications of the original differential taxation scheme are in part due to the realization that the differential assessment of agricultural lands is more of an income transfer to land owners than a mechanism for retaining land in agriculture. When development pressures increase more quickly than agricultural values in a locality, the tax savings provided by differential assessment increase but so does the foregone income from not developing

the land. Although growing pressure to develop agricultural land leads to larger tax savings under a system of differential taxation, the amount of foregone income increases even more. For this reason, differential taxation will have less of an influence upon the landowners' farmland conversion decision than originally hypothesized.

In addition, because differential taxation acts to increase the value of land by lowering the cost of ownership, the value of qualifying land is increased. This increase will be capitalized by the first owner into the value of the land, benefiting only the first owner. For these reasons, it appears that in most cases a tax relief scheme alone is not an effective farmland retention technique (Knapp, Hady and Sibold).

A host of other equity related questions involving tax shifting and tax incidence contribute to doubts already raised concerning the merits of differential taxation policies, especially in the case of farmland retention policy (Stoll, et al.). A possible compromise between the ineffective (from a retention standpoint) tax relief and right to farm laws and the effective but unpopular restricting of farmers' development rights is the technique chosen by two states in the Southeast: agricultural districts. This technique has the appeal of being a nonradical break with the

Southern tradition of legislation, while at the same time having the flexibility to be tailored to a state's particular needs.

4.4.5 AGRICULTURAL DISTRICTS

The use of agricultural districts as a farmland retention technique is a relatively new approach to local level land use management. Agricultural districts designate specific areas of land for long term agricultural use and usually link membership with benefits such as eligibility for differential assessment or protection from nuisance ordinances (Coughlin and Keene). Membership in agricultural districts is voluntary and usually subject to renewal in a specified number of years.

New York, which now has over 80% of its farmland in agricultural districts, pioneered the concept as an institutional arrangement in 1971 and has served as a model for the 12 states which now authorize some form of agricultural districts (Gardner, et al.). However, Conklin and Bryant (p.608) have described agricultural districts as a compromise approach to farmland retention. Research monitoring the New York experience supports this assertion by concluding that agricultural districts are not formed where conversion

pressures (and payoffs) are the highest. In addition, the districts are structured for a designated period of time and do not provide a permanent solution to the conversion of agricultural land.

Although agricultural districts lack the legal power of other control based retention techniques such as agricultural zoning, they can provide tangible incentives for joining when linked explicitly to eligibility for differential assessment. While only two southern states, Virginia and Kentucky, currently authorize the formation of agricultural districts, it appears that the voluntary compliance and linkage to existing use value taxation may make this policy attractive to a region with a strong property rights heritage (Luzar and Batie).

4.5 COSTS OF FARMLAND RETENTION

For local and state governments considering the adoption of one or a combination of these tools, a trade-off quickly emerges. In general, from the standpoint of "protecting" land in agriculture, the relatively more effective retention techniques (e.g., exclusive agricultural zoning or purchase of development rights) come at a relatively high financial or political cost, while the less effective retention tools

such as right to farm legislation or tax relief programs, are lower cost activities.

Any policy or technique designed to retain prime land in agricultural use comes first at the cost of using this land in its next best use. This opportunity cost of retaining prime land in agriculture can potentially be quite high, as land suited for modern commercial agriculture is equally well suited for commercial, industrial or residential uses. Research by Dillman and Cousins supports the hypothesis that development is biased toward prime land. Their estimates revealed that additional site preparation costs of developing second best sites for industries located on prime agricultural land in the Greenville-Spartensburg-Pickens SMSA would have ranged from \$9,000 to \$16,000 per acre.

In addition to the opportunities foregone by restricting the usage of agricultural land, state and local governments will have to consider other costs inherent in the design of the techniques themselves, costs which are monetary as well as non-monetary, public as well as private. The most obvious of these is the public expenditure required for the purchase of development rights.

New York's expenditure of 21 million dollars, often 40 to 60 percent of fee simple, New Jersey's allocation of five million dollars for the purchase of development rights, and

King County's expected expenditure of 50 million dollars hint at the magnitude of money required for the operation of this type of program. Programs that establish a market for development rights succeed in shifting the burden of costs to the private sector, but will still require significant local government administrative involvement in establishing and operating the market.

Alternative retention techniques such as exclusive agricultural zoning may come at a relatively low monetary cost and yet involve a high cost in terms of freedom of personal choice. The attenuation of property rights associated with exclusive zoning is a cost not readily accepted by most land owners and is probably the most limiting factor in the adoption of this usually effective retention mechanism.

Although relatively low cost as a retention tool, agricultural districts still involve considerable local time and effort in their formation. In addition, as a form of voluntary zoning, agricultural districts result in a voluntary loss of some property rights for members. However, because this cost is borne voluntarily, it can be assumed to be less of a detriment to the adoption of the technique.

Reliance on tax relief programs and right to farm legislation is a low cost, but not costless strategy. The reduction in property tax revenues resulting from the

differential assessment of agricultural lands is frequently significant enough that local governments must raise other non-agricultural property taxes to compensate for the loss in revenues. Knapp and Watkins, for example, estimated that in Nelson County, Virginia the 1977 use-value taxation program resulted in the necessity of a tax rate that was 9.6 percent higher to raise the same pre-tax revenue. Therefore, attempts to retain agricultural lands through differential assessment of agricultural lands imposes an additional cost (in terms of tax burden) on nonagricultural property owners.

The costs of farmland retention outlined here do not represent a complete accounting of what a state or local government will bear in return for the benefits gained from preserving land in agricultural use. It is important to emphasize however, that the costs are potentially high and come at different levels, public or private, and in a variety of forms: high public cash expenditures, attenuation of personal property rights, inequities resulting from shifting tax burdens or opportunity costs resulting from the retention of prime land in agriculture.

4.6 FARMLAND RETENTION POLICIES FOR THE SOUTHEAST

The individual land use institutions described above have evolved to address different aspects of the farmland retention issue discussed earlier in Chapter III. However, in tailoring land use policies to meet the diverse needs of the Southeast, selecting an appropriate policy may require innovative enactment of a package of policies rather than a acceptance of a single policy. For example, Wisconsin's pioneering efforts in land use policy design resulted in a hybrid policy that links favorable features of a number of policies previously proven to be inadequate when enacted alone. New York's experience in designing the agricultural district policy similarly suggests the advantages of dealing with complex land use issues by designing policies, rather than simply adopting what is currently in use in the state nearby.

The argument for land use policy design may be especially relevant to the property rights oriented Southeast. The policies that appear most politically acceptable to this region (differential assessment of agricultural land, and right to farm legislation), are at the same time considered to be some of the least effective in achieving farmland retention objectives. A case can be made, based on the

phenomena of the conservative reinforcement of the status quo, that new land use institutions rarely supplant existing institutions, but instead act to complement existing policies. States in the Southeast interested in improved land use policies therefore may be working within a framework of existing land use institutions considered politically popular but ineffective.

Virginia's experience in developing new land use policies designed to address unclearly articulated farmland retention issues provides a case in point. In addition to its existing differential assessment taxation policy and right to farm legislation, Virginia adopted an agricultural district policy loosely modeled after the New York Agricultural District Act. Although based on New York's policy, Virginia's Agricultural and Forestal District Act has had significantly lower participation rates than the New York policy. Almost ten years later, as Virginians begin a review of this policy, questions have been raised by both public and private sectors regarding the desirability and effectiveness of the policy as a farmland retention technique.

The following chapter continues the development of the pattern model by turning to the role of the actors involved in the farmland retention policy issue. Using the Virginia

Agricultural and Forestal District Act as a representative policy, county supervisors and private landowners are identified as the relevant actors in the behavioral analysis. Their behavioral response to issues raised by the evolution, design and administrative structure of the policy is investigated in terms of factors hypothesized to influence both public and private participation in the AFDA.

Chapter V

THE VIRGINIA AGRICULTURAL AND FORESTAL DISTRICT ACT: THE ACTORS

The pattern model outlined in Chapter III includes as a major component of the model the behavioral response of the actors in the policy environment. In this model, individuals are analyzed in terms of their behavioral response, first as constrained by the institutional environment, and secondly, as agents of change in that environment. This chapter links the analysis of the policy environment developed in Chapters III and IV with a case level analysis of the actors in that environment. Using the Virginia Agricultural and Forestal District Act as a representative farmland retention policy, the behavior of public sector officials and individual landowners is analyzed with respect to policy adoption decisions as constrained by the institutional environment and as potential sources of institutional change.

After an overview of the design of the Virginia AFDA, results of a hypothesis generating phone survey of local level public officials are presented. In addition, selection of Culpeper County as a case study area is discussed. Based on the phone survey and previous studies of factors influencing public and private participation in land use poli-

cies, a number of factors which may influence public and private participation in the Virginia Agricultural and Forestal District Act are identified in the final section.

5.1 VIRGINIA'S FARMLAND RETENTION POLICY

In 1977, Virginia adopted a formal farmland retention policy and chose as its primary policy instrument the Agricultural and Forestal District Act (AFDA).⁹ The AFDA provides

a means by which agricultural and forestal land may be protected and enhanced....as an economic and environmental resource....(Marshall, 1981).

This policy joined existing right to farm and use value taxation legislation in Virginia.

Table 5.1 presents an overview of Virginia's Agricultural and Forestal District Act. Virginia's agricultural districts, authorized by general law as a local option for land owners, differ from the New York agricultural district model in two key ways. First, Virginia requires that agricultural districts contain at least 500 acres of contiguous land. This modification results in a larger critical mass of land committed to agriculture, but may deter participation by landowners with relatively smaller holdings.

⁹ Title 15.1, Chapter 36, Sections 15.1-1506 through 15.1-1513, Code of Virginia.

TABLE 5.1

OVERVIEW OF VIRGINIA AGRICULTURAL AND FORESTAL DISTRICT ACT

1. ENACTED BY VIRGINIA GENERAL ASSEMBLY: 1977
 2. LOCAL ADOPTION BY COUNTY BOARD OF SUPERVISORS
 3. PROTECTS LAND FROM SOME POWERS OF ALL LEVELS OF GOVERNMENT
 4. USE-VALUE TAXATION IS AUTHORIZED AND MAY BE EXTENDED TO ELIGIBLE LAND EVEN WITHOUT A SEPARATE AUTHORIZING ORDINANCE
 5. OWNERS OF LAND INITIATE EVERY DISTRICT BY VOLUNTARY ACTION
 6. A DISTRICT MUST CONTAIN A MINIMUM OF 500 CONTIGIOUS ACRES
 7. A DISTRICT MAY BE ESTABLISHED FOR NO FEWER THAN FOUR YEARS AND NO LONGER THAN EIGHT YEARS, AND IS SUBJECT TO PERIODIC REVIEW
-

SOURCE: MARSHALL, J. PAXTON. "VIRGINIA'S AGRICULTURAL AND FORESTAL DISTRICT ACT: A SUMMARY." M.B. 280 DEPARTMENT OF AGRICULTURAL ECONOMICS, VPI & SU.

The second, perhaps more important difference in the policy, is that it does not explicitly tie membership in an agricultural district to eligibility for differential assessment. As a farmland retention technique, agricultural districts were originally designed to operate as an incentive mechanism, i.e., membership in agricultural districts is a prerequisite for eligibility in a tax relief program. In this original form agricultural districts can be used to complement existing tax relief programs which alone are inadequate restraints to farmland conversion (Hady, Bahl).

Initial interest in the Virginia AFDA can be traced to a concern in the mid-1970's that differential taxation might be rescinded in Virginia. Original sponsors of the AFDA proposed it as a hedge against repeal of the use value assessment program at the state level (Marshall, 1985). Therefore, in Virginia's adaptation,

use value taxation is authorized by an ordinance that establishes a district, and such taxation may be extended to eligible land even when a board or council has not adopted a separate authorizing ordinance (Marshall, 1981).

By stipulating that use value taxation could be authorized for land in an agricultural district even when the county does not separately authorize a use value ordinance, it was hoped that the use value taxation policy could survive state level discontinuance. In spite of this concern, use value taxation has not been rescinded in Virginia.

Virginia does not require membership in an agricultural district as a prerequisite for eligibility for use value assessment. Virginians who voluntarily form agricultural districts receive instead as benefits, protection from some powers of all levels of government and governmental agencies with land use concerns within a district. This can result in protection from agricultural nuisance suits, which however are already prohibited by existing right to farm legislation.

The design of Virginia's AFDA attempts to integrate characteristics of three policies, use value taxation, right to farm legislation, and agricultural districts, into one farmland retention policy. However, as the review of farmland retention policies in Chapter IV indicated, the objectives which these policies are designed to address differ.

For example, use value taxation is an income transfer for agricultural landowners which can cause shifts in tax incidence, burdening nonagricultural property owners with higher tax rates, while at the same time having little influence on the conversion of farmland out of agriculture. Right to farm legislation addresses only one factor, agricultural nuisance suits, which may contribute to the conversion of farmland to alternative uses. Agricultural districts create a critical mass of land committed to agri-

culture, and in the New York model, this commitment comes in exchange for the income transfer gained through use value assessment.

Without the benefit of the income transfer associated with use value taxation, Virginia's AFDA appears to offer few tangible benefits not already offered by existing legislation with which to compensate participants in return for the potential opportunity cost incurred by retaining land in agricultural use. However, even without the explicit incentive of eligibility for differential assessment, agricultural districts are being formed in Virginia. Table 5.2 lists Virginia's current Agricultural and Forestal Districts by county. As of March, 1986, 114 districts had been formed in 22 counties, with a total of 466,605 acres enrolled in the program (Virginia Department of Agriculture and Consumer Services). Individual districts in the state range in size from 513 acres to over 23,000 acres.

Over 90 percent of Virginia's agricultural districts are approaching a mandatory local review that will lead to renewal or discontinuation of the districts. In addition, plans are under way for a legislative study resolution designed to review the state enabling AFDA legislation as its tenth anniversary approaches. At both levels of government, information describing the factors influencing public

TABLE 5.2

VIRGINIA AGRICULTURAL AND FORESTAL DISTRICTS BY COUNTY: 1986

COUNTY	NUMBER OF DISTRICTS	ACRES
1. ACCOMACK	22	83,118.69
2. ALBEMARLE	3	9,908.13
3. CLARKE	2	25,085.99
4. CULPEPER	13	45,736.00
5. FAIRFAX	1	638.83
6. FAUQUIER	7	57,837.94
7. FREDERICK	1	11,563.57
8. GREENE	7	57,873.94
9. HANOVER	6	14,805.70
10. ISLE OF WIGHT	2	8,906.00
11. KING WILLIAM	5	3,729.95
12. LOUDOUN	15	83,705.92
13. MADISON	1	607.07
14. MONTGOMERY	11	47,487.91
15. NEW KENT	2	1,782.70
16. PRINCE WILLIAM	2	3,466.83
17. RAPPAHANNOCK	9	16,056.91
18. SHENANDOAH	2	2,102.50
19. TAZEWELL	1	7,362.00
20. WARREN	1	8,069.00
TOTAL	113	466,842.58

SOURCE: VIRGINIA DEPARTMENT OF AGRICULTURE
AND CONSUMER SERVICES

participation decisions as well as individual landowner participation decisions, both for and against participation, can assist both public and private land use decision makers more fully evaluate the need for change in or continuation of the AFDA.

For example, as county level decision makers decide upon acceptance of the AFDA as a local land use option, factors related to the design of the policy, personal characteristics of the decision makers, their attitudes toward land use issues, or their perception of public benefits and costs of participation may influence the choice process. Also, public perceptions of the private demand for public land use management may influence the county level participation decision. By determining which factors significantly influence this public level decision, elements of policy design that appear ambiguous or redundant with other policies may be reconsidered. Alternatively, it may be possible to determine that the AFDA is operating according to its original design intentions, and no modifications are necessary.

In addition to the public level AFDA participation choice, private landowners choose to participate or not to participate in the AFDA. Insights into the factors influencing this private level decision can similarly contribute

to an evaluation of the AFDA by public and private land use decision makers. However, as is the case for public level AFDA participation choices, this information is not readily available for analysis. For example, little information is available at the local level explaining which land use issue landowners are responding to when they make a decision to participate or not participate in the Virginia AFDA. It is not clear whether landowners are participating in the AFDA as a hedge against the possible elimination of use value taxation, or if they believe that they must participate as a condition of eligibility for use value taxation. Alternatively, little is known about interest in developing areas committed as a critical mass to agriculture, use of agricultural districts to preserve environmental amenities, or use of the AFDA to combat agricultural nuisance suits.

In order to increase understanding of the issues and factors influencing public county level adoption and private participation in the Virginia AFDA program, a series of telephone and mail surveys were conducted in the Fall of 1984. The telephone survey of local government officials described below was used to generate and formalize hypotheses about public and private AFDA participation decisions. Mail surveys of individual landowners and county supervisors were then conducted to gather data for formal

empirical testing of these hypotheses. Results from the surveys were also used to enrich the qualitative understanding of the public and private AFDA participation decision processes, as well as their relationship together.

5.2 TELEPHONE SURVEY OF VIRGINIA PUBLIC OFFICIALS

Virginia counties that have authorized the establishment of agricultural districts are required to register these districts with the Virginia Department of Agriculture and Consumer Services. While this provides a means for identifying counties that authorize this policy, no such identifying mechanism exists for counties that have considered but rejected their establishment. In order to identify counties that have considered but rejected the AFDA, county officials, primarily County Administrators, in 95 Virginia counties were interviewed in a telephone survey (Appendix A).

In response to this survey, County Administrators supplied information about AFDA activity in their county. The telephone survey was used to determine if a county had considered adoption of the AFDA, elicited information about initial sources of program interest, and developed background on related county land use policies and issues. In many instances, additional information was obtained by

subsequent telephone interviews with county extension agents or county planning staff.

As one product of the telephone survey, a list of 17 counties that considered and rejected the Agricultural and Forestal District program was developed to complement the list of 18 counties known to have considered and adopted the program as of 1983. In addition, County Administrators who indicated that the Agricultural and Forestal District Act had been considered as a land use option in their county (adopted or rejected) by the Board of Supervisors were asked to supply names and addresses of the Board members at the time of that consideration.

Figure 5.1 shows the location of the counties identified in the telephone survey that considered the AFD program and either rejected or accepted it as a local land use option. Figure 5.1 reveals the concentration of program acceptance in northern Virginia counties in 1983. In addition, a pattern of program consideration is evident along what is known as Virginia's metropolitan crescent, the population growth corridor reaching from the Norfolk coastal area through metropolitan Richmond, to northern counties within commuting distance of the Washington, D.C. metropolitan area. This metropolitan crescent currently contains over 60% of Virginia's population and is expected to accom-




modate the majority of Virginia's future population growth (Report of the Governor's Commission on Virginia's Future).

Using information supplied by County Administrators in the 35 counties that had considered the AFDA, a mailing list of 178 county supervisors who had voted on the issue of adopting the AFDA as a local land use option was developed for use in a mail survey of county supervisors. In addition, based on the telephone survey of public officials, a case study area was defined for the analysis of landowner AFDA participation decisions. The following section explains the choice of Culpeper County as the case study area, and provides some background information about use of the AFDA in that county as a farmland retention policy.

5.3 SELECTION OF THE CASE STUDY AREA

The local level decision regarding acceptance of the Virginia AFD program can be described as a two part decision process. In addition to the public level decision to accept or reject the AFDA as a local land use option made by county supervisors, individual landowners similarly face the choice of whether or not to join an agricultural district once they are authorized in their county. In order to add to the information known about this landowner participation deci-

LEGEND:

-  ADOPTED AFD
-  REJECTED AFD
-  NO CONSIDERATION

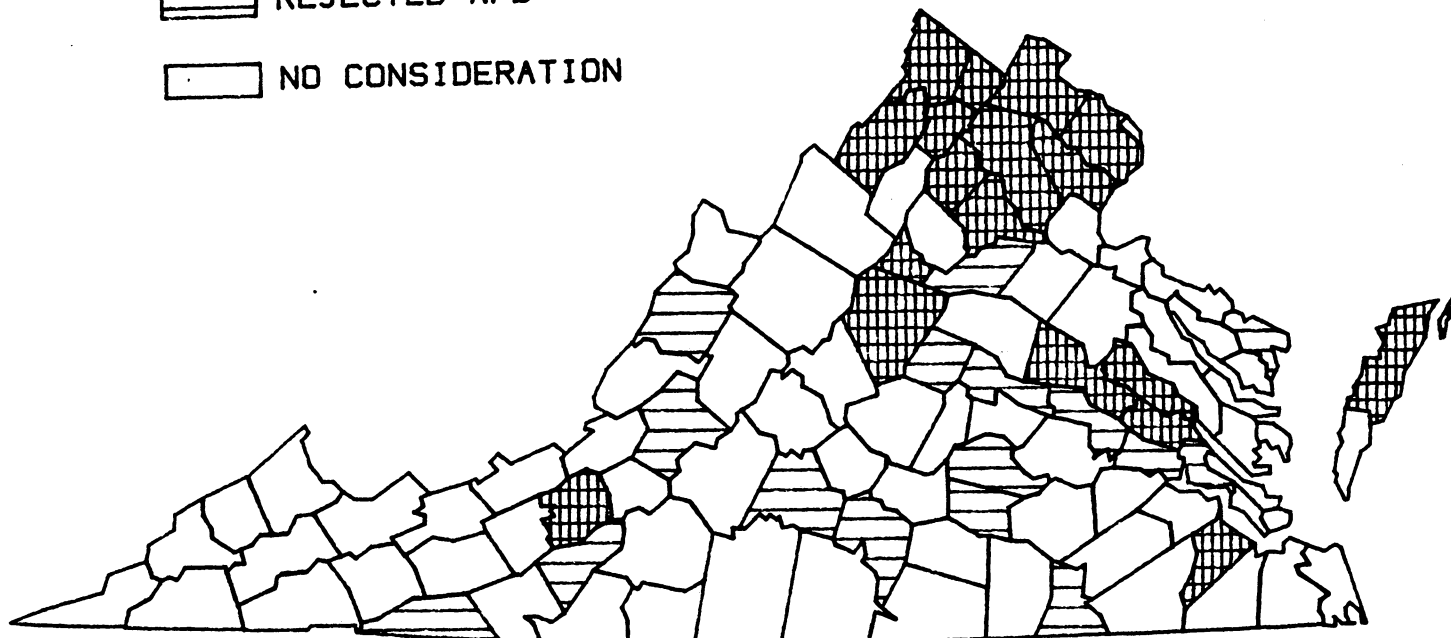


Figure 5.1: VIRGINIA'S AGRICULTURAL AND FORESTAL DISTRICTS

sion, a case study area, Culpeper County, Virginia, was selected for a survey of Virginia landowners.

Culpeper County was selected as the landowner case study area based on its relatively early adoption of the AFD program as a local land use option, geographical and locational considerations, and because of its historic role as an agricultural center in northern Virginia. In addition, after discussions with Culpeper County public officials, it was determined that Culpeper County was facing a number of land use issues representative of a wide range of Virginia's counties.

Eight percent of Culpeper County's work force are presently employed in agriculture. In addition, three-quarters of the county's land has been classified as agriculturally important to the local economy (Carter). Current appreciation of the importance of agriculture in the county is also further enhanced by the role the county has historically served as a focal point for regional agricultural marketing. The county's central location in northern Virginia (Figure 5.2) and its access to rail and highway transportation have facilitated this traditional role as well as its more recent role as a regional agricultural supply center.

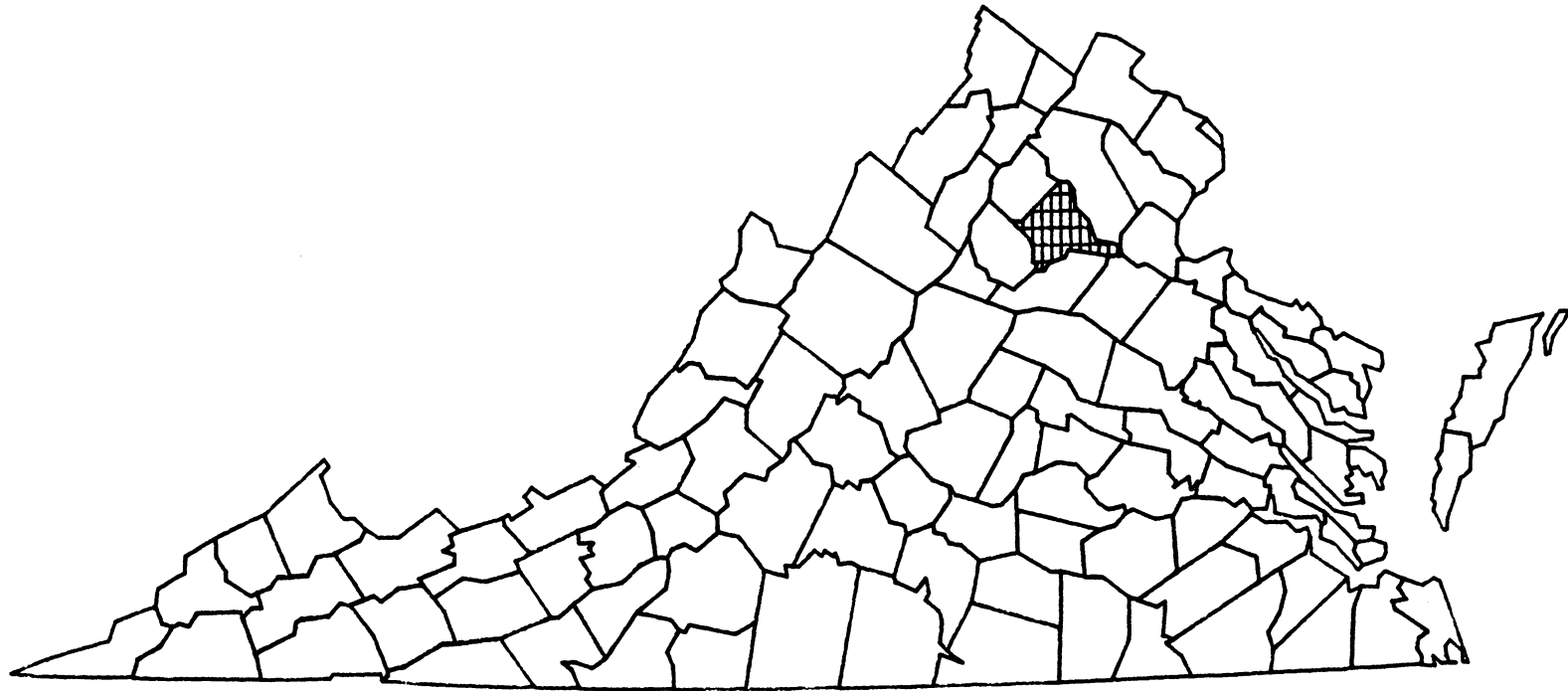


Figure 5.2: LOCATION OF CULPEPER COUNTY VIRGINIA

The strong agricultural heritage of Culpeper County has however been increasingly challenged by competing uses for agricultural land emanating from local demographic transformations such as the growth of the non-farm county population. Three-quarters of Culpeper County's population increases (a growth rate of 24.2 percent for the 1970 - 1980 decade) have been from immigrants, two-thirds of which are young families. Coupled with the immigration has been an increase in the labor force that commutes (20 percent) and that is employed outside of the county.

Culpeper County maintains use value taxation and agricultural district programs as separate policies. In Culpeper County it is not necessary to have land enrolled in an agricultural district in order to receive the benefits of use value taxation. In addition, county officials indicated awareness of the overlap between the state's right to farm legislation and the AFDA with respect to protection from agricultural nuisance suits. Therefore, the two primary potential benefits of AFDA participation, use value assessment of agricultural land and protection from agricultural nuisance suits, are not at issue in Culpeper County.

Culpeper County was an early adopter of the AFDA program. By 1983 the county had authorized formation of 13 Agricultural and Forestal Districts encompassing over 45,736

acres of land (Figure 5.3). Size of the Districts ranges from 513 acres to 14,151 acres (Table 5.3), and as noted in The Culpeper County Plan, (p.15) the properties enrolled create a pattern that closely resembles that of the county's best agricultural lands.

In addition to providing information useful in the selection of the case study area, information obtained from the survey of Virginia public officials was used in conjunction with insights generated by previous farmland retention policy participation studies conducted in New York and Wisconsin to formalize hypotheses about the public and private AFDA participation decisions. By identifying factors that either negatively or positively influence the participation decision made by county level officials and individual landowners, land use decision makers can better understand that land use issues are considered to be important, as well as which issues the AFDA is perceived to address. This information may additionally be useful in identifying elements of policy design and implementation which limit or encourage participation. The following section describes the factors hypothesized to influence the AFDA participation decision made by county supervisors.

AGRICULTURAL AND FORESTAL DISTRICTS

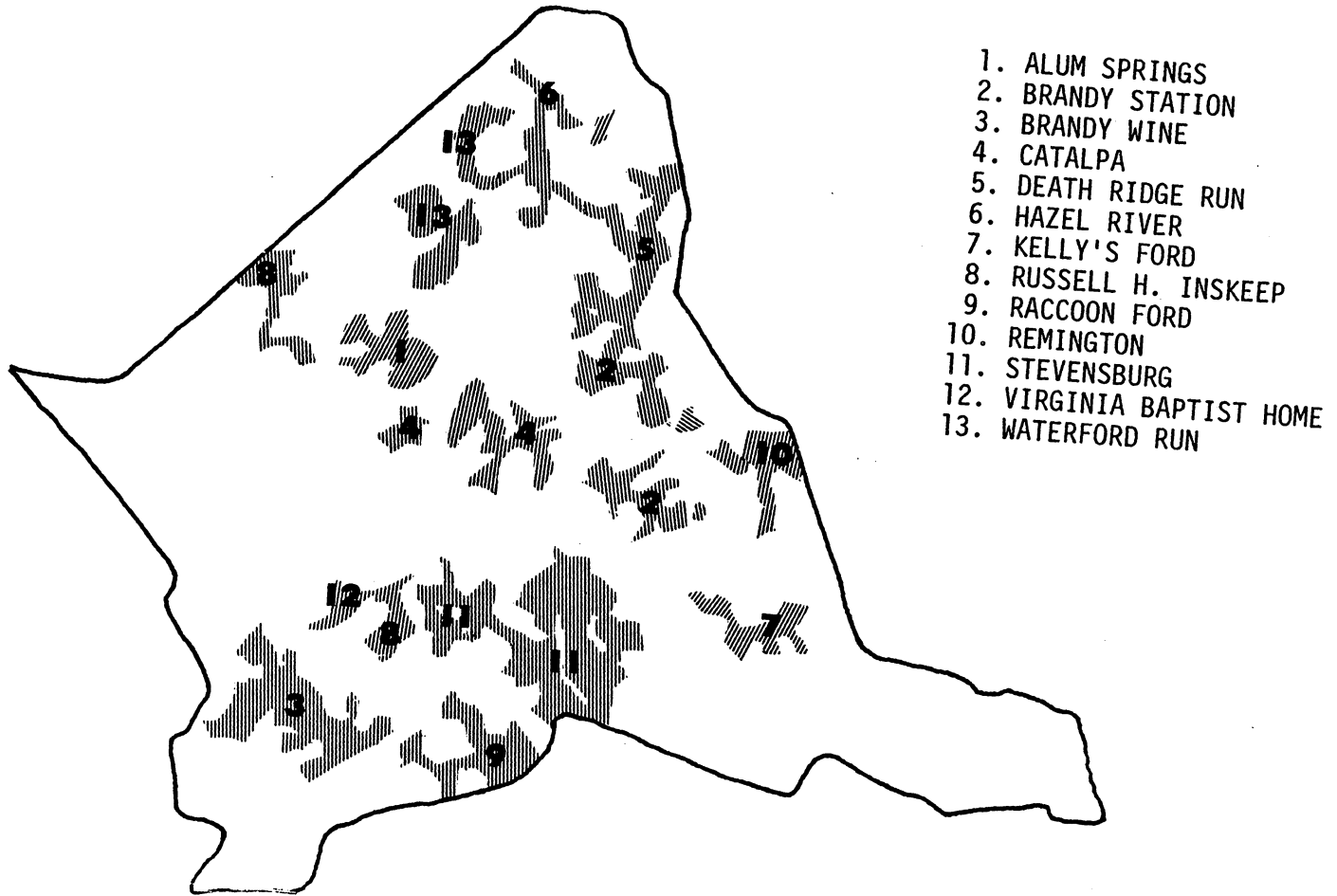


Figure 5.3: CULPEPER COUNTY AGRICULTURAL AND FORESTAL DISTRICTS

TABLE 5.3

CULPEPER COUNTY AGRICULTURAL AND FORESTAL DISTRICTS

DISTRICT	CONTRACT PERIOD	ACRES
RUSSEL H. INSKEEP	1979 - 1985	718.65
VIRGINIA BAPTIST HOME	1979 - 1985	513.26
BRANDYWINE	1980 - 1988	5,444.35
WATERFORD RUN	1980 - 1988	2,781.59
DEATHERAGE'S RUN	1980 - 1988	6,404.68
RACoon FORD	1980 - 1988	1,353.28
STEVENSBURG	1980 - 1988	14,451.58
HAZEL RUN	1980 - 1988	1,189.06
ALUM SPRINGS	1980 - 1988	1,111.68
BRANDY STATION	1980 - 1988	6,743.74
CATALPA	1980 - 1988	2,620.12
REMINGTON	1981 - 1989	1,331.41
KELLY'S FORD	1981 - 1989	1,072.63
TOTAL ACRES:		45,736.03

SOURCE: VIRGINIA DEPARTMENT OF AGRICULTURE
AND CONSUMER SERVICES

5.4 FACTORS HYPOTHESIZED TO INFLUENCE COUNTY SUPERVISOR AFDA PARTICIPATION DECISION

The decision to adopt a new land use institution such as the Virginia AFDA involves consideration and acceptance at two distinct levels. First, members of county Boards of Supervisors must enact an ordinance permitting the local formation of agricultural districts. Second, local landowners must voluntarily decide to participate in the new land use institution by forming the districts.

At the first level of institutional change, individual members of the county Board of Supervisors vote on whether to accept or reject the land use institution. It is hypothesized here that their behavior will be influenced by a combination of economic factors, personal attributes, factors related to the adoption process, attitudinal factors of the Supervisors, and perception of their constituents' attitudes.

5.4.1 ECONOMIC CONSIDERATIONS

Supervisors considering local adoption of the Virginia AFDA have reported consideration, in a very subjective manner, of costs and benefits of the program to their county. High on the list of economic considerations deterring adoption is

the loss of revenue resulting from assessment of agricultural land at use value. Although Virginia does not require enrollment in an agricultural district as a prerequisite for eligibility in the use value assessment program, public officials interviewed by telephone perceive a close association between the two programs. Associated with this are political costs resulting from imposing higher tax rates on other county residents needed to maintain existing county revenue levels. As the tax burden is shifted to the constituency which owns non-agricultural property, their attitudes or perceived attitudes can be influential in the Supervisors' decision process resulting in rejection of the AFDA.

Other cost considerations include constraints on the county's development opportunities as land is removed from the market for non-agricultural development. In addition, administrative costs associated with the creation, maintenance, review and renewal of the districts are positive but as yet not well defined.

Benefits gained from adoption of the Virginia AFDA can conceivably accrue to the local public sector (the county) as well as individual participating landowners. Supervisors may perceive that this legislation benefits the local economy by contributing to the preservation of an important sector of their local economy. This may be accomplished by

providing additional protection from nuisance suits or knowingly shifting tax burdens to others perceived to be more able or willing to bear them.

Perceived public sector benefits may also include protection from environmental degradation resulting from non-agricultural development. Environmental, aesthetic and historical concerns may be emphasized, especially in areas with environmental special interest groups that have lobbied in support of passage. The Piedmont Environmental Council has played such a role as an active proponent of the AFDA in its northern Virginia nine county area.

5.4.2 PERSONAL ATTRIBUTES

In addition to the economic considerations described above, it is hypothesized that personal attributes of the individual county supervisors may influence their decision to adopt or reject the the Virginia AFDA. Specifically, age, education, and personal affiliation with agriculture are hypothesized to influence this decision. Age and education can interact to increase an individual's knowledge of land use issues, alternative land use policy instruments and the effects of these policies on the public sector, and on private participants.

A clear understanding of the the AFDA and of the land use issues particular to their county can be a result of practical experience gained through age and formal education. While these personal attributes are thought to affect the decision to adopt the AFDA, the direction of their influence is conceptually ambiguous.

The third personal attribute, affiliation with agriculture, is hypothesized to be less of an ambiguous influential factor in the supervisors' decision. A personal tie with agriculture either through employment and/or membership in a farm related organization is hypothesized to positively influence the adoption decision. With a personal agricultural affiliation, supervisors may personally be more involved in the issue, and be exposed to a peer group personally interested in the issue.

An affiliation with agriculture through membership in a farm related organization is also hypothesized to positively influence the decision to adopt the Virginia AFDA. In Virginia, perhaps the best example of farm related organization involvement with the AFDA is the role of the Virginia Farm Bureau association. At a national level, the American Farm Bureau has a policy stance against farmland protection legislation. However, in Virginia, the Farm Bureau has been an early and consistent supporter of the AFDA, primarily due

to its potential role as a replacement policy should use value assessment (a policy supported by the Farm Bureau) be rescinded.

5.4.3 ATTITUDINAL FACTORS

Attitudes, opinions, and preferences influence behavior by coloring and structuring personal subjective valuations of benefits and costs, and by defining the ideological boundaries within which these personal valuations occur. Previous sociological research has indicated that attitudes, opinions, and preferences on issues such as farmland retention will significantly affect participation decisions by influencing perception of the issue, consideration of alternatives, and consequences of actions (Kohl and Barrows, Nowak, Bultena and Hoiberg).

In the case of elected officials, not only are their personal attitudes, opinions and preferences relevant considerations in their decision process, but also their perception of their constituents' attitudes, preferences, and opinions. It is therefore hypothesized that the attitude of county supervisors toward government involvement in local land use issues, as well as their more specific opinions about local government control of local environmental

and agricultural land use issues will have a positive relationship with their AFDA adoption decision. In addition, their perception of the fairness of use value assessment of agricultural land in their county is also hypothesized to influence their decision. Finally, supervisors' belief that agriculture, for any number of reasons, deserves special treatment in the local economy is hypothesized to influence their vote on the AFDA.

County supervisors, as elected officials, may react to the preferences of their constituents in a number of ways. They may attempt to ascertain constituency preferences and vote according to these preferences. Alternatively, responding to a different perception of representative government, they may vote as they deem appropriate having been elected on the basis of supposedly shared ideology with their constituency. Accountability in either case eventually occurs for these elected officials at the polls, thus increasing their interest in their constituents' attitudes, opinions and preferences. In addition, because these constituents potentially stand to gain or lose because of these actions, they have a vested interest in making their preferences known to their Board of Supervisors.

Therefore it is hypothesized that supervisors' perception of their constituents' attitudes toward the same issues

mentioned above will influence their AFDA adoption vote. Specifically, their perceptions of their constituents' attitudes toward government involvement in land use issues, local government involvement in environmental issues, involvement in agricultural land use issues, perception of the fairness of use value assessment of agricultural land, and attitude that agriculture deserves special, preferential treatment in their county.

5.4.4 THE ADOPTION PROCESS

The adoption of a new land use institution such as the Virginia AFDA can be conceptualized as a process in which the adoption choice proceeds in a series of progressive and interdependent steps. Viewed over time, this systematic series of actions will reveal stages of adoption described by Nowak (p.12) as awareness, evaluation, trial, and adoption. In the case of institutional change represented by adoption of a new land use institution such as the AFDA, adopters are confronted with a lumpy good--although the AFDA may be experimentally tried for different lengths of time, i.e., review periods, it must be adopted at one time as a whole. As a result, the awareness and evaluation stages may increase in significance for these cases where adoption is

viewed as a discrete choice process offering only limited opportunity for experimentation.

In the context of adoption of the Virginia AFDA by county supervisors as a local land use option, it is hypothesized that perceptions (awareness) of a need for change will motivate adoption of the AFDA. Perceptions of problems related to the conversion of agricultural land to non-agricultural uses, perceptions of problems related to the inability of farmers to practice normal agricultural practices due to the threat of nuisance suits, and perceptions of the relative fairness of the local revenue structure with respect to taxation of agricultural land at use value are hypothesized to contribute to the awareness phase of the adoption process, contributing to the AFDA vote.

Awareness and evaluation leading to adoption of the AFDA are also hypothesized to be influenced by information sources, and by influential participants in the consideration of the act. It is hypothesized that initiation of AFDA consideration by special interest groups such as farm related organizations or environmental interest groups will positively influence adoption by Supervisors due to their expertise in public affairs, knowledge of the AFDA and credibility among the supervisors' constituencies.

5.5 FACTORS HYPOTHESIZED TO INFLUENCE LANDOWNER AFDA PARTICIPATION

Factors hypothesized to influence the voluntary AFDA landowner participation decision suggested by the survey of local government officials and previous research ¹⁰ include economic considerations, personal and farm attributes, attitudinal factors, and the adoption process.

5.5.1 ECONOMIC FACTORS

In evaluating the decision to participate in farmland retention programs, landowners in Wisconsin and New York reported subjectively evaluating benefits of participation relative to costs. These cost considerations are hypothesized to be related to subjective evaluations of opportunity costs incurred by not allowing land to transfer, via the market, to higher valued uses, especially non-agricultural development. These costs are hypothetical and subjective, but may have some grounding in reality if the landowner has previously advertised land for sale for non-agricultural use or has previously sold land for non-agricultural use. In addition, plans to sell land for non-agricultural use are also

¹⁰ Especially Kohl and Barrows, Gardner, et al. and Nowak, Bultena and Hoiberg.

hypothesized to limit AFDA participation.

Although membership in an agricultural district is voluntary, participation involves costs in terms of loss of individual liberty to dictate use of the land. While this is perhaps more appropriately categorized as an attitudinal factor to be discussed later, it does involve subjective assessment of a cost of AFDA participation by landowners, and is hypothesized to negatively influence AFDA participation decisions.

Public officials indicated that landowners closely identify the Virginia AFDA with the states' use value assessment program. To reiterate, it is not necessary, especially in Culpeper County where an effort has been made to distinguish between the programs, to have land enrolled in an agricultural district in order to qualify for use value assessment. However, landowners appear to perceive the AFDA as a hedge against possible rescission of the use value statute. Therefore, it is hypothesized that landowners paying relatively high property tax bills and who are enrolled in the use value assessment program will favor AFDA participation.

Landowners experiencing legal suits filed to limit agricultural practices, or landowners aware of and fearing similar legal action may consider the AFDA to be added

protection. While the existing Virginia Right to Farm legislation provides this sort of protection to farmers employing a normal range of farming practices, ignorance of this legislation or the desire to supplement it may motivate landowners to participate in the AFDA.

In addition to benefits associated with the use value taxation hedge, and additional protection from anti-nuisance suits, landowners may perceive the AFDA in terms of providing environmental or aesthetic benefits. Landowners who perceive problems of environmental degradation associated with non-agricultural development may view the AFDA as a means of controlling population growth and development in agricultural areas. The desire to maintain a certain rural ambiance associated with agriculture may extend beyond the farming population to attract non-farm rural landowners to AFDA participation.

5.5.2 PERSONAL ATTRIBUTES

In addition to the perceptions of benefits and costs associated with participation in the AFDA, landowners' personal and farm attributes are hypothesized to influence their participation decision. ¹¹ Landowners' personal attributes,

¹¹ Causally separating personal attributes from perceptions of benefits and costs and from attitudinal factors (yet

including age, education, family composition, and years spent as the owner/operator of their farmland are identified here and in previous studies (Kohl and Barrows, Bills) as being influential in farmland retention program participation.

The age of landowners is hypothesized to be positively associated with participation in the AFDA. Older farmers, especially post retirement landowners, may view the AFDA as a means of maintaining the rural environment familiar to them. In addition, this hypothesis suggests that retirees may favor participation more than younger landowners because the potential opportunity costs of using their land in other, higher yielding non-agricultural uses are forgone.

These older landowners may therefore be less interested in the opportunity costs of development and more interested in maintaining a status quo of rural living in their retirement years. This hypothesis also includes the possibility of recent retirees who have moved to a rural area, purchased land, and seek some assurance that the package of rural amenities purchased with their land remains intact.

to be discussed) is somewhat misleading. The interaction between who we are in terms of attributes, our perceptions of subjective phenomena such as benefits and costs, and our attitudes does not lend itself to simplistic causal descriptions.

Related to the landowner age issue mentioned above is the issue of which older landowners are participating, long standing landowners or recent purchasers of agricultural land. It is hypothesized here that, not only are older landowners participating in the AFDA, but that the length of time they have owned their land is positively associated with AFDA participation.

This hypothesis is based on the premise that more recent acquirers of rural land in Culpeper County have had less time to perceive threats to their rural environment, and will be less informed about options such as the AFDA as a means of protection. In addition, these landowners who may fall short of the 500 acre minimum will have had less time to integrate themselves into their neighborhood, making collaboration with neighboring landowners more difficult.

The educational level of landowners is also hypothesized to influence their AFDA participation decision. More specifically, it is hypothesized that AFDA participation decisions are positively associated with lower levels of education, especially in the case of those landowners who terminated their formal education before graduating from high school. These landowners are hypothesized to respond, perhaps with limited or incorrect information, to participation in the AFDA as a means of assuring lower property taxes.

Landowners who plan to be succeeded by their children as landowners are hypothesized to be more likely to join the AFDA. If this is recognized to be a family farm plan, landowners will tend to participate in programs such as the AFDA in the hope that factors that might contribute to the conversion of the land out of agricultural use will be eliminated.

While the personal attributes of landowners described above are considered to be influential in the landowner AFDA participation decision, characteristics of the land owned are also hypothesized to contribute significantly to this decision process. The number of acres owned and farm business income, the type of farming enterprise, real property improvements, acres of land left idle, and form of legal ownership are hypothesized to influence the decision to participate in the AFDA.

It is hypothesized that the more acres a landowner owns, or the greater the farm business income, the less likely is participation in the AFDA. This hypothesis of an inverse relationship between farm size and membership is based on the premise that landowners with larger acreages will be better informed about the limited benefits of participation in the AFDA and less interested in participating in hope of assuring continued assessment of their property at

use value. It is hypothesized that owning relatively more acres of land increases the owners' ability to control his or her environment, politically and financially.

In addition, larger farming enterprises can often sell some acreage for non-farm development and still maintain viable farming operations. Participating in the AFDA can impose constraints on this control and flexibility which, it is hypothesized, landowners will be reluctant to surrender.

In addition to farm size, it is hypothesized that the type of farming enterprise will influence a landowner's AFDA participation decision. Enterprise types in Culpeper County range from dairy to livestock to cash grain operations--each requiring a different intensity and fixity of investment and yielding different returns on that investment. It is possible to develop support for a number of hypotheses related to farm enterprise mix based on the capital intensity and fixity aspects of the operations.

For example, it can be hypothesized that dairy farms exhibit more investment fixity than a livestock enterprise and therefore, dairy farmers might be more inclined to participate in the AFDA in order to "protect" that investment from non-agricultural development pressures. Alternatively, certain types of enterprises might be more likely to generate the negative externalities that stimulate nuisance

suit activities and thus be more inclined to participate in order to enhance their legal protection from nuisance suit activity. Cash crop operations may, as an example, require movement of machinery on highways, use of environmentally damaging chemicals inputs, and operation at early and late hours of the day.

No one hypothesis has emerged in previous studies as significantly more plausible than any other with regard to the nature of the influence of enterprise type on participation. As a result, selected as one of a number of competing possible hypotheses, it is proposed that cash grain farming operations will be more likely to participate in the AFDA in order to ensure increased nuisance suit protection.

Related to hypotheses regarding enterprise types is the hypothesis that acres of land left idle will have an inverse relationship with AFDA participation. Land taken from production may be in the preliminary stages of transfer to non-agricultural use. Also, land generating no production income creates an even higher opportunity cost for its owner if development opportunities exist, but can not be acted upon. Therefore it is hypothesized that the number of acres left idle will inversely influence the AFDA participation decision.

One additional characteristic of land owned in Culpeper County is hypothesized to influence the AFDA participation decision: how the land is titled. It is hypothesized that sole proprietorships will negatively influence the AFDA participation decision, due to a reluctance on the part of individuals to compromise their decision making independence by joining an agricultural district.

5.5.3 ATTITUDINAL FACTORS

The AFDA participation decision made by Culpeper County landowners is hypothesized to be influenced by a number of attitudinal factors. Attitudes toward personal involvement in government programs, and toward government involvement in local land use issues involving agriculture or environmental concerns are hypothesized to be influential in the landowner decision making process.

A preference for personal involvement in government programs is hypothesized to positively influence the AFDA participation decision. Attitudes that local agricultural issues and local environmental issues should be decided locally by local government are hypothesized to have an inverse relationship with the AFDA participation decision. Landowners are thought to be individualistic in nature and

view the voluntary formation of agricultural districts as a preferred substitute for more direct government involvement in these local issues.

5.5.4 THE ADOPTION PROCESS

Landowners' participation in a new land use institution such as the Virginia AFDA can, like that of supervisors, be conceptualized as a process in which the adoption choice proceeds in a series of progressive and interdependent steps. This systematic series of actions will reveal the same stages of adoption described earlier as awareness, evaluation, trial, and adoption. Potential adopters are once again offered a lumpy good, and again, although the AFDA may be experimentally tried for different review periods, it must be adopted at one time as a whole. The awareness and evaluation stages are again hypothesized to increase in significance for these cases where adoption is viewed as a discrete choice process offering only limited opportunity for experimentation.

In the context of adoption of the Virginia AFDA by landowners as a local land use option, it is hypothesized that perceptions (awareness) of a need for change will motivate adoption of the AFDA. Perceptions of problems related

to the conversion of agricultural land to non-agricultural uses, perceptions of problems related to the inability of farmers to practice normal agricultural practices due to the threat of nuisance suits, and perceptions of the relative fairness of the local revenue structure with respect to taxation of agricultural land at use value are hypothesized to contribute to the awareness phase of the adoption process, contributing to the AFDA vote.

Awareness and evaluation leading to adoption of the AFDA are also hypothesized to be influenced by information sources and by influential participants in the consideration of the act. It is hypothesized that initiation of AFDA consideration by special interest groups such as farm related organizations or environmental interest groups will positively influence adoption by landowners due to their expertise in public affairs, knowledge of the AFDA and credibility.

In the case of landowners, the phases of adoption described by Nowak as awareness and evaluation are hypothesized to be especially influential in the decision process. Perceptions of problems related to the threat of nuisance suits, problems stemming from a perception of undesired population growth in the non-agricultural sector, perceptions of environmental or aesthetic damage from non-agricul-

tural development, and pressures for conversion of agricultural land out of agriculture are hypothesized to influence the participation decision of landowners. Finally, a perception of unfairly high property taxes is hypothesized to influence the decision.

Landowners who fear legal action (such as nuisance suits) that may limit their range of farming practices are hypothesized to be more likely to participate in the AFDA in hope of legal protection. A perception of undesirable non-agricultural population growth is hypothesized to be positively associated with AFDA participation. These landowners are hypothesized to be participators in an effort to limit this growth in their areas. Similarly, landowners who perceive a problem in Culpeper County related to the unwanted conversion of agricultural land to non-agricultural uses are hypothesized to be influenced participation in the AFDA as a deterrent to unwanted conversions.

The perception of aesthetic damage due to non-agricultural development and environmental damage from the same source is hypothesized to positively influence landowner participation decisions as they perceive AFDA membership as a means of environmental protection. In addition, a perception of unfairly high property taxes for agriculturalists is hypothesized to be influential in the landowner participa-

tion decision. The ambiguous relationship between the AFDA and use value assessment programs is hypothesized to underlie this relationship, as landowners are believed to associate future, assured eligibility for use value assessment with participation in the AFDA.

In addition to the awareness stage of adoption, the evaluation phase is hypothesized to be influential in the landowner participation decision. A number of factors mentioned above in the discussion of economic factors, attitudinal factors, and personal and farm attributes are hypothesized to influence the evaluation of the landowner. In addition, sources of information about the AFDA and perceived reliability of these information sources are hypothesized to influence landowners participation decisions.

It is therefore hypothesized that information sources, particularly other landowners who have already decided to participate in the AFDA, will influence landowner participation decisions. This information source is hypothesized to positively influence landowner participation through a combination of peer pressure and the demonstration effect.

5.6 SUMMARY

This chapter began the analysis of the role of the actors in the farmland retention policy process. This analysis was set in the institutional environment created by Virginia's experience in developing a farmland retention policy which integrates components of existing land use policies, use value taxation and right to farm legislation, with a new land use policy, the establishment of agricultural districts, in order to achieve its stated goal of protecting and enhancing agricultural and forestal land as economic and environmental resources. After reviewing the institutional history of Virginia's Agricultural and Forestal District Act, problems stemming from apparent ambiguities in the policy's design were identified.

In an effort to understand the influence of the AFDA policy design on both the public and private acceptance of the policy, a state-wide hypothesis generating phone survey of Virginia County Administrators was conducted. Based on this survey, counties which had considered adoption of the AFDA as a local land use issue were identified. In addition, land use issues suggested by County Administrators aided in selection of a case study area for further analysis.

Adoption of the AFDA as a new land use institution was described as a two part decision process, public and private. Based on previous studies and information generated by the telephone survey of County Administrators, a number of hypotheses were suggested to explain the public (county supervisors) and private (individual landowners) decision to participate or not to participate in the Virginia AFDA.

The following chapter continues the behavioral analysis of land use decision makers. The data collection processes used to provide information for a formal test of the hypotheses stated in this chapter are described, as well as a qualitative summary of the survey results.

Chapter VI

SURVEY OF VIRGINIA COUNTY SUPERVISORS AND CULPEPER COUNTY LANDOWNERS

The previous chapter identified relevant actors for a behavioral analysis set in the context of the farmland retention policy issue. The Virginia Agricultural and Forestal District Act was reviewed in terms of its institutional history, its institutional design, and potential costs and benefits of public and private participation. Within this policy environment, factors hypothesized to influence public and private AFDA participation decisions, especially identification of the issues motivating participation, perceptions of the costs and benefits of participation, attitudes toward a number of land use issues, and the adoption process as it influences participation decisions, were proposed and discussed.

This chapter reports the development and implementation of two mail surveys designed to provide the qualitative and quantitative information needed to continue the behavioral analysis begun in Chapter V. In addition to survey sample development, the procedures used in survey design and implementation are discussed. Response rates for both mail surveys are also presented. Responses to the surveys are

summarized in terms of similarities and differences within the categories of public and private participants and non-participants, and between categories of public and private participants and non-participants.

6.1 SURVEY SAMPLE DEVELOPMENT

The survey of landowners in Culpeper County required development of a sample of landowners that included both participants and non-participants of Culpeper County's Agricultural District program. A mailing list of the 181 AFD program participants was provided by the Culpeper County Planning Office. A systematic sample of 229 non-participants was developed with the help of the Culpeper County Agricultural Stabilization and Conservation Service (ASCS) office. The systematic random sample of non-participants was generated by the Culpeper County ASCS office from their comprehensive list of Culpeper County landowners by iteratively selecting the tenth name from the list until a final sample of 250 landowners was obtained (Scheaffer, Mendenhall, and Ott).

A comparison with the Culpeper County AFDA program participant list revealed that 21 of the 250 ASCS generated names were included in the list of AFD participants. The final sample was therefore obtained by eliminating AFD

program participants from the ASCS sample, yielding a final sample of 229 non-participating landowners and 181 participating Culpeper County landowners.

The survey sample for county Supervisors was composed of 178 supervisors identified in the telephone survey of County Administrators. The sample included 77 supervisors from the 18 counties which had considered but rejected the AFDA, and 101 supervisors from counties which had considered and adopted the AFDA as a local land use option.

6.2 MAIL SURVEY DESIGN

The survey of land use decision-makers required design of two surveys, one for county supervisors involved in the county level decision, and one for local landowners involved in the individual participation decision. The two surveys were further differentiated in design between supervisors from counties that had considered and rejected the program and supervisors from counties that had adopted the AFD program. In a similar fashion, the survey of landowners was designed to elicit slightly different information from landowners who are program participants and landowners who are not participants.

Previous research on the New York Agricultural District program (Gardner, et al.), and the Wisconsin Farmland Preservation program (Kohl and Barrows) provided an initial basis for survey questionnaire design. However, because these programs offer more tangible benefits for participation (income tax credits and use value assessment), than the Virginia AFDA, a number of additional factors described below were included for consideration.

6.2.1 DESIGN OF THE COUNTY SUPERVISOR SURVEY QUESTIONNAIRE

The questionnaire developed for the survey of county supervisors was designed to elicit information in five general areas hypothesized to be influential in their decision process:

1. Knowledge and consideration of alternative farmland retention policies.
2. The process of program consideration leading to adoption or rejection.
3. County supervisors' perceptions of their constituents' attitudes toward a variety of land use issues.
4. Attitudes of county supervisors toward a variety of land use issues.
5. Personal attributes of county Supervisors.

County supervisors were asked to indicate whether their Board had considered any of a number of farmland retention policies and which, if any, of these policies were in effect. They were also asked to indicate their familiarity with these policies.

Information on the process leading to the consideration and adoption or rejection of the AFD program in their county was generated by means of a series of questions focusing on initial sources of interest in the program in their county, their personal sources of information about the program, and assessment of best information sources. Information on public participation in the decision process as well as perceptions of influential individuals or groups was also gathered in a series of questions.

Supervisors were asked why they thought the policy was adopted or rejected in their county, how they personally voted on the issue, and why they voted as they did. They were also asked if their vote would change if they were to vote again on the establishment of Agricultural and Forestal Districts in their county.

The county supervisors were asked to indicate their perception of their county residents' attitudes toward a series of statements about local land use conflicts, attitudes toward government involvement in local land use deci-

sions, environmental land use issues, and attitudes toward the treatment and role of agriculture in their community. The supervisors were also asked to give their own personal opinion about the same set of land use issues.

In the final section of the questionnaire, supervisors were asked a number of questions about their personal characteristics, including employment, education, age and sex. They were also asked to indicate affiliation with local organizations as well as their personal association, if any, with agriculture in their county.

Questionnaire design differed for AFD counties from that designed for non-AFD counties primarily in two areas. AFD County supervisors were asked additional questions about the land enrolled in their county's program and satisfaction with the program. In addition, they were queried concerning their AFD program participants' perceived willingness to join local and state level associations of AFD members if such associations existed.

6.2.2 DESIGN OF THE LANDOWNER SURVEY QUESTIONNAIRE

The questionnaire developed for the survey of landowners was designed to elicit information in the following five general areas hypothesized to be influential in the landowner AFDA participation decision:

1. Description of land owned as well as its use, and location.
2. Landowner plans for the land.
3. Attitudes of landowners toward a variety of land use issues.
4. The process of AFD program consideration leading to participation or non-participation.
5. Personal attributes of landowners.

The questionnaires designed for the landowner survey included a series of questions about land owned in Culpeper County and how this land is used. In addition, information was gathered about the number of years of ownership as well as the length of time the land has been in the extended family. Locational attributes of the land owned were also asked. Landowners were asked their plans for future investment in their land, plans for enterprise expansion, and about plans for continuation of ownership by children or immediate family. Landowners were also asked about their plans to sell their land for non-agricultural uses.

The landowner survey included the same set of questions concerning local land use issues that was used in the county supervisor survey. The landowners were asked their opinion about local sources of land use conflicts, the need for preferential treatment of agricultural land, involvement of government in local land use decisions, and the role of agriculture in their community.

Landowners were asked a number of questions about their decision to either participate or not participate in the Culpeper County AFD program. Questions were asked about initial information sources, assessment of best information sources, influences on their decision, and motives for their decision. Non-program participants were asked about their interest in getting additional AFD program information as well as their knowledge of where to get such information. Program participants were asked about their role in the formation of their AFD, as well as their interest in joining local or state level AFD associations if such associations existed. They were also asked about their plans for continued involvement in their AFD after the review.

Both sets of landowners were asked the same questions about their personal and family characteristics, including age, sex, education, and family size. Landowners were asked to indicate their form of farm business organization, and how the land was titled. Landowners were also asked their gross receipts from their farm enterprise as well as the net farm business income. In addition, they were asked to indicate if their land is assessed at use value and the amount of the real property tax paid on this property.

6.3 MAIL SURVEY PROCEDURES

Survey procedures used in this study closely followed recommendations developed by Dillman in his analysis of factors that influence survey response quality and quantity. The Total Design Method (TDM) developed by Dillman used in this study involves elements of survey design and administration selected to lower the cost and increase the likelihood of accurately completed and returned mail questionnaires.

Mail surveys for 178 Virginia County supervisors and 410 Culpeper County landowners were administered simultaneously during the Fall of 1984. The correspondence that accompanied the first survey mailing as well as follow-up reminders are included in Appendix B. ¹² The initial mailing was followed a week later by a postcard reminder. Two weeks later, a replacement survey and letter were mailed to non-respondents. Follow-up letters and a third mailing were completed as prescribed by the TDM.

¹² See Appendix C for the text of the county supervisor surveys, and Appendix D for the text of the Culpeper County landowner surveys.

6.4 SURVEY RESPONSE RATES

A total of 178 questionnaires were mailed to Virginia county supervisors identified by the telephone survey of Virginia County Administrators. Only two were returned as undeliverable. The response from counties that had considered and rejected the AFD program was 57 of the original 77 mailed. Of these, 50 were judged to be usable for the study. ¹³ In counties that had considered and approved the AFD program, a total of 101 surveys were mailed. Sixty-five questionnaires were returned by these supervisors, with 60 usable returns. The response rate for non-AFD county supervisors was 74 percent, while the response rate for AFD county supervisors was slightly lower, at 64 percent. The final survey response rate for the Virginia county supervisor survey was 69 percent.

The Culpeper County landowner survey involved 410 landowners: 229 program non-participants and 181 program participants. A total of 18 questionnaires were returned as undeliverable for the non-participants, leaving a total of 211 non-participants. One hundred fifty-six non-participant landowners responded to the survey. From this group of 156

¹³ Criteria for survey elimination in both mail surveys were based on the degree of completion, timeliness of the survey response, and survey completion by an appropriate respondent.

survey returns, 26 were eliminated as unusable for the study, leaving 130 usable returns. The final response rate for the non-participants was 71 percent.

Eleven of the 181 program participant questionnaires were returned as undeliverable, leaving a total of 170. Of the 131 questionnaires eventually returned, only 13 were deemed unusable for the study. The final response rate for the AFD program participant group was 77 percent. The final response rates of 69 percent for the Virginia county supervisor survey and 74 percent for the Culpeper County landowner survey fall within the range of acceptable response rates suggested by Dillman for surveys of this detail and length.

6.5 QUALITATIVE ANALYSIS OF SUPERVISOR AND LANDOWNER SURVEY RESULTS

6.5.1 SUMMARY OF COUNTY SUPERVISOR SURVEY RESPONSES

Information on personal attributes of the county supervisors is presented first in this section, followed by information on supervisors' familiarity with various farmland retention policies. Their role in the consideration of the AFDA, their perception of the policy, and the process surrounding

consideration of the policy are then discussed. Supervisors' attitudes about a variety of land use issues are presented and compared with their perception of their constituents' attitudes toward the same set of issues. A similar summary of Culpeper County landowner survey responses then follows.

6.5.1.1 PERSONAL ATTRIBUTES: COUNTY SUPERVISORS

The county supervisors surveyed reported their educational background in terms of the highest level of education achieved (Table 6.2). Over 60 percent of the supervisors from counties with the AFDA approved reported that they had completed college, compared with 36 percent of the supervisors from non-AFDA counties.

The average age of AFDA county supervisors was reported to be 54 years, while non-AFDA county supervisors averaged 56 years in age. The range of ages was greater (28 to 79 years) for AFDA county supervisors than for non-AFDA county supervisors (37 to 73 years). Both groups were predominately male, 86 percent male in AFDA counties, 94 percent male in non-AFDA counties.

TABLE 6.1
EDUCATIONAL LEVELS OF COUNTY SUPERVISORS

EDUCATIONAL LEVEL	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
NO FORMAL SCHOOLING	0	0	0	0
SOME GRADE SCHOOL	1	0	1.66	0
COMPLETED GRADE SCHOOL	1	1	1.66	2.34
SOME HIGH SCHOOL	3	7	5.00	14.00
COMPLETED HIGH SCHOOL	7	17	11.23	34.23
SOME COLLEGE	12	7	20.79	14.51
COMPLETED COLLEGE	36	18	60.34	36.22

AFD = 60

NON-AFD = 50

6.5.1.2 AFFILIATION WITH AGRICULTURE

Supervisors were questioned about their personal affiliation with agriculture in their own county and about their land use patterns. Thirty-eight percent of the AFDA county supervisors indicated a personal affiliation with agriculture in terms of previous or current employment. In non-AFDA counties, 72 percent of the supervisors claimed to be personally affiliated with agriculture in terms of employment. Supervisors were also questioned about membership in agricultural related organizations such as the Virginia Farm Bureau. Membership in the Farm Bureau was higher for non-AFDA county supervisors, with 46 percent enrolled as members versus 28 percent of the AFDA county supervisors.

On average, non-AFDA county supervisors reported owning 255 acres of land, while AFDA county supervisors on average owned 214 acres (Table 6.3). Agriculture dominated as a land use for both groups. An average of 157 acres of the non-AFDA county supervisors' land was used in agriculture. AFDA county supervisors reported an average of 123 acres of land used for agricultural purposes.

TABLE 6.2
 LAND USE CATEGORIES: COUNTY SUPERVISORS

LAND USE CATEGORY	AVERAGE ACRES	
	AFD	NON-AFD
AGRICULTURAL	123.7	157.3
FOREST	38.1	89.5
IDLE (NOT FARMED IN 1983)	1.3	9.2
COMMERCIAL (BUSINESS)	.2	1.1
RESIDENTIAL	3.2	2.3
INDUSTRIAL	0	.8
AVERAGE ACRES OWNED	214.2	255.0

AFD = 60

NON-AFD = 50

6.5.1.3 FAMILIARITY WITH FARMLAND RETENTION POLICIES

Supervisors were asked to indicate their familiarity with a number of farmland retention policies. Table E.1 ¹⁴ summarizes AFDA county supervisors' familiarity with six farmland retention policies and indicates which of the policies are currently in effect in their county. Use value taxation and agricultural districting were reported as the most frequently used policy options. Supervisors reported least familiarity with transfer and purchase of development rights policy options.

Table E.2 reports the same information for non-AFDA county supervisors. One notable difference is that use value taxation is authorized less frequently in these counties. Purchase of development rights and transfer of development rights were even less familiar to these supervisors. These policies were as a result considered as policy options less frequently in non-AFDA counties.

¹⁴ Tables E.1 through E.41 summarizing the survey results are found in Appendix E.

6.5.1.4 AFDA CONSIDERATION

The county supervisors were also asked a series of questions designed to provide insight into the process of AFDA consideration by themselves as well as by the county as a whole. Primary sources of consideration of the program were reported to be local agricultural landowners in both AFDA and non-AFDA counties (Table E.3). In non-AFDA counties, supervisors also indicated that their own Board of Supervisors as well as farm related organizations played a smaller role in this phase of the process. Historic preservation or environmental groups were reported to play a larger role as initiators in AFDA counties than in non-AFDA counties. Public sector organizations such as the ASCS and the Virginia Cooperative Extension Service appeared to have little involvement at that point of the process.

Once the issue was raised, supervisors reported receiving information from a number of sources (Table E.4). Both AFDA and non-AFDA county supervisors reported that local landowners were an important source of information. Similarly, the Virginia Cooperative Extension Service provided information to both groups. A significant difference in information sources was evident as AFDA county supervisors also relied heavily on county planning officials. Also,

environmental or historic preservation groups played a small information role in AFDA counties, but none in non-AFDA counties.

When asked to indicate the "best" (i.e., most helpful, inexpensive, reliable, and available) source of information, AFDA and non-AFDA county supervisors differed in their assessment. While many supervisors in both groups found the Virginia Cooperative Extension Service to be the "best" information source, AFDA county supervisors indicated most confidence in county planning officials as a source of information (Table E.5). In general, non-AFDA county supervisors indicated a wider range of helpful information sources.

The county supervisors differed markedly in their assessment of the most active participants in the county AFDA decision process (Tables E.6 and E.7). In the case of non-AFDA county supervisors, they reported that the Board of Supervisors was most active in the decision. AFDA county supervisors indicated that agricultural landowners were the most active participants. In a related question, AFDA county supervisors reported that local agricultural landowners followed by environmental or historic preservation groups were the most influential in the decision to establish the AFDA in their county (Table E.8). Non-AFDA county supervi-

sors reported the Board of Supervisors to be the most influential in the decision to reject establishment of the AFDA in their county (Table E.9). While agricultural landowners and county planning officials were influential to a lesser degree, environmental or historic preservation groups were not reported to be influential.

Supervisors' descriptions of the public participation in this decision process varied between AFDA and non-AFDA counties. Table E.10 suggests that in AFDA counties, public meetings called by the Board of Supervisors were the primary vehicle for public participation. Local planning officials were also reported to be sponsors of some public meetings in these counties. Non-AFDA county supervisors also identified meetings called by their Board of Supervisors as the primary means of public participation. The role played by local planning officials was however reported to be greater than in AFDA counties (Table E.11).

The AFDA county supervisors were asked their opinion on their county's motive for adopting the AFDA. Motives for AFDA adoption were most frequently reported to be provision of tax relief for agricultural landowners, followed by the desire to keep agriculture a part of the local economy. Ensuring adequate supplies of food and fiber were also reported to be a motive for AFDA adoption (Table E.12).

Supervisors were asked to indicate their individual motives for their vote on the AFDA issue in their county. In counties that adopted the AFDA, supervisors who voted for the AFDA did so primarily to provide tax relief for agricultural landowners (Table E.13). Protection for farmers from nuisance suits, preservation of scenic or open space, and protection of family farm businesses were also motives for a vote in favor of the AFDA. Supervisors who voted against the AFDA in counties that adopted the program did so primarily because they felt it provided an unfair tax break to agricultural landowners or because they felt the program to be too restrictive for their local land use problems (Table E.14).

In counties that considered but rejected the AFDA, supervisors who voted in favor of the AFDA did so in order to provide tax relief for landowners (Table E.15). Those supervisors who voted against the AFDA in counties that rejected the program reported voting against the AFDA because they felt that adoption of the AFDA would cause a significant loss of county tax revenue (Table E.16). The AFDA program was also considered by some to be too restrictive for local land use problems.

Table E.17 summarizes supervisors' perception of why landowners participate in the AFDA. Leading the list of

motives is property tax relief. A desire to keep agriculture strong in the county, protection of family farm businesses and preservation of scenic or open space were also mentioned as participation motives by some supervisors.

6.5.1.5 ATTITUDES, PERCEPTIONS, AND OPINIONS: SUPERVISORS

Underlying many of the land use decisions made by county supervisors are their attitudes, perceptions and opinions about a variety of related issues. In addition, as elected public officials, their perception of their constituents' opinions, attitudes and perceptions of the same land use issues will, to some extent, influence their decision making process. Supervisors were therefore asked to indicate how, in their opinion, their constituents considered a series of statements about local land use issues. Supervisors were also asked to indicate their attitude toward the same set of local land use issues.

Non-AFDA county supervisors perceived that a majority of their constituents were concerned with problems related to nuisance suits against farmers (Table E.18). These supervisors also indicated that they felt their constituents were concerned about aesthetic damage from non-agricultural development in their county. The issue of agricultural land

taxation drew significant responses from supervisors: they perceived that their constituents were almost equally divided on the issue of whether farmers pay a fair share of local taxes. Supervisors also perceived an attitude among their constituents in favor of minimizing government involvement in local land use issues. Non-agricultural population growth and problems of agricultural land conversion were perceived by non-AFDA county supervisors to be issues of some concern to the majority and to influential minorities in their county.

AFDA county supervisors also perceived agricultural nuisance suits to be an issue of concern to a majority of their constituents (Table E.19). Agricultural property taxes were again perceived by supervisors to be an important issue for a majority of their constituents, but again constituents were perceived to be divided on the fairness of current agricultural property tax policies.

Aesthetic damage from non-agricultural development was perceived to be a lesser concern to the majority. The conversion of agricultural land was perceived to be a more important issue to the majority in AFDA counties, while problems related to non-agricultural population growth were perceived to be about the same importance as in non-AFDA counties. As was the case in AFDA counties, non-AFDA super-

visors perceived an attitude in favor of minimizing government involvement in local agricultural issues.

Non-AFDA supervisors were asked their own opinion (agree or disagree) about the same set of local land use issues. AFDA county supervisors were less concerned with the agricultural nuisance suit issue in their counties (Table E.20). Supervisors were divided on the issue of agricultural land conversion as a problem in their county. These supervisors did however perceive aesthetic damage from non-agricultural development to be a problem in their county as well as non-agricultural population growth.

Supervisors were split about the problem of agricultural land conversion in their county. With respect to the issue of agricultural taxation, most supervisors did not feel that farmers were paying too little in taxes. The attitude that agriculture deserves special concessions was strongly supported by these supervisors. The supervisors also strongly disagreed with the notion that government should not be involved with local land use issues.

Non-AFDA county supervisors differed from the AFDA county supervisors in their assessment of the agriculture nuisance suit problem in their county (Table E.21). They also disagreed that their county was experiencing aesthetic damage from non-agricultural development. The non-AFDA

county supervisors did not think that farmers were paying less than their fair share of local taxes. The supervisors were divided on the issue of non-agricultural population growth but did not perceive agricultural land conversion to be a problem in their county. The non-AFDA county supervisors were less committed to the notion that government should be involved in local land use issues.

6.5.2 SUMMARY OF LANDOWNER SURVEY RESPONSES

The following sections summarize the Culpeper County landowner survey responses. Information describing the personal attributes of these landowners is presented, including age, sex, education, and family composition. Length of time as landowners in Culpeper county, land use patterns, locational attributes of land owned, and farm business characteristics are also presented.

The process of AFDA consideration by the landowners is then reviewed, including information sources, perceived costs and benefits of AFDA participation, and plans for future program participation. Culpeper County landowners were also asked to give their opinion about the same set of local land use issues discussed in the summary of county Supervisors. The attitudes, perceptions, and opinions of

the landowners toward these issues are presented in the final section.

6.5.2.1 PERSONAL ATTRIBUTES: CULPEPER COUNTY LANDOWNERS

Culpeper County landowners reported their educational background in terms of the highest level of education attained (Table 6.4). AFDA participants were more often college graduates than AFDA non-participants (34 percent versus 14 percent), and on the whole, had attained higher levels of education. AFDA and AFDA non-participants were of nearly the same average age: 56 years for AFDA participants, and 57 years for AFDA non-participants (Table 6.5). Both groups were composed predominately of males. Eighty-nine percent of the AFDA participants surveyed were men, while 86 percent of the AFDA non-participants were men. Landowners surveyed in both groups reported on average just over two children per family.

6.5.2.2 LAND USE PATTERNS

AFDA non-participants indicated in the survey that their family has owned farmland in Culpeper County on the average for 41 years. This is slightly longer than AFDA participant

TABLE 6.3
 EDUCATIONAL LEVELS OF CULPEPER COUNTY LANDOWNERS

EDUCATIONAL LEVEL	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
NO FORMAL SCHOOLING	0	1	0	.76
SOME GRADE SCHOOL	3	9	2.54	6.92
COMPLETED GRADE SCHOOL	10	8	8.47	6.15
SOME HIGH SCHOOL	10	32	8.47	24.61
COMPLETED HIGH SCHOOL	35	35	29.66	26.92
SOME COLLEGE	20	27	16.94	20.79
COMPLETED COLLEGE	40	18	33.89	13.84

AFD = 118

NON-AFD = 130

TABLE 6.4
FARM OPERATOR CHARACTERISTICS

OPERATOR CHARACTERISTICS	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
MALE	112	106	86.12	89.89
FEMALE	18	12	13.82	10.14
	AFD	NON-AFD		
AVERAGE AGE	55.9	56.9		
CHILDREN	2.5	2.2		
YEARS FAMILY HAS OWNED FARMLAND IN CULPEPER COUNTY	33.0	41.3		
YEARS OPERATOR HAS OWNED CURRENT FARMLAND IN CULPEPER COUNTY	20.3	22.4		

AFD = 118

NON-AFD = 130

families had owned their Culpeper County farmland (33 years). AFDA participants had, as operators, owned their current farmland in Culpeper County for fewer years than AFDA non-participant farm operators (Table 6.5).

Culpeper County landowners were asked in the survey to describe their land in terms of land use categories. Table 6.6 presents a summary of land use categories for AFDA participants and AFDA non-participants. On average, AFDA participants owned more land in Culpeper County (281 acres) than AFDA non-participants (158 acres), and used more of this land for agricultural purposes (193 acres versus 113 acres). AFDA participants averaged almost twice as much forest land as AFDA non-participants. Acreage in residential, commercial, industrial and idle was similar for both groups.

Table 6.7 reports more information on land use in Culpeper County. AFDA participants and AFDA non-participants tended to use approximately the same percentage of their owned land in a farming operation (71 and 73 percent). AFDA participants reported renting more acres to non-family members than AFDA non-participants, and also rented more to family members. On the average, more acres were rented in (63 acres) by AFDA participants than by AFDA non-participants.

TABLE 6.5

LAND USE CATEGORIES: CULPEPER COUNTY LANDOWNERS

LAND USE CATEGORY	AVERAGE ACRES	
	NON-AFD	AFD
AGRICULTURAL	113.7	193.7
FOREST	34.6	67.6
IDLE (NOT FARMED IN 1983)	4.2	5.9
COMMERCIAL (BUSINESS)	.3	.5
RESIDENTIAL	1.8	1.9
INDUSTRIAL	.7	.2
AVERAGE ACRES OWNED	158.4	281.0

AFD = 118

NON-AFD = 130

TABLE 6.6
 AGRICULTURAL LAND USE: CULPEPER COUNTY

AGRICULTURAL LAND USE	AVERAGE ACRES	
	AFD	NON-AFD
LAND OWNED IN CULPEPER COUNTY	281.0	158.4
OWNED ACRES OPERATED AS FARM	200.7	116.9
OWNED ACRES RENTED TO NON-FAMILY	39.5	16.4
OWNED ACRES RENTED TO FAMILY	20.0	.6
ADDITIONAL CULPEPER COUNTY ACRES RENTED-IN	63.7	52.5

AFD = 118

NON-AFD = 130

Table 6.8 describes the farm enterprises for both groups of landowners. Livestock operations appear to dominate for both groups, with 68 percent of the AFDA participants and 78 percent of the AFDA non-participants in that category. Dairy enterprises are more common among AFDA participant landowners than among AFDA non-participant landowners. AFDA participant landowners reported some commercial forest operations while AFDA non-participants reported none. A number of landowners in both groups chose to describe their farm enterprise as mixed.

6.5.2.3 LOCATIONAL ATTRIBUTES

Landowners were asked to describe a number of locational attributes of their Culpeper County land. Average distance (in miles) from the town limits of Culpeper, distance from business or commercial areas, distance from highways, residential subdivisions, and recreation areas were reported for both groups of landowners, with very little difference evident. Table 6.9 summarizes these locational characteristics for AFDA participants and AFDA non-participants.

Landowners were also requested to describe the community within which their land lies. AFDA participant and AFDA non-participant land was primarily described as being part

TABLE 6.7

FARM ENTERPRISE TYPE: CULPEPER COUNTY LANDOWNERS

TYPE OF FARM ENTERPRISE	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
DAIRY	14	9	11.8	6.9
CASH CROPS	8	11	6.7	8.4
LIVESTOCK	65	78	55.0	60.0
POULTRY	0	0	0	0
SPECIALITY CROPS	0	0	0	0
FOREST FOR COMMERCIAL HARVEST	6	0	5.0	0
MIXED	13	9	11.1	6.9
OTHER	12	18	10.1	13.8

AFD = 118

NON-AFD = 130

of a rural area with a population of less than 100 per square mile. Table E.23 indicates that 75 and 76 percent of the responses were in this category. Slightly more AFDA participants than AFDA non-participants described their community as a town with a population of 3,000 to 7,000 persons.

6.5.2.4 FARM BUSINESS CHARACTERISTICS

Farm business characteristics of land owned in Culpeper County were elicited from landowners in a series of questions concerning farm business organization, farm title, gross receipts from sales of farm products, and net farm business income. Table E.24 indicates that sole proprietorship is the leading form of organization for both groups, with 72 percent of AFDA participants and 87 percent of AFDA non-participants organized this way. AFDA participant landowners show slightly more diversity in the range of organizations reported than AFDA non-participants.

The two groups were similarly matched with regard to how their farm business was titled (Table E.25). Over half the landowners in both groups (51 percent of the AFDA participants and 60 percent of the AFDA non-participants) indicated that their land was titled as sole ownership (indivi-

TABLE 6.8

LOCATIONAL CHARACTERISTICS: CULPEPER COUNTY LAND

FARMSTEAD LOCATIONAL CHARACTERISTICS	AVERAGE DISTANCE (MILES)	
	AFD	NON-AFD
DISTANCE FROM:		
CULPEPER TOWN LIMITS	8.0	8.4
BUSINESS OR COMMERCIAL AREA	6.7	6.6
FEDERAL HIGHWAY	15.5	14.0
STATE HIGHWAY	2.5	2.7
RESIDENTIAL SUBDIVISION (MORE THAN 10 HOUSES)	3.8	4.7
RECREATION AREA	9.5	8.5

AFD = 118

NON-AFD = 130

dually held). The next highest category for both groups was joint tenancy with right of survivor. Corporations and partnerships were reported more frequently by AFDA participants.

Gross receipts from sales of farm products are reported in Table E.26. Sales of less than \$20,000 were reported by 62 percent of the AFDA participants and 75 percent of the AFDA non-participants. AFDA non-participants reported few instances of sales greater than \$200,000, while nine percent of the AFDA participants indicated that their gross farm sales were greater than \$400,000.

Table E.27 summarizes the landowners' net farm business income before taxes. Thirty-one percent of the AFDA non-participants indicated that their net farm business income was less than \$5,000, compared with only 14 percent of the AFDA participants. Ninety percent of the AFDA non-participants generated a net farm business income of below \$15,000, and none greater than \$30,000. In contrast, 78 percent of the AFDA participants reported net farm business incomes of below \$15,000. Net farm business incomes for this group ranged upward to greater than \$50,000.

6.5.2.5 FUTURE FARM PLANS

Culpeper County landowners were asked in the surveys to share information about their plans for continued operation of their farm by family, their investment plans, and plans to sell or offers they have had to buy their land. Plans for their agricultural land over the next 10 years are summarized for both groups of landowners in Table E.28. Sixty percent of the AFDA participants indicated that they plan to continue operating their present farmland at their current acreage and level of intensity. This compares with 57 percent of the AFDA non-participants who have the same plan.

Ten percent of the AFDA participants and 11 percent of the AFDA non-participants reported that they plan to increase the acreage or level of intensity of their present farming operation. Only four percent of the AFDA participants and three percent of the AFDA non-participants indicated plans to decrease acreage or level of farming intensity. Plans to reduce time devoted to the farm but to have a family member continue to farm it were reported by six percent of the AFDA participants and eight percent of the AFDA non-participants. A similar response rate was given by both groups concerning plans to discontinue operating the

farm in ten years. Seventeen percent of the AFDA participants indicated that they plan to discontinue operating the farm, as did 17 percent of the AFDA non-participants.

When asked about their plans for their children (or grandchildren) to continue farming their land, 44 percent of the AFDA participants responded that they plan for their children or grandchildren to continue operating their farm (Table E.29). Thirty-five percent of the AFDA non-participants had similar plans. ¹⁵ Over half the landowners surveyed reported that they have no plans for their children to continue the farming operation.

If farming were to be discontinued during the next year, 40 percent of the AFDA participants report that they would rent their land to a family member who would continue to farm it (Table E.30). Only 27 percent of the AFDA non-participants indicate that they would do the same. Both groups indicated that they were least interested in selling the land for development for non-farm use.

Culpeper County landowners were also asked about their plans for investments in their land over the next ten years. Table E.31 describes their responses to queries about investment in their farming operations. Fifty percent of the

¹⁵ Although landowners reported plans for their offspring to continue operating the farm, only 39 percent of the AFDA participant offspring and 28 percent of the AFDA non-participant offspring reportedly share these plans.

AFDA participants responded that they have no plans to make investments in farm improvements. Thirty-eight of the AFDA non-participants similarly had no future farm investment plans. Thirty-three percent of the AFDA participants and 39 percent of the AFDA non-participants reportedly have plans to make investments in farm improvements totaling less than \$15,000 in the next ten years. Sixteen percent of the AFDA participants plan to make investments in farm improvements greater than \$15,000, while 20 percent of the AFDA non-participants plan the same.

In addition to their plans for future investments, the landowners were also asked about real property improvements made over the last ten years (Table E.32). New fences for fields were the most frequently reported improvement for both groups of landowners. Almost half the landowners (AFDA and AFDA non-participants) indicated that they made more than one of the improvements listed in the questionnaire. Only two respondents reported making no real property improvements in the last ten years.

The landowners were questioned in the surveys about their plans to sell their land and about offers they had received to buy their land. While a nearly equal percentage of landowners from both groups reported offers to buy their land for non-agricultural use, a greater percentage of non-

participants than participants reported offers to buy their land for agricultural use (Table E.33). In addition, 17 percent of the AFDA non-participants had advertised their land for sale while only six percent of the AFDA participants had advertised their land. Thirteen percent of the AFDA non-participants had formerly sold part of their farmland for non-agricultural use, and seven percent of the AFDA had done the same. Although some landowners expressed an interest in selling land for non-agricultural use in the future, 77 percent of the AFDA participants and 70 percent of the AFDA non-participants reported no plans to sell their farmland during their lifetime.

6.5.2.6 AFDA CONSIDERATION

The Culpeper County landowners surveyed were asked a number of questions about the process leading to their decision to participate or not to participate in the Culpeper County AFDA program. Landowners were asked about familiarity with the AFDA, sources and quality of information, motives for joining or not joining an AFD, and their plans for future involvement in an AFD. Landowners were also asked to give their opinions about the same set of local land use issues that the county Supervisors responded to in their survey.

Table E.34 summarizes landowner sources of information about the Culpeper County AFD program. When asked to indicate their familiarity with the program, 36 percent of the AFDA non-participants reported that they were not familiar with the program. Thirteen percent gained knowledge of the program from the popular press, 12 percent from farm related organizations, and 15 percent from friends or neighbors. AFDA non-participants reported gaining information from public officials such as county supervisors, extension personnel, or county planning officials less frequently.

AFDA participants also relied on the popular press for information about the AFDA (16 percent), as well as family (11 percent), and farm related organizations (15 percent). Their most frequent source of information was reported to be friends or neighbors (37 percent). AFDA participants appear to have relied slightly more on public sources of information.

When asked to identify their "best" AFDA information source, 19 percent of the AFDA non-participants familiar with the program selected the popular press (Table E.35). County planning officials and farm related organizations were also identified as best information sources by 12 percent and 10 percent of the AFDA non-participants. Initial sources of information such as friends or neighbors were reported less frequently as best information sources.

Twenty-five percent of the AFDA participants reported that friends were the best source of AFDA information. Twenty-three percent indicated that meetings called by the county extension office were the best source of information, while 10 percent acknowledged the county planning officials as the best source.

Landowners were asked to identify people who were most influential in their AFDA participation decision. In both groups landowners frequently claimed little outside influence on their decision. Fifty-six percent of the AFDA non-participants and 44 percent of the AFDA participants reported that it was their personal decision made with no outside influence (Table E.36). Twenty-three percent of the AFDA participants claimed to be influenced by another farmer with land in an agricultural district.

In a related question, landowners were asked to describe their motives for participating or not participating in the AFDA program. Fifty-seven percent of the AFDA participants responded that they had joined in hopes of keeping their taxes down (Table E.37). Other motives given included keeping agriculture strong in the community (6.8 percent), protection of the farm family business (4.2 percent), and a combination of reasons including those mentioned here (22 percent).

Table E.36 gives the same information for AFDA non-participants. As mentioned earlier, 36 percent of this group indicated no familiarity with the AFDA, a certain deterrent to participation. ¹⁶ However, the most frequent response from those familiar with the program was that they they did not want their land use decisions tied up by other landowners. Another group indicated that they found the program to be too restrictive (11 percent). Nine percent reported that they prefer not to participate in government programs.

AFDA participants were questioned about their plans for future involvement in the Culpeper County AFDA program and interest in joining other local and state level AFDA associations (Table E.39). An overwhelming percentage of AFDA participants reported that they plan to continue in the AFDA program after the eight year review. Of the 17 percent of the AFDA participants who did not already have all their land in an AFD, 14 percent indicated plans to keep the same acreage enrolled. Ninety-eight percent of the AFDA participants reported that they have no plans to withdraw from the AFD before the end of the eight year review period.

¹⁶ When asked if they were now interested in obtaining information about the program, 53 percent indicated interest, but only 38 percent of these landowners reported knowing where to find this information.

Forty-seven percent of the AFDA participants responded positively to a question asking their interest in joining a community association of AFDA participants, if such an association existed. ¹⁷ Thirty-three percent also indicated interest in joining a similar state level association of AFDA participants, if such an association existed.

6.5.2.7 ATTITUDES, PERCEPTIONS, AND OPINIONS: LANDOWNERS

Using the same set of statements concerning local land use issues to which county supervisors responded, Culpeper County landowners were also asked to give their opinions in terms of agreement or disagreement. Table E.40 summarizes the responses of the AFDA non-participants. When asked about the growth of the county's non-agricultural population, 73 percent perceived that the county was experiencing rapid growth in this area. In addition, 58 percent indicated that the conversion of agricultural land is a county problem. Only 24 percent of the AFDA non-participants perceived aesthetic damage from non-agricultural development in the county. Thirteen percent felt that farmers were not paying

¹⁷ AFDA county supervisors were asked the same questions, in terms of how they thought their constituents would respond. Sixty-three percent thought that their county AFDA participants would join a local AFDA association, and 56 percent thought that their AFDA participants would join a state level association of AFDA participants.

enough in county taxes.

Seventy-six percent of the AFDA non-participants agreed that decisions concerning local environmental issues are best made locally. Slightly more, 88 percent, felt that decisions about local agricultural issues should be made locally, but 49 percent felt that these decisions should not be made by government. Finally, 93 percent of the AFDA non-participants agreed with the statement that special concessions such as lower taxes should be made for agriculture.

Table E.41 presents the responses of the AFDA participants to the same set of statements about local land use issues. Seventy percent of this group indicated that Culpeper County was experiencing a rapid rate of non-agricultural population growth. Conversion of agricultural land was perceived to be a county problem by 52 percent of the AFDA participants. Thirty-three percent indicated that aesthetic damage from non-agricultural development constitutes a problem for Culpeper County. Only eight percent of the AFDA participants agreed with the statement that farmers are not paying enough in local taxes. Seventy-five percent agreed that decisions about local environmental issues should be made locally, and 82 percent agreed that decisions about local agricultural issues should be made locally. Thirty-six percent felt that government has no place in

decisions concerning local agricultural issues, but 92 percent agreed that agriculture should be granted special concessions locally.

6.6 SUMMARY: QUALITATIVE ANALYSIS

By reviewing the results of the surveys, differences and similarities between and within groups become evident. With respect to personal attributes, AFDA county supervisors were on average better educated. While the average age of supervisors in both groups was similar, AFDA supervisors spanned a broader range of ages. Both groups were predominately male. Non-AFDA county supervisors more frequently reported a personal affiliation with agriculture in terms of employment and membership in farm related organizations than did AFDA county supervisors. Agriculture dominated as a land use for both groups.

When asked about their familiarity with alternative farmland retention policies, non-AFDA county supervisors were less familiar with the menu of options presented, and had considered fewer as local land use options. Consideration of the Virginia AFDA initially followed similar paths for the two groups of supervisors. Although both reported the importance of local landowners as initial sources of

AFDA information, outside groups also played a role at this level of consideration by AFDA county supervisors. AFDA county supervisors additionally relied on county planning officials for information about the AFDA.

AFDA and non-AFDA county supervisors differed in their assessment of influences on their final decision as well as participants in this decision. Where the AFDA was adopted, landowners and environmental or historical preservation groups were noted as most influential, and where the AFDA was not adopted, Board members identified themselves as most influential in the decision.

Motives for program adoption or rejection focused on provision of tax relief for agricultural landowners. Supervisors who voted in favor of AFDA adoption claimed to do so in order to provide farmers with tax relief. Supervisors who voted against adoption of the AFDA in their county did so because it afforded agricultural landowners an unfair tax break or because it was too restrictive for local land use problems.

Supervisors reporting their perception of their constituents' attitudes and opinions indicated for both groups a preference for minimal government intervention in dealing with local land use issues. Agricultural property taxation was perceived to be a significant issue for both groups of

constituents, but one on which they were divided. Nuisance suits were also perceived to be a matter of concern in both cases. Although neither group perceived constituent concern over non-agricultural population growth, AFDA county supervisors did feel that their constituents were concerned with the conversion of agricultural land in their county.

Supervisors' reported responses to the same set of local land use issues differed somewhat from their perceptions of their constituents' responses. AFDA county supervisors were less concerned about nuisance suits in their counties, were divided on the issue of agricultural land conversion, but did believe that aesthetic damage from non-agricultural development and non-agricultural population growth were problems.

AFDA county supervisors were divided in their assessment of the agricultural land conversion problem and did not indicate that farmers were paying too few taxes, generally supporting the idea that agriculture deserves special concessions. These supervisors differed from their constituents with respect to their attitude on government involvement in local land use issues. Non-AFDA county supervisors did not perceive nuisance-suits or aesthetic damage from non-agricultural development to be problems in their counties. They also indicated that they believe farmers are

paying a fair share in property taxes. Agricultural land conversion was not perceived to be an issue with these supervisors. The non-AFDA county supervisors more nearly mirrored their attitude of their constituents in their desire to minimize government involvement in local land use issues.

A similar recapitulation of Culpeper County landowner responses to the mail survey reveals a number of similarities and differences between AFDA and non-AFDA participants. As was the case with county supervisors, AFDA participants were generally better educated than non-participants. Few differences were evident in other areas describing personal attributes such as age, sex, and family size.

Questions regarding land use patterns revealed that on average, non-AFDA participants and their families had owned their current farmland longer than AFDA participants. AFDA participants owned more land than than non-AFDA participants, and used a greater percentage of their land in agricultural use. No significant differences in locational attributes of the land was evident between the two groups of landowners. Farm business characteristics were similar in terms of how land was titled, with AFDA participants showing slightly more diversity in organization. AFDA participants appear to manage larger farming operations in terms of gross farm sales and net farm income.

Both groups of landowners reported similar future farm plans, including plans for continued operation, and plans to sell for non-farm development. A greater number of AFDA participants than non-participants plan for their children to continue their farming operation. Investment plans also did not vary greatly between groups. Although a high percentage of both groups reported that they had no plans to sell their farmland during their lifetime, a greater number of AFDA non-participants had previously advertised and sold part of their land for non-agricultural use.

Questions about landowner consideration of the AFDA program revealed that 36 percent of the non-AFDA participants were not familiar with the AFDA program in Culpeper County. Of those familiar with the program, participant as well as non-participant landowners relied on a variety of public and private information sources. AFDA participants did however appear to rely more frequently on friends or neighbors for their information, also identifying them as the "best" source of information.

Although AFDA participants did report some influence from other farmers in agricultural districts, landowners in both groups claimed that they made their AFDA participation decision with little outside influence. AFDA participation motives as reported were based on the hope that landowners

would receive lower taxes. AFDA non-participants based their decision on the restrictiveness of the program, described in terms of constraints imposed by the AFDA policy design and a desire to not have their land use decisions tied up by other landowners.

AFDA participants appear to be satisfied with the program and plan to continue participation in their agricultural district. Almost half the AFDA participants showed some interest in joining a local AFDA association, but only a third were interested in joining a similar state level association.

Opinions, attitudes and preferences expressed by the two groups of landowners were remarkably similar. Both groups expressed concern over the growth of non-agricultural population in the county, and showed similar responses to questions regarding conversion of agricultural land to non-agricultural use. AFDA participants and AFDA non-participants responded in similar fashion to questions about local government involvement in local environmental and agricultural issues. AFDA participants did respond with greater frequency to questions regarding perception of aesthetic damage resulting from non-agricultural development. AFDA non-participants reported a stronger preference for minimizing government involvement in local agricultural land use

issues. Landowners in both groups indicated with a similarly high frequency the opinion that agriculture deserves special concessions such as lower property taxes.

The surveys of Virginia County supervisors and Culpeper County landowners described in this chapter have provided qualitative information on the public and private behavioral response to the AFDA. The following chapter uses data from these surveys to more formally test hypotheses advanced in Chapter V concerning a specific behavioral response to the public and private AFDA adoption decision.

Chapter VII

MODELING BEHAVIORAL RESPONSES IN THE FARMLAND RETENTION POLICY ENVIRONMENT

7.1 INTRODUCTION

Conceptual issues identified in Chapter V contributed to the development and implementation of two mail surveys designed to collect information on the public and private behavioral response to the farmland retention policy issue, in particular, response to the Virginia Agricultural and Forestal District Act. Chapter VI reported on the development of these surveys and summarized some of the qualitative information they yielded. This chapter provides a formal empirical analysis of the public and private AFDA participation behavioral response. In the context of the pattern model, this individual behavior is analyzed in probabilistic terms to reflect the essentially unpredictable behavioral alternatives permitted by the institutional environment.

The first section describes the formulation of qualitative response models. The statistical properties of these specifications are reviewed and related to the behavioral foundations of pattern models. Specification of the county supervisor AFDA adoption model is presented in the next

section, followed by specification of the same model in statistical terms. Results of the econometric estimation of the the supervisor AFDA adoption model are then described. The parallel analysis of the landowner AFDA participation decision presents the model specification, the statistical model, and results of the empirical estimation.

7.2 LOGIT ANALYSIS OF QUALITATIVE RESPONSE MODELS

In the context of this analysis, county supervisors either vote for or against county adoption of the Agricultural and Forestal District program. Similarly, local landowners either decide to participate or not participate in the program. The choice process described in both instances suggests a dependent variable of dichotomous nature, requiring formulation of a qualitative response model.

Qualitative dependent model formulations such as logit and probit are available for empirical estimation. Recent empirical and theoretical comparisons of the logit and probit specifications made by Amemiya, and Capps and Kramer suggest no apparent superiority of either specification over the other. Based on the conclusions of the Capps and Kramer comparative study, the logit formulation was chosen for use in model specification in this study.

The logit formulation, like the probit formulation, circumvents three documented problems associated with the alternative least squares estimation of the standard linear probability model:

1. The variance of the disturbance term is heteroscedastic.
2. The distribution of the disturbance term is Bernoulli rather than normal.
3. Predictions can fall outside the 0-1 interval (Capps and Cheng).

The heteroscedastic variance of the disturbance term in the linear probability specification results in efficiency losses among parameter estimates (Goldberger). The non-normal distribution of the error term suggests that classical tests of significance are inappropriate, including the testing of hypotheses which requires a normal distribution of the error term (Pindyck and Rubinfeld). The fact that the linear probability model specification allows predictions to fall outside of the 0-1 interval creates an inconsistency with interpretations of such predictions as probabilities.

Use of the logit or probit formulation permits specification of the dependent variable in dichotomous form. This formulation involves a monotonic transformation of the original model in order to guarantee that predictions lie in

the unit interval. In addition, the use of a maximum likelihood estimation procedure legitimizes the use of conventional tests of significance, and hence legitimizes hypothesis testing. (Capps and Cheng). Qualitative dependent model formulations such as the logit specification allow generation of measures in changes in probabilities. The appeal of this model specification increases due to this probabilistic output which is representative of a probabilistic world. Finally, this dichotomous dependent variable specification constitutes a behavioral model consistent with the behavioral foundation of the pattern model developed here. ¹⁸

Probabilities obtained from the logit specification are generated using a cumulative logistic probability function which can be specified as:

$$(1) P_i = F(X'\beta) = F(Z_i) = 1 / (1 + e^{-Z_i})$$

where P_i represents the probability that an individual will make a certain choice, given knowledge of X , X being a vector of independent variables influencing decision makers, F the cumulative logistic probability function, and e is the base of natural logs (approximately 2.718). In the logit

¹⁸ In addition to favorable statistical properties discussed above, Amemiya has also noted that specification of the dependent variable in 0-1 terms is especially useful in the analysis of survey data is often collected in terms of dichotomous responses.

specification, Z is the underlying, unmeasured scale index (Pindyck and Rubinfeld). Capps and Cheng (p.13) suggest use of the following "particularly readable presentation" of the logit specification found in Amemiya, and Pindyck and Rubinfeld:

$$(2) \quad P_i = F(z_i) = e^{Z_i} / (1 + e^{Z_i}),$$

where

$$-\infty < Z_i < \infty,$$

and

$$Z_i = X'_i \beta$$

where, in this instance, P_i represents the probability that the i^{th} individual votes for, or participates in, the Virginia AFD program.

7.3 SPECIFICATION OF THE SUPERVISOR AFDA ADOPTION MODEL

Chapter V suggested and substantiated a number of factors hypothesized to influence the voluntary public AFDA participation decision made by Virginia county supervisors. Specification of the econometric adoption model in this chapter is based on these hypotheses. The following sections therefore identify and briefly review factors hypothesized to influence the public level AFDA participation decision, and

specify the hypothesized direction of this influence on the behavioral model. Included in this specification are economic considerations, personal attributes of county supervisors, their attitudes toward a number of land use issues, their perception of their constituents' attitudes toward these same issues, and the adoption process.

7.3.1 ECONOMIC FACTORS

The apparent widespread confusion over the exact relationship between the AFDA and use value taxation suggests that supervisors will be influenced in favor of participation in the AFDA if they perceive unfairly high tax burdens for agricultural landowners, as well as perceiving that their constituents believe agricultural landowners to be unfairly taxed. In addition, a belief on the part of supervisors that agriculture deserves special treatment, and a similar belief that their constituents share this philosophy is hypothesized to positively influence the supervisors' AFDA participation decision.

7.3.2 PERSONAL ATTRIBUTES: COUNTY SUPERVISORS

Personal attributes described in Chapter V, including age, education, and a personal affiliation with agriculture, are hypothesized to influence supervisors' AFDA adoption decision. While age and education are hypothesized to be influential in the AFDA decision process, conceptual ambiguities discussed in Chapter V prevent a priori specification of the direction of this influence. The personal affiliation with agriculture is hypothesized to positively influence the supervisors' AFDA adoption decision.

7.3.3 ATTITUDINAL FACTORS

The hypothesized influence of the attitudes and beliefs of supervisors toward a number of land use issues, as well as their perception of their constituents' attitudes on similar issues were discussed in Chapter V. Based on this discussion, supervisors who believe that local government should be involved in local land use issues are hypothesized to vote in favor of the AFDA as a local land use option. Similarly, supervisors with the attitude that government should be involved in local environmental issues are hypothesized to vote in favor of adopting the AFDA in their county. In

addition, it was hypothesized that supervisors who perceived their constituents to share similar beliefs about environmental protection would favor adoption of the AFDA. Finally, supervisors who believe that agriculture merits special treatment in their county are hypothesized to vote in favor of AFDA adoption. Supervisors who believe their constituents share this attitude of special treatment for agriculture are hypothesized to vote in favor of adopting the AFDA.

7.3.4 THE ADOPTION PROCESS

Of the stages of adoption described in Chapter V, (awareness, evaluation, trial and adoption) which characterize the adoption process, the stages of awareness and evaluation are included in the specification of the behavioral model of public level AFDA adoption. Awareness, or perception of a need for change or belief that constituents feel a need for change are hypothesized to influence supervisors' decisions to adopt the AFDA. The perception that conversion of agricultural land to non-agricultural uses is a problem in their county is hypothesized to positively influence supervisors' AFDA adoption decision. A belief that their constituents also perceive a problem with agricultural land conversion is hypothesized to positively influence the AFDA adoption vote.

Perception of a need for change due to limitations on normal farming practices is hypothesized to positively influence supervisors to vote for the AFDA in their county. A belief that their constituents perceive the same problem is also hypothesized to influence the AFDA adoption vote positively.

Evaluation of the AFDA is influenced by sources of information about the policy. It is hypothesized that information gained from expert sources of information such as planning officials will positively influence supervisors' AFDA adoption decisions. It is hypothesized that initiation of AFDA consideration by special interest groups such as the Farm Bureau or the Piedmont Environmental Council will positively influence supervisors to vote in favor of the AFDA in their county. Similarly, if public meetings were held by special interest groups in order to discuss the AFDA, then supervisors are hypothesized to vote in favor of AFDA adoption.

7.4 THE STATISTICAL MODEL: COUNTY SUPERVISORS

The statistical model used in this study to analyze the county supervisor AFDA adoption decision is given by:

$$\begin{aligned}
 (3) \quad \text{ADOPT} &= \alpha_0 + \alpha_1 \text{INITIATE} + \alpha_2 \text{INFLUENCE} + \alpha_3 \text{AFDINFO} \\
 &+ \alpha_4 \text{MEETING} + \alpha_5 \text{ACTIVE} + \alpha_6 \text{AGGIE} + \alpha_7 \text{ACRES} + \alpha_8 \text{EDUC} \\
 &+ \alpha_9 \text{AGE} + \alpha_{10} \text{BUREAU} + \alpha_{11} \text{CONVERT} + \alpha_{12} \text{CONVERT2}
 \end{aligned}$$

$$\begin{aligned}
& + \alpha_{13}\text{NUISANCE} + \alpha_{14}\text{NUISANCE2} + \alpha_{15}\text{SPECIAL} + \alpha_{16}\text{SPECIAL2} \\
& + \alpha_{17}\text{USEVALUE} + \alpha_{18}\text{NOGOVT} + \alpha_{19}\text{NOGOVT2} + \alpha_{20}\text{UNFAIR} \\
& + \alpha_{21}\text{UNFAIR2} + \alpha_{22}\text{LOCALENV} + \alpha_{23}\text{LOCALENV2} + \alpha_{24}\text{LOCALAG} \\
& + \alpha_{25}\text{LOCALAG2} + \varepsilon
\end{aligned}$$

Table 7.1 describes the variables included in the supervisor model used to estimate empirically the conceptual hypotheses presented earlier. ADOPT, the 0-1 dependent variable, represents the dichotomous choice of AFDA program adoption made by county supervisors. INFLUENCE, AFDINFO, ACTIVE, USEVALUE, and MEETING refer to aspects of the adoption process and the supervisors' role in that process. AGGIE, ACRES, EDUC, AGE and BUREAU are variables which describe personal attributes of county supervisors. A number of attitudinal measures are included in the model, both of supervisors and of their perceptions of their constituents' attitudes toward agricultural land conversion issues (CONVERT, CONVERT2, NUISANCE, NUISANCE2, SPECIAL, SPECIAL2).

Additional attitudinal measures (NOGOVT, NOGOVT2, UNFAIR, UNFAIR2, LOCALAG, LOCALAG2) are specified to determine the effect of preferences for varying levels of government involvement in local land use issues on the AFD adoption decision. Variables which represent supervisors' attitudes and supervisors' perceptions of constituents'

TABLE 7.1

VARIABLE DEFINITIONS: SUPERVISOR MODEL

VARIABLE NAME	DESCRIPTION
INITIATE	1 IF ISSUE INITIATED BY SPECIAL INTEREST; 0 OTHERWISE
INFLUENCE	1 IF SUPERVISORS MOST INFLUENTIAL IN DECISION; 0 OTHERWISE
AFDINFO	1 IF PLANNERS PRIMARY INFORMATION SOURCE; 0 OTHERWISE
MEETING	1 IF PUBLIC MEETINGS HELD BY SPECIAL INTEREST; 0 OTHERWISE
ACTIVE	1 IF SUPERVISORS MOST ACTIVE IN DECISION; 0 OTHERWISE
AGGIE	1 IF SUPERVISOR EMPLOYED IN AGRICULTURE; 0 OTHERWISE
ACRES	NUMBER OF AGRICULTURAL ACRES OWNED BY SUPERVISOR
EDUC	1 IF SUPERVISOR EDUCATION MORE THAN HIGH SCHOOL; 0 OTHERWISE
AGE	1 IF SUPERVISOR AGE IS GREATER THAN 65; 0 OTHERWISE
BUREAU	1 IF SUPERVISOR IS A FARM BUREAU MEMBER; 0 OTHERWISE
CONVERT	1 IF CONSTITUENTS PERCEIVE CONVERSION AS A PROBLEM; 0 OTHERWISE
CONVERT2	1 IF SUPERVISOR PERCEIVES CONVERSION AS A PROBLEM; 0 OTHERWISE
NUISANCE	1 IF CONSTITUENTS PERCEIVE NUISANCE SUITS AS A PROBLEM; 0 OTHERWISE
NUISANCE2	1 IF SUPERVISOR PERCEIVES NUISANCE SUITS AS A PROBLEM; 0 OTHERWISE

TABLE 7.1

(CONTINUED)

VARIABLE DEFINITIONS: SUPERVISOR MODEL:

VARIABLE NAME	DESCRIPTION
SPECIAL	1 IF CONSTITUENTS FAVOR PREFERENTIAL TREATMENT FOR AGRICULTURE; 0 OTHERWISE
SPECIAL2	1 IF SUPERVISOR FAVORS PREFERENTIAL TREATMENT FOR AGRICULTURE; 0 OTHERWISE
USEVALUE	1 IF USEVALUE TAXATION IN EFFECT IN COUNTY; 0 OTHERWISE
NOGOVT	1 IF CONSTITUENTS PREFER NO GOVERNMENT INVOLVEMENT; 0 OTHERWISE
NOGOVT2	1 IF SUPERVISOR PREFERS NO GOVERNMENT INVOLVEMENT; 0 OTHERWISE
UNFAIR	1 IF CONSTITUENTS FEEL AGRICULTURE UNFAIRLY TAXED; 0 OTHERWISE
UNFAIR2	1 IF SUPERVISORS FEEL AGRICULTURE UNFAIRLY TAXED; 0 OTHERWISE
LOCALENV	1 IF CONSTITUENTS WANT LOCAL ENVIRONMENTAL ISSUES DECIDED LOCALLY; 0 OTHERWISE
LOCALENV2	1 IF SUPERVISOR WANTS LOCAL ENVIRONMENTAL ISSUES DECIDED LOCALLY; 0 OTHERWISE
LOCALAG	1 IF CONSTITUENTS WANT LOCAL AGRICULTURAL ISSUES DECIDED LOCALLY; 0 OTHERWISE
LOCALAG2	1 IF SUPERVISOR WANT LOCAL AGRICULTURAL ISSUES DECIDED LOCALLY; 0 OTHERWISE

attitudes about their environment and land use issues (LOCALENV, LOCALENV2) are also included.

7.5 ESTIMATION OF THE SUPERVISOR ADOPTION MODEL

The supervisor model was estimated via a maximum likelihood technique, assuring large sample properties of consistency and normality of the parameter estimates. Given these properties, this estimation technique allows conventional tests of significance. Data for the estimation were obtained from the survey of Virginia county supervisors described earlier.

The descriptive statistics associated with the supervisor county decision model, including the means and standard deviations of the variables are presented in Table 7.2. The means of the binary variables refer to proportions of supervisors who take on the qualitative attribute (Capps and Kramer, p.53). For example, approximately 68 percent of the supervisors in the sample believe that agriculture deserves special treatment. While ten percent of the supervisors indicate that local agricultural problems are best handled locally, over 90 percent of the supervisors believe that their constituents feel that way.

The maximum likelihood estimates for the supervisor logit analysis are presented in Table 7.3. Parameter esti-

TABLE 7.2

DESCRIPTIVE STATISTICS: SUPERVISOR ADOPTION MODEL

VARIABLE	MEAN	STANDARD DEVIATION
VOTE	.66363	.47462
INITIATE	.80901	.39481
INFLUENCE	.22727	.42098
AEDINFO	.20000	.40183
MEETING	.91818	.27534
ACTIVE	.32732	.47136
AGGIE	.55454	.51733
ACRES	233.10200	511.17211
EDUC	.66363	.47462
AGE	.19090	.39481
BUREAU	.36363	.48324
CONVERT	.19090	.39481
CONVERT2	.36363	.48324
NUISANCE	.05454	.22813
NUISANCE2	.11818	.32430

N = 110

TABLE 7.2
(CONTINUED)

DESCRIPTIVE STATISTICS: SUPERVISOR ADOPTION MODEL

VARIABLE	MEAN	STANDARD DEVIATION
SPECIAL	.23636	.42679
SPECIAL2	.68181	.46790
USEVALUE	.79090	.40852
NOGOVT	.09090	.28879
NOGOVT2	.15454	.36312
UNFAIR	.20000	.40183
UNFAIR2	.20000	.40183
LOCALENV	.10909	.31318
LOCALENV2	.87272	.33480
LOCALAG	.10000	.30137
LOCALAG2	.92727	.26087

mates, changes in probabilities, and t-ratios are presented for the variables analyzed. Changes in probabilities refer to the partial derivatives of the nonlinear probability functions evaluated at their sample means, (Pindyck and Rubinfeld, p.287). The change in probability P_i with respect to a change in each attribute X_i is given as:

$$(4) \quad \partial P_i / \partial X_i = (\partial F(Z_i) / \partial Z) (\partial Z / \partial X_i)$$

Since

$$\partial F(Z_i) / \partial Z = f(Z_i) = e^{Z_i} / (1+e^{Z_i})^2$$

and

$$\partial Z / \partial X_i = \beta_i$$

then

$$(5) \quad \partial P_i / \partial X_i = (e^{Z_i} / (1+e^{Z_i})^2) \beta_i$$

where β_i is the parameter associated with X_i , and $f(Z_i)$ represents the value of the logistic density function.

In addition, summary statistics, including number of iterations and correct classification rate, are included. The correct classification rate is a goodness of fit measure suggested by Amemiya (p.1503). This measure involves the correct classification of supervisors as either adopting or rejecting the AFDA on the basis of the explanatory variable information. On the basis of a 50-50 classification scheme suggested by Amemiya, slightly more than 54 percent of the

supervisors were correctly classified with respect to their vote on the AFDA.

The maximum likelihood estimates of the supervisor logit probability model found in Table 7.3 indicate that, at a .05 significance level, seven variables appear to significantly influence the supervisors' AFDA adoption decision. These variables will be discussed in terms of the classifications suggested earlier: personal attributes, the adoption process, attitudinal factors including supervisors' and supervisors' perceptions of their constituents' attitudes, and economic considerations. These classifications are not intended to be definitive, but rather are employed to provide an analytical framework for discussion.

Maximum likelihood estimates have no direct interpretation with respect to probability of adoption other than indicating a direction of influence on probability. It is useful to turn instead to the calculated changes in probabilities. These changes in probability can be interpreted using equation (5). For example, in the case of SPECIAL2, a binary variable indicating existence of a preference for special treatment for agriculture, the probability that supervisors will vote in favor of the AFDA, *ceteris paribus*, is 21 percent higher when they embrace this attitude than when they feel otherwise.

TABLE 7.3

MAXIMUM LIKELIHOOD ESTIMATES: SUPERVISOR LOGIT MODEL

VARIABLE	ESTIMATES	CHANGE IN PROBABILITY	T-RATIOS
INTERCEPT	0.0420		0.0153
INITIATE	2.3539	.23122	2.3152 *
INFLUENCE	-0.7969	- .19866	.7486
AFDINFO	1.1693	.12950	1.6190
MEETING	-4.1814	- .23422	1.6446 *
ACTIVE	-1.9784	- .19426	2.3602 *
AGGIE	0.3684	.09170	.3880
ACRES	-0.0011	- .00002	1.7016 *
EDUC	1.0988	.27396	1.3821
AGE	2.0596	.51347	2.0089 *
BUREAU	1.9344	.48222	2.1007 *
CONVERT	-0.7937	- .19780	.8601
CONVERT2	0.6243	.15565	.7891
NUISANCE	0.7491	.18670	.5012
NUISANCE2	-0.2413	- .06011	.1848

N = 110

NUMBER OF ITERATIONS: 7

CORRECT CLASSIFICATION RATE: .54

* = STATISTICALLY SIGNIFICANT AT .05

TABLE 7.3

(CONTINUED)

MAXIMUM LIKELIHOOD ESTIMATES: SUPERVISOR LOGIT MODEL

VARIABLE	ESTIMATES	CHANGE IN PROBABILITY	T-RATIOS
SPECIAL	0.5013	.12491	.5642
SPECIAL2	4.1158	.21260	3.8400 *
USEVALUE	-0.3436	- .08561	.4341
NOGOVT	2.5200	.32828	1.2111
NOGOVT2	1.0939	.23272	1.1490
UNFAIR	0.8352	.20826	.9201
UNFAIR2	0.2724	.06799	.2683
LOCALENV	0.4529	.11290	.2914
LOCALENV2	1.0946	.02721	.9086
LOCALAG	-1.0946	- .31123	1.5065
LOCALAG2	-2.3792	- .21361	1.3731

In contrast, the change in probability for continuous variables can be interpreted in terms of unit changes similar to the interpretation of ordinary least squares results. As an example, a decrease of one acre owned will generate an insignificant decrease, .00002, in the probability of voting for adoption of the AFDA.

Factors with significant impacts on the probability of AFDA adoption fall into three categories: personal attributes of the county supervisors, attitudinal factors, and the adoption process. ACRES, AGE, and BUREAU, personal attributes of the county supervisors were found to significantly influence the adoption decision.

ACRES, the number of agricultural acres owned by the supervisor, was included as an indication of personal affiliation with agriculture, and was hypothesized to positively influence AFDA adoption. While ACRES does appear to significantly contribute to the probability of adoption, the relationship is an inverse one. This suggests that the hypothesis generated for landowners and acres owned may be appropriate for county supervisors as well.

Membership in farm related organizations such as the Farm Bureau was hypothesized, as an indication of a personal affiliation with agriculture, to positively influence the probability of adoption. The statistical results indicate

that BUREAU, the proxy for this attribute, does influence adoption as hypothesized.

The variable AGE, another personal attribute, was found to have a positive impact on the probability of AFDA adoption. No sign was originally posited for this variable due to conceptual ambiguities suggested by this and other research efforts.

Variables included in the categorization of the adoption process, INITIATE, MEETING, and ACTIVE, appear to have a substantial influence on the probability of AFDA adoption. INITIATE, the variable describing special interest group activity in initiating the AFDA as an issue for consideration is significant and positive as hypothesized. This suggests that groups such as the Farm Bureau and the Piedmont Environmental Council, with potentially different agendas for AFDA consideration, were nonetheless influential in the decision process.

MEETING and ACTIVE, both hypothesized to positively influence the probability of AFDA adoption, appear instead to have an inverse relationship with ADOPT. Meetings called by special interest groups appear to have had an opposite effect on adoption than these groups would have desired. With respect to ACTIVE, it seems that supervisors may have been responding to other active groups in the decision process rather than just the Board of Supervisors.

Attitudinal measures as specified, with one exception, have little statistical impact on the probability of AFDA adoption. The exception, SPECIAL2, is a variable indicating that supervisors' favor special treatment for agriculture. This variable, hypothesized to positively influence the probability of AFDA adoption, appears to have such an influence.

Although the other attitudinal variables do not appear to influence the probability of AFDA adoption in a statistically significant way, it is interesting to compare the signs and magnitudes of the supervisor's perceptions of their constituents' attitudes toward the local land use issues with their own. For example, while supervisors attitude that agriculture deserves special treatment is positively related to the probability of adoption, their perception of their constituents' attitude on the same issue reveals an opposite sign. Similarly, signs on the nuisance suit variables and on the agricultural land conversion variables are opposite.

Of additional interest is the comparison of the supervisors' perception of their constituents' attitudes on these issues and the attitudes reported by Culpeper County landowners. This comparison and a discussion of possible implications is presented as part of the analysis of the landowner participation model.

7.6 SPECIFICATION OF THE LANDOWNER PARTICIPATION MODEL

Adoption of the AFD program at the county level represents one dimension of institutional change. The decision on the part of landowners to voluntarily participate in the AFD program constitutes another dimension of institutional change at the local level. As is the case with county supervisors, a number of factors described earlier in Chapter V are hypothesized to influence the voluntary AFDA participation decision: economic considerations, personal and farm attributes, attitudinal factors, and the adoption process. The following sections briefly review the basis for inclusion of these factors in the landowner adoption model, and describe the hypothesized direction of their influence on landowners' private decision to participate or not participate in the AFDA.

7.6.1 ECONOMIC FACTORS

In their assessment of the costs of participating in the AFDA, it is hypothesized that landowners subjectively consider their opportunity cost incurred by limiting the opportunity of their land to be transferred to higher valued, non-agricultural uses. It is hypothesized that

landowners who have previously advertised their land for sale for non-agricultural use will be less likely to participate in the AFDA program. Similarly, landowners who have previously sold land for non-agricultural use are hypothesized to be more cognizant of the opportunity cost of participation and less likely to participate. Future plans to sell land for non-agricultural purposes are also hypothesized to negatively influence the landowner AFDA participation decision.

It is hypothesized that landowners will also subjectively consider benefits of AFDA participation, primarily in terms of continued reduced property taxes for agricultural land. Therefore, it is hypothesized that a positive relationship exists between the amount of property taxes paid and participation in the AFDA, i.e., the higher the agricultural property tax paid by landowners, the more likely the landowner is to participate in the AFDA. As a related hypothesis, it is hypothesized that landowners currently enrolled in the use value assessment program will be more likely to participate in the AFDA. As a different benefit from participation, landowners may perceive the AFDA as a form of protection from nuisance suits which may limit farming operations. Therefore, it is also hypothesized that landowners who perceive a threat from nuisance suits will be more likely to participate in the AFDA.

In addition to benefits related to use value taxation and protection from nuisance suits, it is hypothesized that landowners perceive AFDA participation as providing environmental or aesthetic benefits. It is hypothesized that landowners who perceive environmental degradation from non-agricultural development to be a problem in their county will be more likely to participate in the AFDA. Landowners who perceive aesthetic damage from non-agricultural development are similarly hypothesized to be more likely participants in the AFDA program.

7.6.2 PERSONAL ATTRIBUTES: LANDOWNERS

In addition to perceptions of economic benefits and costs hypothesized to influence individual participation in the Virginia AFDA, Chapter V identified a number of personal and farm business characteristics that are hypothesized to influence the AFDA participation decision. Age, education, family composition, and years spent as the owner/operator of their farmland are factors identified as influential factors in the decision to participate or not participate in the AFDA.

Previous literature on the farmland retention issue (Plaut) has hypothesized that landowner age is related to

the decision to convert agricultural land to non-agricultural uses. This hypothesis is refined in this behavioral specification in order to test its applicability for a narrower range of landowners: those 65 years and older. As post-retirement landowners, this age group is thought to value retaining present use of their land more than the income to be gained from converting the land to non-agricultural use. Therefore, it is hypothesized that landowners at the retirement age are more likely to participate in the Virginia AFDA.

Related to the landowner age hypothesis is one considers length of time the landowner has owned the land. Length of time that a landowner has owned land is hypothesized to be a positive influence on the private landowner decision to participate in the AFDA. As was discussed in Chapter V, this hypothesis is based in part on ease of access to information about the AFDA, as well as on the assumption that newer landowners will be less informed about developmental threats to their rural environment or problems with nuisance suits. As a result, more recent landowners will perceive less of a need for the protective benefits associated with AFDA membership.

The educational level of landowners is also hypothesized to be influential in the private AFDA participation

decision. Landowners who ended their formal education before graduating from high school are hypothesized to be more likely to participate in the AFDA than those with more formal education. Landowners with less education are hypothesized to respond, with limited or incorrect information, to participation in the AFDA as a means of assuring lower property taxes.

The hypothesis that family composition, especially the presence or absence of children, influences the decision to convert land to non-agricultural use is refined in this specification to more explicitly account for plans for an intergenerational transfer. A plan on the part of existing owners for children or grandchildren to continue a farming operation is hypothesized to positively influence the private AFDA participation decision. Landowners may consider membership in an agricultural district as one additional means of ensuring the continued stewardship of a farm across generations.

In addition to the personal attributes of landowners hypothesized to influence the AFDA participation decision, attributes of the land owned are also included in this behavioral specification as potentially influential factors. Numbers of acres owned, farm business income, type of farming enterprise, real property improvements, acres of idle

farmland, and form of legal ownership are attributes reviewed in Chapter V as potentially influential in the private landowner AFDA participation decision.

Farm size in terms of the number of acres owned is hypothesized to have an inverse influence on the decision to participate in the AFDA. Similarly, farm income is hypothesized to have an inverse influence on participation in the AFDA. The hypothesis that the more acres a landowner owns, the less likely that landowner will be to participate in the AFDA, and the hypothesis that the more income a landowner earns from the land, the less likely that landowner will be to participate in the AFDA, are based on the assumption of a more accurate knowledge of the benefits of AFDA participation, particularly with respect to use value taxation. In addition, it is assumed that the larger farm operations which can afford to sell some acreage without influencing the operation in a negative way will wish to maintain that flexibility.

Chapter V reviewed a number of competing hypotheses related to the influence of farm enterprise type on the conversion of agricultural land to non-agricultural uses. In these hypotheses, capital intensity and the fixity of capital in farming enterprises is recognized to differ with enterprise types. This behavioral specification tests one of

these competing hypotheses by focusing on the potential for negative externalities generated by cash grain farming operations which might require protection from nuisance suits. Therefore, for this specification, it is hypothesized that operating a cash grain farming enterprise will positively influence the probability of AFDA participation.

In addition to the type of farm enterprise, landowners also choose the intensity of the farming enterprise. Hypotheses presented in Chapter V suggested that land left idle may be incurring a high opportunity cost for its owner if non-agricultural development opportunities exist. This unfarmed land may be in the preliminary stages of transfer to non-agricultural use. It is hypothesized that the number of acres left idle will inversely influence the AFDA participation.

As a final attribute considered in the specification of the landowner AFDA participation model, the relevance of how the farmland is titled is addressed. In joining an agricultural district landowners may relinquish some rights to their land, particularly development rights. In a more general sense, for landowners with less than the minimum acreage required to establish a one owner agricultural district, membership in an agricultural district means incorporating the preferences of others into decisions

concerning the use of the land. While landowners who title their land as a partnership or have incorporated their land holdings may be familiar with this loss of independence in decision making, landowners who maintain private title to their land may consider this loss of independence too high a cost to bear relative to perceived benefits of participation. Therefore, it is hypothesized that holding title to land as sole proprietor will negatively influence the AFDA participation decision.

7.6.3 ATTITUDINAL FACTORS

The potentially influential role of the attitudes and preferences of individual landowners toward their personal involvement in public programs and toward the role and level of government involvement in addressing local agricultural or environmental issues was suggested in Chapter V. Hypotheses designed to test the relevance of these preferences for the AFDA participation decision are included in this behavioral specification. It is hypothesized that a stated personal preference for involvement in government programs will positively influence the AFDA participation decision. A preference for local solutions to local land use issues is hypothesized to positively influence the AFDA

participation decision. Similarly, a preference for local solutions to local land related environmental issues is hypothesized to positively influence the AFDA participation decision.

7.6.4 THE ADOPTION PROCESS

As was the case with the public process of policy adoption, it is expected that the adoption stages described by Nowak in Chapter V as awareness and evaluation will significantly influence the private AFDA participation decision. Landowners' perception of problem situations will motivate them to investigate and evaluate solutions for the problem. In the landowner's case, awareness may come through perception of problems related to the threat of nuisance suits or from problems arising from undesired population increases in the non-agricultural sector may positively influence the AFDA participation decision. In addition, perceptions of aesthetic or environmental damage from non-agricultural development, or a perception of pressure for unwanted conversion of agricultural land out of agricultural use, are hypothesized to positively influence the AFDA participation decision. Similarly, a perception that agricultural landowners are required to pay unfairly high property taxes is hypothesized

to positively influence the private AFDA participation decision.

As mentioned in Chapter V, the evaluation phase of adoption has been described by Nowak and others as a critical step in the decision to adopt or participate in a new policy. However, reliable means of evaluating new policies such as the Virginia AFDA may be difficult to discover for the private landowner considering participation. In this behavioral specification it is hypothesized that landowners will be influenced in their evaluation phase by the source of their information about the AFDA. In particular, it is hypothesized that landowners who receive information about the Virginia AFDA primarily from other landowners who are AFDA participants will be positively influenced to participate in the AFDA. This information source will be viewed by landowners as reliable and serves as a demonstration effect for landowners.

In summary, the sections above have reviewed a number of the factors hypothesized to influence the voluntary landowner AFDA participation decision. The next section presents a formal statistical analysis of these factors. Through this econometric analysis, the relative magnitudes of influence and direction of influence will be statistically determined within a given level of confidence.

7.7 THE STATISTICAL MODEL: LANDOWNERS

As with the supervisors' adoption decision, this qualitative choice, to participate or not to participate, can also be analyzed using the logit specification described earlier. The statistical model used to explore Culpeper County landowners' AFDA participation decision is specified as:

$$\begin{aligned}
 (6) \quad \text{PARTICIPATE} = & \beta_0 + \beta_1 \text{AFDINFO} + \beta_2 \text{CASHCROP} + \beta_3 \text{DISTANCE} \\
 & + \beta_4 \text{ADVERTIZ} + \beta_5 \text{OFFER} + \beta_6 \text{SOLD} + \beta_7 \text{SELL} + \beta_8 \text{NOIMPROV} \\
 & + \beta_9 \text{BIGIMPROV} + \beta_{10} \text{ACRES} + \beta_{11} \text{IDLE} + \beta_{12} \text{NEBINC} \\
 & + \beta_{13} \text{SOLE} + \beta_{14} \text{EDUC} + \beta_{15} \text{AGE} + \beta_{16} \text{KIDS} + \beta_{17} \text{YEARSOWN} \\
 & + \beta_{18} \text{TAXBILL} + \beta_{19} \text{USEVALUE} + \beta_{20} \text{POPGROW} + \beta_{21} \text{CONVERT} \\
 & + \beta_{22} \text{NUISANCE} + \beta_{23} \text{HIGHTAX} + \beta_{24} \text{NOGOVT} + \beta_{25} \text{LOCALENV} \\
 & + \beta_{26} \text{LOCALAG} + \beta_{27} \text{ENVIRON} + \beta_{28} \text{AESTHETIC} + \varepsilon
 \end{aligned}$$

Table 7.4 describes the variables included in the landowner model. The landowner participation model is specified with a 0-1 dependent variable, PARTICIPATE, representing the dichotomous choice of landowners. AFDINFO is a variable describing AFD program information sources. CASHCROP, IDLE, and ACRES describe the farmland size, intensity of use, and enterprise. DISTANCE is a locational variable. OFFER, SOLD, and SELL describe the landowners' previous actual offers as well as plans to sell land for non-farm use. NOIMPROV and

BIGIMPROV indicate plans for real property improvements. NEBINC and SOLE indicate the form of farm ownership and net farm business income. TAXBILL and USEVALUE represent enrollment in the use value taxation program and the tax bill paid on land.

AGE, EDUC, KIDS and YEARS OWN are included in the model as descriptions of landowner attributes and future farm ownership plans. A series of attitudinal measures (CONVERT, NUISANCE, POPGROW, and HIGHTAX) related to land use conflicts are specified in the model. LOCALAG, LOCALENV, ENVIRON, and AESTHETIC are variables referring to preferences for government involvement in land use issues, and perceptions of environmental and aesthetic damage resulting from non-agricultural land use of agricultural land.

Data for the estimation of the landowner participation model was obtained from the Survey of Culpeper County Landowners described previously. Table 7.5 presents the descriptive statistics associated with the landowner adoption model. Once again, means and standard deviations are reported for the variables, with an interpretation similar to that presented earlier. Means of the dichotomous variables refer to the proportion of landowners taking on that particular characteristic.

TABLE 7.4

VARIABLE DEFINITIONS: LANDOWNER MODEL

VARIABLE NAME	DESCRIPTION
AFDINFO	1 IF AFD INFORMATION SOURCE IS FRIEND IN AFD; 0 OTHERWISE
CASHCROP	1 IF FARM ENTERPRISE IS CASH CROP; 0 OTHERWISE
DISTANCE	DISTANCE IN MILES FROM CITY OF CULPEPER
ADVERTIZ	1 IF FARMLAND ADVERTIZED FOR NON-FARM USE; 0 OTHERWISE
OFFER	1 IF OWNER RECEIVED NON-FARM USE OFFER; 0 OTHERWISE
SOLD	1 IF OWNER SOLD ANY PART OF LAND FOR NON-FARM USE; 0 OTHERWISE
SELL	1 IF OWNER PLANS TO SELL FOR NON-FARM USE IN 10 YEARS; 0 OTHERWISE
NOIMPROV	1 IF NO PLAN FOR REAL PROPERTY IMPROVEMENTS; 0 IF OTHERWISE
BIGIMPROV	1 IF PLAN FOR REAL PROPERTY IMPROVEMENTS > \$15,000; 0 OTHERWISE
ACRES	ACRES OF OWNED FARMLAND FARMED
IDLE	ACRES OF OWNED FARMLAND LEFT IDLE
NFBINC	NET FARM BUSINESS INCOME BEFORE TAXES
SOLE	1 IF FARM TITLE IS SOLE OWNERSHIP; 0 OTHERWISE
EDUC	1 IF EDUCATION IS LESS THAN HIGH SCHOOL; 0 OTHERWISE

TABLE 7.4

(CONTINUED)

VARIABLE DEFINITIONS: LANDOWNER MODEL

VARIABLE NAME	DESCRIPTION
AGE	1 IF OWNER AGE IS > 65; 0 OTHERWISE
KIDS	1 IF KIDS PLAN TO CONTINUE FARM OPERATION; 0 OTHERWISE
YEARSOWN	NUMBER OF YEARS FARM HAS BEEN IN THE FAMILY
TAXBILL	REAL PROPERTY TAX BILL FOR FARMLAND
USEVALUE	1 IF ENROLLED IN USEVALUE TAXATION PROGRAM; 0 OTHERWISE
POPGROW	1 IF NON-AGRICULTURAL POPULATION GROWTH A PROBLEM; 0 OTHERWISE
CONVERT	1 IF CONVERSION OF FARMLAND A PROBLEM; 0 OTHERWISE
NUISANCE	1 IF NUISANCE SUITS A PROBLEM; 0 OTHERWISE
HIGHTAX	1 IF BELIEVE FARMERS PAYING UNFAIRLY HIGH TAXES; 0 OTHERWISE
NOGOVT	1 IF WANT NO GOVERNMENT INVOLVEMENT; 0 OTHERWISE
LOCALENV	1 IF WANT LOCAL ENVIRONMENTAL ISSUES DECIDED LOCALLY; 0 OTHERWISE
LOCALAG	1 IF WANT LOCAL AGRICULTURAL ISSUES DECIDED LOCALLY; 0 OTHERWISE
ENVIRON	1 IF ENVIRONMENTAL DAMAGE PERCEIVED; 0 OTHERWISE
AESTHETIC	1 IF AESTHETIC DAMAGE PERCEIVED; 0 OTHERWISE

TABLE 7.5

DESCRIPTIVE STATISTICS: LANDOWNER ADOPTION MODEL

VARIABLE	MEAN	STANDARD DEVIATION
ADOPT	.47580	.50040
CASHCROP	.07661	.26651
DISTANCE	8.22097	4.21165
ADVERTIZ	.12500	.33138
OFFER	1.22581	.41895
SOLD	1.10484	.30696
SELL	.16532	.37222
NOIMPROV	.45161	.49866
BIGIMPROV	.18145	.38617
ACRES	151.81400	233.35065
IDLE	5.04012	19.89660
NEBINC	.08870	.28489
SOLE	.79838	.40201
EDUC	.70564	.45660
AGE	.27419	.44700
KIDS	.33871	.47422

N = 248

TABLE 7.5
(CONTINUED)

DESCRIPTIVE STATISTICS: LANDOWNER ADOPTION MODEL

VARIABLE	MEAN	STANDARD DEVIATION
YEARSOWN	37.02020	37.68033
TAXBILL	1121.88000	1589.31915
USEVALUE	.77016	.44215
POPGROW	.72177	.44903
CONVERT	.55645	.49780
NUISANCE	.27419	.44700
HIGHTAX	.49193	.50094
NOGOVT	.43145	.49628
LOCALENV	.75806	.42912
LOCALAG	.85483	.35297
ENVIRON	.43548	.49682
AESTHETIC	.32661	.46992
AFDINFO	.25806	.43845
SPECIAL	.93145	.25319

7.8 ESTIMATION OF LANDOWNER PARTICIPATION MODEL

As with the supervisor model, the landowner model was estimated by means of a maximum likelihood technique which allows conventional tests of significance. The empirical results of the landowner participation model are presented in terms of the conceptual categorizations developed earlier: personal and farm attributes, economic considerations, attitudinal factors, and the adoption process. As discussed in the analysis of the supervisor adoption model, these categories are not definitive nor are they mutually exclusive.

Table 7.6 presents the maximum likelihood estimates for the landowner logit analysis. Parameter estimates, changes in probability, and t-ratios are given, as well as information on the number of iterations, and the correct classification rate. The 50-50 classification scheme discussed earlier indicates that 74 percent of the landowners were correctly classified in terms of their participation.

Variables found to significantly influence (using a .05 significance level) the probability of landowner AFDA participation can be categorized in two groups: personal and farm attributes, and the adoption process. CASHCROP, DISTANCE, NOIMPROV, ACRES and NFBINC were found to have a significant

impact on the probability of AFDA participation. CASHCROP was not a priori assigned a hypothesized sign. The analysis suggests an inverse relationship between land used for cash crops and landowner participation in the AFDA. This suggests that perhaps the land extensive characteristics of the livestock enterprises and characteristics of the capital intensive dairy operations lend themselves more to participation.

The variable measuring distance of the land from the town of Culpeper (DISTANCE), was found to significantly influence the probability of landowner participation. The estimated relationship is positive, suggesting that, as the distance from Culpeper increases, the probability of landowner participation increases. This result supports one criticism of the agricultural district approach to farmland retention: land most likely to convert to non-farm uses, that nearer the urban areas, is less likely to be enrolled in the agricultural district program (Gardner, et al.).

This has been a primary concern in the New York program, and has led to hypotheses suggesting that land near the urban areas has such a high opportunity cost for not converting that it is unreasonable to expect participation in those cases. The question remains, are landowners participating in order to "protect" their land from unwanted

TABLE 7.6

MAXIMUM LIKELIHOOD ESTIMATES: LANDOWNER LOGIT MODEL

VARIABLE	ESTIMATES	CHANGE IN PROBABILITY	T-RATIOS
INTERCEPT	-1.1847		0.8875
CASHCROP	-1.3645	- .30970	1.8975 *
DISTANCE	0.0759	.01720	1.7917 *
ADVERTIZ	-1.0214	- .23184	1.5890
OFFER	0.1365	.03097	.3156
SOLD	-0.9649	- .21292	1.5570
SELL	-0.0377	- .00856	.0731
NOIMPROV	-0.9020	- .20470	2.2172 *
BIGIMPROV	-0.3829	- .08685	.7818
ACRES	-0.0022	- .00417	1.7603 *
IDLE	0.0093	.00211	.8822
NEBINC	2.0931	.00214	2.9120 *
SOLE	-0.5909	- .13410	1.3242
EDUC	1.1172	.25366	2.6838 *
AGE	1.5870	.36021	3.6486 *

N = 248

NUMBER OF ITERATIONS: 6

CORRECT CLASSIFICATION RATE: .74

* = STATISTICALLY SIGNIFICANT AT .05

TABLE 7.6
(CONTINUED)

MAXIMUM LIKELIHOOD ESTIMATES: LANDOWNER LOGIT MODEL

VARIABLE	ESTIMATES	CHANGE IN PROBABILITY	T-RATIOS
KIDS	-0.5925	- .13440	1.5456
YEARSOWN	0.0065	.00143	1.4029
TAXBILL	0.0004	.00015	2.2612 *
USEVALUE	1.5207	.34519	3.3332 *
POPGROW	-0.2022	- .04584	.4967
CONVERT	-0.2764	- .06279	.7067
NUISANCE	0.6040	.13710	1.5411
HIGHTAX	0.4792	.10877	1.2957
NOGOVT	-0.5390	- .01250	1.5422
LOCALENV	-0.0551	- .19330	.1245
LOCALAG	-0.8519	- .15952	1.5041
ENVIRON	0.4066	.09226	1.0768
AESTHETIC	-0.0703	- .01593	.1787
AEDINFO	1.4413	.32718	3.5603 *
SPECIAL	0.0395	.00897	.0566

conversion pressures, and if so, why are landowners most in need of this "protection" less likely to participate?

ACRES, the number of owned acres of land used in agriculture, was also found to significantly influence the probability of landowner participation. It was hypothesized that owners of relatively larger acreages would be less likely to participate in the AFDA. This hypothesis was based on the proposition that owners of larger farming operations would prefer the decision making flexibility associated with non-participation, as well as be better informed regarding program benefits relative to costs.

The variable measuring net farm business income, NFBINC, also significant, displays the opposite sign as ACRES. It was hypothesized earlier that, because these variables represent two alternative measures of farm operation size, for reasons discussed above, they would demonstrate a similar negative influence on probabilities of landowner participation. This result somewhat obscures the conclusion suggested by the hypothesis discussed earlier.

In addition to the farm business attributes described above, variables describing landowners' age and education were found to influence the probability of landowner participation. The age of landowners was hypothesized to positively influence the probability of landowner participation

in the AFDA. AGE, specified to account for landowners older than 65 years, appears to be associated positively with landowner AFDA participation, suggesting that life cycle disinvestment hypotheses may be less descriptive of the decision process than the hypothesis suggested here.

Three variables describing aspects of the adoption process were found to significantly influence the probability of landowner participation in the AFDA: TAXBILL, USEVALUE, and AFDINFO. TAXBILL and USEVALUE were included in the model specification as components of the awareness phase of the adoption process, and were hypothesized to positively influence the probability of landowner participation in the AFDA. As hypothesized, these factors were significant in the model and with the expected sign.

Only one variable from the evaluation phase of the adoption process, AFDINFO, was found to significantly influence the probability of landowner participation. Apparently, as hypothesized, information about the AFDA received from a friend involved in the program will have a positive influence on the probability of participation. Peer pressure, trust of friends as a reliable source of information and frequency of contact are factors which may contribute to this influence.

In addition to the formal statistical results yielded by this behavioral model, other information generated through this analysis is worth noting as it also adds to the understanding of this behavior. For example, a comparison of the supervisors' perception of landowners' attitudes toward the local land use issues reported earlier and the landowners' reported perceptions provides some interesting results.

On the issue of perceived problems of the conversion of agricultural land to non-agricultural uses, although not significant at a .05 significance level, the direction of influence on the CONVERT variable was negative for the landowner model, and positive for the supervisors' own perception. However, in the supervisor logit analysis, the variable describing supervisors' perception of their constituents' attitudes on this issue was negative. This suggests that while a perception of conversion problems may positively influence the probability of supervisors voting for the AFDA, a perception that their constituents perceive a similar problem in their county contributes to the probability that supervisors will not adopt the AFDA.

The variables NUISANCE, NOGOVT, and LOCALENV demonstrate similar patterns. In the case of LOCALAG and SPECIAL, the direction of influence was consistent across parties.

SPECIAL2, the belief on the part of supervisors that agriculture deserves special treatment was in fact one of the strongest statistical indicators of the probability of behavior leading to institutional change.

7.9 SUMMARY

The quantitative analysis of AFDA adoption as a local land use institution was structured to account for the two distinct levels of adoption: by supervisors as a local land use option, and by individual landowners as members of an agricultural district. The conceptualization of the decision process involved in this process suggested use of econometric models of qualitative choice. The logit specification was selected as a means of analysis and data were supplied by the surveys of Virginia county supervisors and Culpeper County landowners.

A number of conceptual categories were developed to structure the development of hypotheses and for use in evaluation and interpretation of the empirical results as they contribute to the pattern model being developed. In the case of county supervisors, factors related to personal attributes of the supervisors, the adoption process, and attitudinal factors were found to significantly affect the prob-

ability of AFDA adoption by supervisors. Factors relating to personal and farm characteristics, and the adoption process were found to be significantly influential affecting the probability that Culpeper County landowners would chose to participate in the AFDA.

It should be noted that interpretation of the quantitative results is not constrained by the conceptual categories developed here. For example, variables assigned to a category of attitudes and perceptions will undoubtedly influence subjective appraisals of the benefits and costs in the economic factors category. These categories were developed to facilitate an organized, internally consistent approach to a multi-dimensional decision process, and are intended to be structurally helpful rather than conceptually limiting.

The empirical analysis of factors thought to influence the behavioral response of local land use decision makers, in this case supervisors and landowners, has added information useful in the development of a more general understanding of the behavioral response of individuals in their policy environment. In Chapter VIII insights generated by the empirical behavioral analysis presented in this chapter are linked with the qualitative analysis of the policy environment of the farmland retention issue so that a story can begin to be told about institutional change evolving from

development of and participation in a farmland retention policy.

Chapter VIII

SUMMARY AND CONCLUSIONS: IMPLICATIONS FOR LAND USE POLICY ANALYSIS IN THE SOUTHEAST

8.1 INTRODUCTION

Present and anticipated land use trends in the Southeast, including increased competition for agricultural land, provide an opportunity for policy economists to contribute to the development of a new generation of land use policies for the region. Recognizing the contribution economists can make in assisting public and private land use decision makers in defining and achieving policy goals, this analysis has focused on increasing economists' understanding of an alternative analytical approach to policy analysis.

The process of institutional change resulting from land use policy evolution has been presented in a framework which identifies and analyzes some of the factors that influence the evolution, design, implementation and adoption of regionally appropriate land use policies. The principal technique used in this institutional analysis, development of a pattern model, focused the analysis on relationships between the policy environment created by existing land use institutions and the behavior of actors in that environment.

The institutional policy environment of the farmland retention issue was identified in terms of the existing land use institutions at the national, state, and local levels. These policies were analyzed historically and descriptively in order to better understand their evolutionary history as land use legislation, identify the linkages between governmental levels of policy formation, as well as to define the relevant level of analysis with respect to public sector involvement.

Alternative and often competing definitions of the farmland retention issue were identified and discussed in the context of the alternative policy instruments that have evolved at different levels to address these issues. Focusing on state level policies for the retention of farmland, implications of the nature and relative magnitude of costs and benefits of alternative policy options were presented in terms of their probable effect on policy adoption in general and for the Southeast.

As a specific illustration of a land use policy issue which may be characteristic of land use issues in the Southeast, the Virginia Agricultural and Forestal District Act was analyzed as a component of the pattern model. The historical evolution of the AFDA, its relationship to other policies, the process of public sector and individual issue

identification, policy design, policy implementation, and factors influencing public and private participation in the Virginia AFDA were examined.

Using the AFDA policy example, the behavioral response of public and private local level land use decision makers to their institutionally determined but evolving policy environment was analyzed in a parallel pattern. Focusing on their qualitative choice problem related to policy adoption decisions, the analysis modeled and empirically tested hypotheses concerning the influence of a number of factors thought to contribute to the institutional change resulting from the policy adoption decision. Policy relevant information generated by development of these components in the pattern model are presented in the following section.

8.2 THE EMERGING PATTERN

8.2.1 POLICY EVOLUTION

Public involvement in land use policies designed to retain land in agriculture was traced in part to a more general pattern of increased government involvement in agriculture stemming from Depression era political philosophies. However, although government involvement in agriculture has

reached unprecedented levels, some agrarian traditions, e.g., local control of land use issues, still appear to have influenced public sector involvement in agricultural land use by maintaining certain functions by level of government. One result of this is that farmland retention policies are the domain of state and local level governments. Federal involvement remains primarily symbolic, which in itself may serve important political functions.

8.2.1.1 POLICY DESIGN

The historical descriptive analysis of farmland retention policies reveals an evolution in policy design that is tied to the evolving process of issue identification and changing objectives which these policies are required to meet. Consistent with characterizations of disjointed incrementalism in the policy formulation process, it is often difficult to make a direct link between the actual design of a policy, its stated intent, and the intent of those forming the policy. The issues identified as central to farmland retention reflect this as they vary by level of government. For example, as revealed through enacted farmland retention legislation, Federal interests symbolically focus on an adequate supply of farmable land to meet food and fiber

needs, while state and local governments identify a much broader range of issues that are more closely linked to local, often overlapping, interests.

Design of farmland retention policies at the state and local level consistently links new policies to existing policies, e.g., the relationship between agricultural districts and use value taxation, in a typically incremental policy formation process. This aspect of incrementalism may increase the likelihood of policy adoption or participation, but it also is a potential source of confusion as the possibly different objectives of these "linked" policies also become intertwined. This is especially apparent in the case of Virginia's AFDA, where the policy design linkages of the AFDA and use value taxation have been the single most influential factors in county level and individual participation decisions.

The practice of linking the design of a new policy such as the AFDA to an existing policy such as use value taxation can cause further obfuscation of policy issues and policy design objectives. This can be advantageous for special interest groups able to mold a multifaceted policy such as the AFDA to fit their own political agenda. Characterization of the AFDA as an environmental protection policy by historical and environmental interest groups like the Pied-

mont Environmental Council, or alternatively, characterization of the AFDA as a means of supporting farm income, as promoted by the Virginia Farm Bureau are two examples of the potential for issue interpretation along special interest agendas.

8.2.1.2 POLICY PARTICIPATION

Individual interpretation of the issue and the policy is one component of what was characterized earlier as the adoption process. This process, including phases described as awareness, evaluation, trial, and adoption, was found to significantly influence participation decisions in the private and public sectors. In the awareness and evaluation phases, information from authority figures, "experts", and personally significant sources can help shape the awareness of a problem situation such as the loss of farmland or rescission of use value taxation. This same information can then be influential in the evaluation of remedies for the problem.

As varied interpretations of the intent and design of the AFDA are communicated by different groups to their constituencies and others, motives for policy participation can potentially be influenced by interpretations that more or less reflect the original, stated intent of the policy.

For example, survey results reported earlier indicate a diversity of participation motives, both among individuals and between public and private sectors that can be traced to sources of information about the policy.

8.3 SUMMARY

The decision to implement a new land use institution designed to protect and enhance agricultural land as an economic and environmental resource is influenced by a wide range of factors, understood in varying degrees by those influential in the decision process. The policy environment within which these decisions are made is recognized as a complex one, and one in which decisions often fail to mirror objectives or directly address perceived needs. This policy process has been described earlier as an incremental movement away from problems, and it is not unique to the farmland retention policy environment.

What may be unique to this policy consideration is the interweaving of a number of related policy agendas by diverse constituencies. For example, the farmland retention issue can be accurately described for some as an issue addressing farm income support, while others may conceive of the issue in terms of environmental significance. The

involvement of special interest groups, (as well as other public and private information sources) in communicating their perceptions of the issue as addressed by the AFDA can contribute to confusion about the issue as well as the intent of the policy.

As a part of the general pattern model developed in this study, the specific analysis of the AFDA suggests that although Virginia has adopted a formal farmland retention policy that complements existing legislation, for a sample of local legislative decision makers across the state, the issue does not appear to be well defined, either for county supervisors or for what they perceive to be the needs of their constituency. The frequent association of the AFDA with the use value assessment program in Virginia is the obvious example of this.

For example, if county supervisors perceive the AFDA in limited terms as a means of ensuring continued use value assessment for agricultural landowners, and nothing more, their AFDA adoption decision may have been made with insufficient appreciation of other land use components the AFDA has to offer. If on the other hand, supervisors view the AFDA only in terms of environmental protection, their decision may similarly have been made without full knowledge of program benefits. Additionally, in these instances, depend-

ing upon the sources of information, supervisors and landowners may learn of only some program benefits associated with program participation.

This analysis has also contributed to an understanding of patterns of representative decision making in the case of local land use issues. Supervisors consistently reported that they believe a need exists for local government involvement in land use issues, including environmental issues. Preferences are consistently in favor of local rather than state or federal involvement. They also reported support for agriculture in their communities as a special sector deserving of special treatment. The quantitative behavioral analysis of supervisors' AFDA participation decision found this to be one of the most significant factors in this decision, one which appears to outweigh other more "soundly" based reasons for their behavior, i.e., local fiscal stability, balanced growth, environmental motivations, or an electoral mandate.

This perception of agriculture's right to special treatment is mirrored in the attitudes of landowners surveyed in this study. The consistent interpretation by landowners of the AFDA as insurance for reduced property taxes is related to what was frequently described by landowners as their right to reduced property taxes. This

may in some respects explain the empirical results of the behavioral models estimated earlier. Many factors hypothesized to influence the public and private AFDA participation decision for this data set did not appear to significantly influence behavior. The basis for selection of many of these factors was their relationship to unwanted or untimely conversion of agricultural land to non-agricultural use. Landowners instead appear to respond to participation in terms of ensuring a right to lower property taxes, with no strong indication that they perceive a relationship between farmland conversion and property taxes.

A number of policy instruments, including the policies reviewed in this study, now exist along with a growing time series of observations reporting relative costs and benefits of these instruments, as well as their political acceptability. The ability of land use decision makers to adopt the "right" policy for their perhaps unique situation will be constrained by their appraisal of the issue, their understanding of these policy instruments, and their ability to weigh the possible consequences of policy adoption.

It is significant therefore, that in addition to problems related to issue definition, many of the supervisors surveyed in this study were not familiar with the range of policy instruments at their disposal. While this limits the

range of policy options available for use, it also limits ability to compare policies such as the AFDA in order to better grasp its potential costs or contributions. Perhaps of more significance is the apparent lack of detailed understanding of the internal mechanisms of the AFDA. The state-wide confusion concerning the exact relationship between the AFDA and the use value assessment program, and degree of overlap between the AFDA and the state's right to farm legislation contribute to the varying perceptions of the role of the AFDA as a land use institution.

Landowners similarly showed a diversity of perceptions concerning issue definition and understanding of the intricacies of the AFDA. With this diversity of issue definition, landowner acceptance of policy proposals may be less than desired, as is the case when the program itself is either not known (over 36 percent of the landowners surveyed were not aware of the AFDA) or the workings of the program misunderstood. As a result of the consistently close association of the AFDA with reduced property taxes, landowners consistently perceived lower property taxes to be the primary benefit of participation. Consistent with what was described as a strong property rights orientation in the Southeast, landowners described perceived costs of participation in terms of loss of their right to make all decisions concerning the use of their land.

Also figuring significantly into the adoption of the new land use institution is the process of adoption. Varying perceptions and awareness of land use problems were reported by landowners and supervisors. Where supervisors more often reported concern over land use problems which might require or justify public involvement, landowners were on an individual basis less aware and less troubled with these same issues. In addition, supervisors' perceptions of their constituents' land use preferences and concerns did not necessarily match those reported by landowners in the survey.

One aspect of the institutional design of the AFDA which relates to the adoption process, the fixed term of agreement, resulted in consistent favorable response from public and private land use decision makers. Both groups viewed the terms (four to eight years) as experimental contractual arrangements. Unlike other more permanent legislation, this policy design allows and requires evaluation and renewal, facilitating public and private consideration (through the demonstration effect) of new or renewed participation. The perception that public and private land use decision makers were not "locked into a policy" was frequently cited by both groups as one of the most attractive characteristics of the policy.

As Virginians begin their review of the AFDA at a number of levels, this information should prove useful. Although an overwhelming number of the supervisors interviewed in this study indicated satisfaction with their AFDA adoption decision, both in terms of adoption and rejection, their decisions will undoubtedly be of interest given an understanding of the range of perceptions about the issue on which they voted.

Supervisors who adopted the AFDA as a local land use issue report that the land enrolled as agricultural districts is the land that they want in the districts. Information gathered here will facilitate a better assessment of that perception. At the second level of adoption, landowners with land enrolled in the AFDA appear equally satisfied with the institution. However, landowners surveyed appear to have chosen participation based on a number of factors, as well as varying perceptions of the issue at hand.

The ability of policy analysts to contribute to the process of matching the "right" policy to the "right" issue (once defined), and facilitating its adoption, will hinge on understanding the emerging pattern of local land use policy adoption. This analysis has attempted to provide a first step in that direction for Virginia's Agricultural and

Forestal District Act, and, by analogy, for land use policy design, implementation, and adoption in the Southeast.

This study has suggested that the farmland retention issue and the policies designed to address this issue are representative of more general land use concerns in the Southeast. Results of the pattern model developed in this study reporting Virginia's experience in policy design, implementation, and adoption may therefore be especially pertinent to this region as it strives to develop a new generation of land use policies.

Chapter IX concludes this research effort by returning to the initial research problem: conceptual limitations imposed by the methodological foundations of mainstream economics and their effect on the ability of policy economists to contribute policy relevant information to the policy process. The alternative analytical approach to policy analysis illustrated in this study, the institutional approach, is reviewed in the context of its potential contribution to the policy process.

Chapter IX

SUMMARY AND CONCLUSIONS: IMPLICATIONS FOR NATURAL RESOURCE POLICY ANALYSIS

9.1 INTRODUCTION

In an environment of social, political, ethical and economic change, policy economists are increasingly called upon to participate in the design of natural resource policies, interpret alternative policy effects, or predict future policy formulations. Because many of the forces influential in these policy changes extend beyond the exchange oriented scope of mainstream neoclassical economics, the analytical abilities and relevance of the methodological basis of the economics profession are increasingly challenged.

One way economists have attempted to expand the scope of neoclassical economic analysis of natural resource policies has been conceptual acknowledgement of the role of institutions in governing natural resource use and allocation. In addition to conceptual acknowledgement, economists have devised a number of ways to incorporate institutions and institutional change into mainstream analysis.

Approaches to recognizing institutions in mainstream neoclassical analysis have included specification in the

ceteris paribus assumption, inclusion as explicit endogenous components of the analysis, or omission of institutional considerations. However, it has been the central thesis of this study that economists' efforts to work "with" institutions by incorporating institutions and institutional change within the body of mainstream economic analysis will be hindered by structural incompatibilities with the evolutionary nature of institutional change, as well as epistemological differences stemming from the inherent inability of neoclassical economics to incorporate nonpredictive modes of knowledge.

Alternatives such as the institutionalist approach to the analysis of natural resource policy issues may offer economists different insights and provide economists with analytical products difficult to evaluate in terms of their neoclassical methodological background. Since policy economists trained in a mainstream neoclassical vein may lack fundamental knowledge of the methodological basis and analytical techniques of alternative approaches such as the institutional approach, their ability to select among competing approaches and to evaluate the appropriateness of applying different approaches to different policy issues is compromised.

The research objectives of this study were therefore chosen and structured to assist in the inquiry of methodological issues identified as especially relevant in the analysis of natural resource policies. By comparing and contrasting alternative methodological approaches to the analysis of natural resource policies, the first objective provided the basis for identifying differences in epistemological assumptions as well as identifying some of the implications of these assumptions as they apply to the final research product.

The second objective of this research involved illustration of an institutional approach to policy analysis. The institutional approach was chosen for illustration in order to explore its ability, relative to the mainstream approach, to provide policy analysis that accounted for the multi-disciplinary elements influencing contemporary natural resource policies, its ability to adequately address the role of institutions as basic determinants of property rights assignments, and the phenomena of institutional change in the context of public policy.

The principal procedure used in this institutional analysis involved development of a pattern model of institutional change at the local level. Use of the pattern model was suggested by the analysis of two alternative methodolo-

gical perspectives, mainstream neoclassical economics, and institutional economics, presented in Chapter II. The fundamentally different epistemological perspectives on the symmetry thesis focused the comparison of the two approaches, along with their treatment of institutions in an economic framework.

Special attention was directed to the generally less familiar methods associated with the institutional approach, in particular the analytical use of pattern models. The epistemological underpinning of the pattern model, understanding as explanation, was developed with special emphasis on pattern model subjectivity and validation. Following this exposition, the issue of methodological monism was discussed in the context of the policy analyst who sees value in and use for more than one analytical perspective.

The following section reviews in some detail the development of the pattern model used in understanding the design, participation in, and evolution of land use policies developed to protect farmland. Following that, a subjective appraisal designed to highlight analytical trade-offs made in the course of using this approach is offered. The relationship of this institutional analytical product to more traditional mainstream analyses of similar issues is discussed, with emphasis on epistemological compatibilities

and incompatibilities. The chapter concludes with a brief summary of the contributions of this study, and suggestions for future research directions.

9.2 THE NUTS AND BOLTS OF PATTERN MODELING

Institutionalist explanation is influenced by a holistic philosophical perspective which lends itself to explanation structured by linking relatively independent parts in order to form concatenated theories. In this inquiry, institutions rather than individuals form the basic unit of analysis, and behavior, viewed within a range of institutionally determined alternatives, is inherently unpredictable. With understanding rather than prediction as an objective, institutionalists have identified the pattern model as the principal method of inquiry.

Pattern models attempt to explain human behavior in the context of its institutional environment. The case study is the most common context for pattern model development. Pattern models are recognized by institutionalists as inherently subjective, structurally open models requiring a validation process different from that of neoclassical models. Focusing on the relative, tentative contribution of pattern models to understanding, institutionalists rely

primarily on contextual validation of their models. By acknowledging the open nature of pattern models, model validation becomes an iterative, ongoing process.

In addition to the relatively unfamiliar epistemological basis of institutional analysis, the process of pattern model development is generally not a familiar activity to economists trained in mainstream economics and its associated analytical techniques. The following section therefore reviews in some detail the development of the pattern model used in this study and the validation procedures associated with this example.

9.2.1 PATTERN MODEL DEVELOPMENT

In summarizing the development of the pattern model in this analysis, the following three characteristics of pattern models suggested by Dugger (1979) served as structural guidelines:

1. The unit of analysis is the institution and not the individual.
2. The psychological perspective maintained is behavioral rather than subjective.
3. The model is constructed to be descriptive instead of predictive

Reflecting these critical elements, and consistent with the previously stated goals of pattern modeling, the basic unit of analysis in this effort was a land use institution, in this case, farmland retention policies. The psychological perspective of the researcher was behavioral, as reflected in the econometric analysis of landowner and supervisor participation decisions. Finally, the pattern model was designed to yield descriptive rather than predictive kinds of information.

The pattern model was structured to facilitate different kinds of analysis of its two major components, the existing policy environment and the actors within that environment, and their interaction. The policy environment of the farmland retention issue was analyzed in a historical-descriptive framework that identified some of the forces driving the demand for policies designed to protect farmland. Legislative activities at the federal, state, and local levels were identified and reviewed in terms of policy objectives, policy design, intended participants, and potential and known costs.

Using information gained from this phase of the analysis, an in depth analysis of a representative farmland retention policy, Virginia's Agricultural and Forestal District Act, was developed as a component of the pattern

model. This analysis explored in greater detail themes emerging from the general analysis of the farmland retention issue, i.e., the role of issue identification in initial policy design, the potential for competitive and complementary relationships between new and existing land use institutions, the dynamic between public and private land use policy objectives, the role of individual subjective perceptions of the benefits and costs of involvement, and the nature of the adoption process as it motivates individual behavioral change within the range of institutionally defined alternatives.

Key actors in the AFDA policy adoption decision, local county officials and individual landowners, were identified in the course of this analysis and interviewed through a series of telephone and mail surveys. The behavioral response to the AFDA adoption decision was analyzed descriptively and empirically at two levels, adoption by county supervisors as a local land use option and participation by landowners.

The behavioral analysis was set in the context of the institutional constraints of both groups, and analyzed qualitatively and quantitatively using primary data collected through the telephone and mail surveys. Drawing on related land use studies and insights generated by the

review of the policy process and existing farmland retention policies, a number of factors were hypothesized to influence the behavior of local land use decision makers in their appraisal of the AFDA. Organizational categories were developed to assist in the analysis of these factors for both analyses.

The qualitative analysis of AFDA adoption included, in addition to the contextual material described earlier, an analysis of supervisor and landowner responses to the mail surveys. Reported in terms of frequencies and averages, this analysis descriptively summarized much of the qualitative information yielded by the surveys, and attempted to interpret this information in the institutional context developed earlier. In conjunction with this component of the qualitative analysis, a quantitative behavioral analysis was completed.

The quantitative analysis of supervisor and landowner behavior with respect to adoption of the AFDA was conceptualized as a process of qualitative choice. The conceptual categories of influential factors developed earlier served as the basis for hypotheses formulation. The discrete nature of the participation and adoption process under investigation suggested specification of a model of qualitative choice in a probabilistic framework. Actions of individuals

analyzed were considered to be inherently non-predictable as they are conceptualized to occur within a range of institutionally determined behavioral adaptations. The empirical analysis was therefore developed to yield a probabilistic, descriptive result rather than traditional predictive estimates.

The logit specification and its probabilistic empirical product were selected in light of these conceptual requirements. Rather than traditional econometric estimates which are regularly interpreted as predictive results, the product of the logit analysis is reported in terms of changes in probabilities, reflecting the nondeterministic, inherently unpredictable subject matter modeled. Additional favorable statistical properties of this specification permit hypothesis testing. ¹⁹

Interpretation of the qualitative and quantitative analyses was presented in the context of the institutional environment and in response to questions such as: Why is a particular policy chosen?, What motivates individuals to participate in a policy?, What is the process underlying policy formulation?, and What is the institutional evolution

¹⁹ Blaug would more correctly identify what has been described as hypothesis testing in this study as application of a discriminant analysis used to describe the data set rather than legitimately test hypotheses, as the entire data set was used in the hypothesis testing exercise.

of a land use policy? Results were generated for the representative policy, the Virginia AFDA, and then generalized for a broader range of land use policies in the Southeast.

In summary, using Dugger's suggestions for pattern model development as structural guidelines, the pattern model developed in this study was designed to facilitate consideration of a broad range of factors which together may contribute to a better understanding of factors influencing the design, implementation, participation, and the eventual evolution of public policies designed to protect farmland. The following section describes validation of the pattern model developed in this study.

9.2.2 PATTERN MODEL VALIDATION

Contemporary institutional economic literature (Dugger, Wilbur and Harrison) stresses that validation of the results of a pattern model require procedures quite different from those used in other traditional mainstream analytical approaches. According to this literature, validation procedures for pattern models involve contextual validation, suggesting that validation requires verification rather than accepted neoclassical falsification. For example, the pattern model developed here blends qualitative and quanti-

tative analyses which by design offer tentative, dynamic insights rather than a single, falsifiable conclusion.

Blaug (p.127) however argues,

How does one validate a particular piece of storytelling? One asks, of course, if the facts are correctly stated; if other facts are omitted; if the lower-level generalizations are subject to counter-examples; and if we can find competing stories which will fit the facts. In short, we go through a process that is identical to the one that we regularly employ to validate the hypothetico-deductive explanations of orthodox economics.

In the case of the pattern model developed in this analysis, contextual validation is ongoing an ongoing process. Experts familiar with land use policies in the Southeast in general and Virginia in particular will be exposed to the model through planned extension products, including publications, meetings, review by survey participants, and formal peer review. Another, more subjective, form of model validation occurred throughout the course of the development of the pattern model, as individual components were linked together to form the pattern. This validation procedure placed demands on the researcher to recognize, however subjectively, both good fits and inconsistencies in the evolving pattern.

The structurally open form of pattern models requires this sort of ongoing validation, as the model never actually reaches a definitive closure which can be definitively validated. Conclusions regarding the success of this modeling effort in turn become part of the evolving model, in turn subject to contextual evaluation. While not substantially different from the validation process used in a more traditional mainstream analysis which is itself based on an open modeling process, pattern model validation explicitly internalizes validation as a component of the iterative, ongoing modeling activity.

9.3 A SUBJECTIVE EVALUATION

In summary, this research has attempted to explore methodological issues in the practice of natural resource policy analysis which create analytical problems for the policy analyst who seeks to contribute a relevant product to the policy process. Much of the discussion has been devoted to comparing and contrasting what were identified as alternative methodological approaches to the economic analysis of natural resource policies, and their associated methods. The general problem of developing land use policies in the Southeast, and more specifically, in Virginia served as

means of illustrating the development of a pattern model, the primary analytical framework in a holistic, institutional analysis.

The research effort has generated an illustrative land use policy analysis of special interest to land use decision makers in the Virginia and the Southeast, as well as a more general methodological analysis of interest to natural resource policy analysts. This second contribution comes at a time when policy analysts are increasingly called upon for timely and relevant research products. ²⁰

For many of these policy analysts, suggestions of alternative methodological and analytical approaches to policy analysis may remain on a philosophical plane unless efforts are made to apply, analyze, and share the results of these often less familiar approaches. The following highly subjective critique of the analytical endeavor of pattern modeling attempted in this study is presented with this goal in mind.

For the neophyte pattern modeler, Randall's warning looms large when searching for concrete examples of research clearly identifies as institutional pattern modeling.

²⁰ Relevant research is a subjective concept, but the product is recognizable to those embroiled in the policy process.

Unfortunately, however, the details of a satisfactory holistic methodology--the "nuts and bolts" of how to do it and how to evaluate its quality when done--are not well developed.

However, the expanding literature on the methodological basis of institutional analysis provides a solid foundation for understanding the components of a pattern model, and more importantly, how these models make a holistic methodological approach operational. The recent methodological contributions of Blaug, Dugger, Fushfeld, and Wilbur and Harrison, have done much to clarify the epistemological differences between mainstream and institutional economics, and have begun to shed light on applications of institutional analysis.

However, as experienced in this application, gray areas exist which, while perhaps not unique to institutional analysis, do contribute to the uncertainty felt by a traditionally trained researcher. For example, in what is described in the institutional literature as the process of "linking validated theories" in order to form a pattern, the intellectual glue which holds the theories together becomes at best, a highly subjective compound.

This example typifies the subjective judgement calls a researcher is called upon to make from start to finish in developing a pattern model. Again, this is not unique to

institutional analysis, but is much more apparent as the approach requires the researcher to be subjective, but be more objective about that subjectivity. In this pattern model, the subjective process of variable selection, definition, and measurement for use in the empirical behavioral analyses was as subjective a process as the selection of components of the overall pattern model, but nonetheless, a more traditionally familiar subjective process.

This subjectivity is especially apparent in the validation process suggested for pattern models. Validation is to occur through a process of contextual validation subjectively structured and evaluated by the researcher. Once again, this is not unlike the validation process described earlier by Blaug used in mainstream economic validation procedures. Randall's comment that it is difficult to evaluate how well institutional analysis has been done applies equally to the open models of neoclassical economics. The use of testing (in terms of falsification procedures) may lend a false air of objectivity to the neoclassical validation process.

Application of institutional economics by development of a pattern model initially appears to have fewer guidelines than neoclassical economics, requiring greater subjectivity on the part of the researcher. Dugger has attempted

to explain the difference by suggesting that institutional economics is best viewed as an analytical approach rather than as a body of theory to be directly compared with the well-articulated neoclassical theoretical construct. As it has evolved, institutional economics draws from a number of disciplinary theoretical constructs, including neoclassical economic theory. This in turn suggests that institutional economics and neoclassical economics have some sort of linkage in application.

9.3.1 LINKING INSTITUTIONAL AND NEOCLASSICAL ANALYSIS

The focus of much of the comparative analysis in this study of institutional and mainstream economics has been on the methodological basis of these approaches. A major conclusion to be drawn from the analysis in Chapter II is that a fundamental methodological incompatibility results from differing perspectives of the symmetry thesis. With an epistemological difference of this magnitude, a direct linkage or blending of the two approaches seems unwarranted.

Differing psychological perspectives as well as different concepts of a static versus an evolving world make integration of the two approaches difficult to say the least. In addition, the intellectual goals of the two

approaches, while not at odds, nonetheless suggest a different research focus and application. Efforts on the part of mainstream economists to contribute to the identification of universal laws through an endless iteration of the falsification approach may result in less interest in contributing to understanding of relatively localized phenomena whose truth value is determined in large part by verification.

If some sort of integration can occur, it may be through the way institutional economics uses mainstream economic concepts in the course of developing a pattern model. Shabman has argued consistently that institutional economics can benefit from application of traditional neoclassical concepts such as opportunity cost, the role of incentives in directing human behavior, and the concept of marginalism. While it can be argued that neoclassical economics does not have sole intellectual property rights to these concepts, they are recognized as cornerstones of mainstream economic theory.

To the extent that there was a synthesis of approaches in this study, it was of this form. Neoclassical concepts of marginalism, the role of incentives in influencing human behavior, and the subjective appraisal of opportunity cost were implicit in much of the general analysis of land use policy improvement, as well as serving as the basis for many of the hypotheses generated in the quantitative analysis.

9.3.2 PROFESSIONAL ACCEPTANCE OF INSTITUTIONAL ANALYSIS

The applicability of pattern models to policy analysis in the area of natural resource economics can be great. In an earlier chapter, the common classical heritage of institutional and mainstream neoclassical economics was established. A driving purpose of classical economic analysis was the desire to aid decision makers in the area of political economy. Institutional economics has remained tied to this original purpose, while mainstream economics has evolved toward a different goal of discovering universal laws.

In the current policy environment, the role of the policy economist as a social scientist asked to contribute to the development of improved public policies suggests a role for the sort of analytical product characteristic of institutional economics. The type of questions typically asked in an institutional analysis can for example provide needed insight into the evolution of institutions, as well shed light on the development of the attitudes and beliefs which form the basis of preferences. This subject matter is not the unique domain of institutional economists, but the institutional approach more readily encourages its exploration.

Although a demand for this sort of analysis may already exist, and may be growing, internal professional acceptance of this alternative perspective and analytical product is far from complete. While some may point to a concern for maintaining integrity as scientists gained through adherence to a single methodological approach common to all scientific endeavors (an argument for methodological monism and an appeal for the falsificationist approach), other related barriers to the internal acceptance of institutional economics exist. Reluctance to work on a case study level of inquiry, claims of nonrigorous analytical techniques, and inability to contribute to knowledge through development of universal laws are but a few of the additional barriers institutional economics faces from within its own discipline.

9.3.3 CONTRIBUTIONS OF THIS RESEARCH

This research was designed with economists as a primary audience. The primary objective of addressing this research to economists is based on the perceived need for, and opportunity to, improve the contribution economists can make in the area of natural resource policy analysis and design. This study has contributed to this objective by presenting

an analysis and application of an alternative approach to policy analysis based on institutional economics.

Although acknowledged as a promising mode of inquiry, it is generally unfamiliar to policy economists. While other, more specific contributions relating to the illustrative analysis of a land use policy are also recognized as contributions of this study, it is the in-depth exposition of the methodological basis of institutional economics, along with the illustration of its primary means of inquiry, the pattern model, that should be recognized as the primary contribution of this study.

REFERENCES

- Amemiya, Takeshi. "Qualitative Response Models: A Survey." *Journal of Economic Literature* 19(1981):1483-1535.
- Bahl, R.W. "A Land Speculation Model: The Role of the Property Tax as a Constraint to Urban Sprawl." *Journal of Regional Science* 8(1980):199-208.
- Barrows, R. and B. Prengruber. "Transfer of Development Rights: An Analysis of a New Land Use Policy." *American Journal of Agricultural Economics* 57(1975):549-557.
- Barrows, R. and D. Yanggen. "The Wisconsin Farmland Preservation Program." *Journal of Soil and Water Conservation* 33(1978):209-213.
- Batie, S.S. "Alternative Views of Property Rights: Implications for Natural Resource Allocation." *American Journal of Agricultural Economics* 66 (1984):814-818.
- Batie, S.S., L.A. Shabman, and R.A. Kramer. "U.S. Agriculture and Natural Resource Policy: Past and Future." Paper prepared for Future of the North American Granary, St. Paul, MN. June, 1984.
- Batie, S. and J.W. Looney. "Preserving Agricultural Land: Issues and Answers." *The Agricultural Law Review* 1(1980):600-628.
- Berry, D. and G. Steiker. "An Economic Analysis of the Transfer of Development Rights." *Natural Resources Journal* 17(1977):55-80.
- Blaug, M. *The Methodology of Economics, or How Economists Explain*, Cambridge University Press, Cambridge, London, 1980.
- Boulding, K.E. "Agricultural Economics in an Evolutionary Perspective." *American Journal of Agricultural Economics*. 63(1981):788-795.
- Brewer, M. and R. Boxley. "Agricultural Land: Adequacy of Acres, Concepts and Information." *American Journal of Agricultural Economics* 63(1981):879-887.

- Brooks, J. "Black Farmers and Rural Heir Property Owners." *Understanding Public Problems and Policy*. Oak Brook, Illinois, Farm Foundation, (1983):76-83.
- Capps, O. and H. Cheng. "The Nonreporting of Household Income: Link to Demographic Attributes." SP-84-16, Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia. June 1984.
- Capps, O. and R. Kramer. "Analysis of Food Stamp Participation Using Qualitative Choice Models." *American Journal of Agricultural Economics* 67(1985):49-59.
- Carman, H.F. "California Landowners' Adoption of a Use Value Assessment Program." *Land Economics* 53(1977):275-287.
- Carmen, H.F. and J.G Polson. "Tax Shifts as a Result of Differential Assessment of Farmland: California 1968-69." *National Tax Journal* 24(1971):449-456.
- Carriker, R.R. "Federal Initiatives for Farmland Retention." in *Farmland Retention in the Southeast*, J.R. Skees, (ed.) Southern Rural Development Center Series No. 78, (1985):8-16
- Carter, C. *The Culpeper County Plan*, 1984, Culpeper County, Virginia.
- Conklin, H.E. "Some Propositions about the Preservation of Farm Land." *Journal of the Northeastern Agricultural Economics Council* 9(1980):79-80.
- Conklin, H.E. and W.R. Bryant. "Agricultural Districts: A Compromise Approach to Agricultural Preservation." *American Journal of Agricultural Economics* 56(1974):607-613.
- Conklin, H.E. and W.J. Leshner. "Farm Value Assessment as a Means for Reducing Premature and Excessive Agricultural Disinvestment in Urban Fringes." *American Journal of Agricultural Economics* 59(1977):755-759.
- Coughlin, R.E. and J.C. Keene. (eds.). *The Protection of Farmlands: A Reference Guidebook for State and Local Governments, National Agricultural Lands Study*. Washington, D.C. 1981.
- Coughlin, R.E., D.Berry and T.Plaut. "Differential Assessment as an Incentive to Open Space Preservation and

Farmland Protection." *National Tax Journal*
31(1987):165-179.

Coughlin, R.E. and T. Plaut. "Less-Than-Fee-Acquisition for the Preservation of Open Space: Does It Work?" *Journal of the American Institute of Planners* 44(1978):452-462.

Deal, D.T. "The Federal Role and Attitudes on Land Use Policy." in *Land Use Issues: Proceedings of a Conference. November, 1984*. Publication 629, Extension Division and Virginia Resources Research Center, Virginia Polytechnic Institute and State University, Blacksburg, VA. 24061.

Diderikson, R.I. and R.N. Sampson. "Important Farmlands: A National View." *Journal of Soil and Water Conservation* 31(1976):195-197.

Diemer, J.A. "Development Rights: A New Dimension in the West?" Staff Paper no.16, Department of Agricultural Economics and Agricultural Business, New Mexico State University, Sept. 1980

Diemer, J.A. "Priority Lands: Towards a Policy Oriented Land Classification System.", Staff Paper no.13, Department of Agricultural Economics and Agricultural Business, New Mexico State University, Oct. 1979.

Dillman, B. and C. Cousins. "Urban Enchroach on Prime Land: A Case Study." *International Regional Science Review*. 7(1982):675-699.

Dillman, D. *Mail and Telephone Surveys: The Total Design Method* New York, John Wiley and Sons, 1987.

Dugger, W.M. "Methodological Differences Between Neoclassical and Institutional Economics." *Journal of Economic Issues* 18(1979):899-909.

Dunford, R.D. "A Survey of the Property Tax Relief Programs for the Retention of Agricultural and Open Space Lands." *Gonzaga Law Review* 15(1980):675-699.

Elliott, J.R. "Institutionalism as an Approach to Political Economy." *Journal of Economic Issues*. 12(1978):91-113.

Field, B.C. and J.M. Conrad. "Economic Issues in Programs of Transferable Development Rights." *Land Economics* 51(1975):331-340.

- Fishel, W.A. "The Urbanization of Agricultural Lands: A Review of the National Agricultural Lands Study." *Land Economics* 58(1982):236-259.
- Fusfeld, D.R. "The Conceptual Framework of Modern Economics." *Journal of Economic Issues* 14(1980):1-51.
- Gardner, B.D. "The Economics of Agricultural Land Preservation." *American Journal of Agricultural Economics* 59(1977):1027-1036.
- Gardner, K., N. Bills, W. Leshner, K. Cobb and D. Allee. "New York's Agricultural Districts - The Preservation of Farming Rather Than the Prevention of Growth." Staff Paper no.77-16, Department of Agricultural Economics, Cornell University, 1977.
- Geisler, C.C. and O.B. Martinson. "Local Control of Land Use: Profile of a Problem." *Land Economics* 52(1976):371-381.
- Gibson, J.A. "On the Allocation of Prime Agricultural Land." *Journal of Soil and Water Conservation* 32(1977):271-275.
- Goldberger, A. *Econometric Theory*, New York, John Wiley and Sons, 1964.
- Grepps, H. A. (ed.) *Toward a New Dominion: Choices for Virginians*. Task Force Reports, Governor's Commission on Virginia's Future. Richmond, VA. December, 1894.
- Grossman, M.R. and T.G. Fischer. "Protecting the Right to Farm: Statutory Limits on Nuisance Actions Against the Farmer." *Wisconsin Law Review* 1(1983): 95-166.
- Hady, T.F. "Do State Property Tax Programs Preserve Farmlands?" Rural Development Perspectives no. 4, ERS, Economic Development Division, U.S. Department of Agriculture.
- Hady, T.F. and A. Sibold. "State Programs for the Differential Assessment of Farm and Open Space Land." Agricultural Economics Report no. 256, ERS, U.S. Department of Agriculture, 1974.
- Heady, E.O. and J.F. Timmons. "U.S. Land Needs for Meeting Food and Fiber Demands." *Journal of Soil and Water Conservation* 30(1975):15-22.

- Healy, R.G. "Forestry, Agricultural, and Urban Competition for Land in the Southeastern U.S." in *Farmland Retention in the Southeast*, J.R. Skees, (ed.), Southern Rural Development Center Series No. 78, (1985):17-21.
- Hiemstra, H. and N. Bushwick. "Summary of State Agricultural Department Farmland Protection Activities." in *Farmland Notes*, National Association of State Departments of Agriculture, Research Foundation Farmland Project, 3(1984):3.
- Hiemstra, H. and N. Bushwick. "King County Set to Buy Easements Worth \$35 Million." in *Farmland Notes*, National Association of State Departments of Agriculture, Research Foundation Farmland Project, 4(1985):3.
- Hirsch, W. "The Efficiency of Restrictive Land Use Instruments." *Land Economics* 53(1977):145-156.
- Hite J. and B. Dillman. "Protection of Agricultural Land: An Institutional Perspective." *Southern Journal of Agricultural Economics* 13(1981):43-53.
- House, V.W., K.C. Quenemon and A. Hill. "Alternative Methods of Maintaining Land in Agriculture." Bulletin No. 162, Department of Agricultural Economics, Montana State University, Bozeman, MT. 1981.
- Keene, J.C. "A Review of Governmental Policies and Techniques for Keeping Farmers Farming." *Natural Resources Journal* 119(1979):118-144.
- Knapp, J.L. and B.R. Johnson. "Use Value Taxation in Virginia." Manuscript, Tayloe Murphy Institute, University of Virginia, 1982.
- Knapp, J.L. and R.W. Watkins. "Use Value Assessment in Nelson County." Manuscript, Tayloe Murphy Institute, University of Virginia, Charlottesville, VA., n.d.
- Kohl, E. and R. Barrows. "A Preliminary Analysis of Farmers' Decision on Signing Farmland Preservation Agreements." Staff Paper no.197, Department of Agricultural Economics, University of Wisconsin, 1981.
- Lapping, M., R.J. Bevins and T. Herbers. "Differential Assessment and Other Techniques to Preserve Missouri's Farmland." *Missouri Law Review* 42(1977):369-371.

- Leshner, W.G. and D.A. Eiler. "An Assessment of Suffolk County's Farmland Preservation Program." *American Journal of Agricultural Economics* 60(1978):140-143.
- Libby, L.W. "Farmland Retention Issues: Implications for Research and Extension." in *Farmland Retention in the Southeast*, J.R. Skees, (ed.), Southern Rural Development Center Series No. 78, (1985):59-66.
- Libby, L.W. "Land Use Policy: Implications for Commercial Agriculture." *American Journal of Agricultural Economics* 56(1974):1143-1153.
- Lindblom, C. "Still Muddling, Not Yet Through." *Public Administration Review*. 39(1979):517-626.
- Luzar, E.J. and S.S. Batie. "Local and State Policies For the Retention of Farmlands." in *Farmland Retention in the Southeast*, J.R. Skees, (ed.) SRDC Series No. 78, 1985.
- Mabbs-Zeno, C.C. "Design of Programs Using Transferable Development Rights to Preserve Farmland in the Northeast." *Journal of the Northeastern Agricultural Economics Council* 10(1981):57-62.
- Mark, S. and H. Yamauchi. "Agricultural Use Value Taxation and Farmland Preservation: A Basic Inconsistency." *Annals of Regional Science* 74(1982).
- Marshall, J.P. Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, VA. 24061 Per. Comm., August, 1985.
- Marshall, J.P. "Retaining Qualifying Land in Agricultural Use: Some Policies Reviewed with Special Emphasis on the Michigan and Wisconsin Laws." in *Protecting and Preserving Rural Land Uses: Issues, Problems, Institutions*. Proceedings of a Conference, J.P. Marshall and W.R. Kerns, (eds.). MB 296, Extension Division and Virginia Water Resources Research Center, Virginia Polytechnic Institute and State University, Blacksburg, VA. 24061.
- Marshall, J.P. "Virginia Agricultural and Forestal District Act: A Summary." MB. 280, 1982. Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, VA. 24061.
- McClosky, D. "The Rhetoric of Economics." *Journal of Economic Literature*. 21(1983):481-517.

- Mulkey, D. and R. Clouser. "Agricultural Land Preservation: Understanding the Policy Issues." Paper presented at the annual meeting, Southern Agricultural Economics Association, Nashville, TN. February 1984.
- Myers, D. "The Legal Aspects of Agricultural Districting." *Agricultural Law Journal* (1980):627-676.
- Newton, D. and M. Boast. "Preservation by Contract: Public Purchase of Development Rights in Farmland." *Columbia Journal of Environmental Law* 4(1978):198.
- Nowak, P.J., G. Bultena, and E. Hoiberg. "Farmers' Reactions to Agricultural Land Retention: An Overview." in *Farm-land Retention in the Southeast*, J.R. Skees, (ed.) Southern Rural Development Center Series NO. 78, (1985):25-31.
- Perryman, M.R. "Institutionalism and Econometrics: Toward a Meaningful Synthesis." *Journal of Economic Issues*. 16(1982):563-568.
- Peterson, A. and R. McCarthy. "Farmland Preservation by Purchase of Development Rights: The Long Island Experiment." *DePaul Law Review* 26(1977).
- Petr, J.L. "Fundamentals of an Institutional Perspective on Economic Policy." *Journal of Economic Issues*. 18(1984):1-17.
- Pindyck, R.S. and D.L. Rubenfield. *Econometric Models and Economic Forecasts*, New York: McGraw-Hill, 1981.
- Plaut, T.R. "Urban Expansion and the Loss of Farmland in the U.S.: Implications for the Future." *American Journal of Agricultural Economics* 62(1980):537-542.
- Platt, R. "The Loss of Farmland: Evolution of Public Response." *Geographical Review* 67(1976)93-101.
- Popper, F.J. *The Politics of Land Use Reform*, University of Wisconsin Pres, Madison, WI., 1981.
- Randall, A. "Discussion of Property Rights and Economic Incentives in Resource and Environmental Systems." in *The Political Economy of Natural Resource and Environmental Use*, Proceedings of a Regional Symposium, Southern Natural Resource Economics Committee, Charleston, SC. SRDC Series NO. 79.

- Raup, P. "An Agricultural Critique of the National Agricultural Lands Study." *Land Economics* 58(1982):260-274.
- Raup, P. "Conservation Viewpoint: What is Prime Land?" *Journal of Soil and Water Conservation* 31(1978):180-181.
- Schaeffer, R.L., W. Mendenhall, and L. Ott. *Elementary Survey Sampling*. Duxbury Press, Massachusetts, MA. 1979.
- Schwartz, S.I. and D.E. Hansen. "Two Methods for Preserving Agricultural Land at the Urban Fringe: Use-value Assessment and Transferable Development Rights." *Southern Journal of Agricultural Economics* 3(1975):165-180.
- Shabman, L. "Discussion of The Political Economy of Natural and Environmental Resources: An Overview." in *The Political Economy of Natural Resource and Environmental Use*, Proceedings of a Regional Symposium, Southern Natural Resource Economics Committee, Charleston, SC. SRDC Series NO. 79.
- Stoll, J.R., R.F. Ziemer, F.C. White, J.C. Bergstrom, and R.S. Kao. *Differential Assessment of Agricultural Lands in the South*, Southern Rural Development Center Series NO.69, 1984.
- Strong, A.L. *Land Banking*, Johns Hopkins University Press, Baltimore, MD., 1979.
- Virginia Agricultural and Forestal Districts*, Virginia Department of Agriculture and Consumer Services, Richmond, VA. March, 1986.
- White, F.C., R.F. Ziemer and J.R. Stoll. "Southern Farmland Protection Through Taxation Programs in the 1980's." Paper Presented at the annual meeting, Southern Agricultural Economics Association, Atlanta, Ga. Feb. 1983.
- Wilbur, C.K. and R.S. Harrison. "The Methodological Basis of Institutional Economics: Pattern Model, Storeytelling, and Holism." *Journal of Economic Issues*. 12(1978):61-89.

Appendix A

TELEPHONE SURVEY OF COUNTY ADMINISTRATORS

PHONE SURVEY: COUNTY ADMINISTRATORS

County: _____
 County Administrator: _____
 Phone: _____
 Date: _____

1. Has your county ever considered the authorization of Agricultural or Forestal Districts?

Agricultural District _____
 Forestal District _____
 Don't Know _____
 If yes, when? _____

2. (If yes) Who initiated the consideration?

Local landowners _____
 County officials _____
 Others _____
 Don't Know _____

3. (If yes) Did the issue ever come to a vote by the Board of Supervisors?

Yes _____ Approved _____
 No _____ Disapproved _____
 Don't Know _____

4. (If yes) Will you please provide me with the names and mailing addresses of members of the Board of Supervisors who voted on this issue?

Yes _____
 No _____

PHONE _____
 MAIL _____

TABLE A.1

COUNTIES IDENTIFIED BY COUNTY ADMINISTRATOR TELEPHONE SURVEY

AFDA COUNTIES	NON-AFDA COUNTIES
ACCOMACK	AMELIA
ALBEMARLE	BATH
CLARKE	BOTETOURT
CULPEPER	CAMPBELL
FAIRFAX	CHARLES CITY
FAUQUIER	CHARLOTTE
FREDERICK	FLOYD
GREENE	FLUVANNA
HANOVER	GOOCHLAND
ISLE OF WIGHT	GRAYSON
KING WILLIAM	GREENVILLE
LOUDOUN	HENRICO
MONTGOMERY	JAMES CITY
NEW KENT	MADISON
PRINCE WILLIAM	NORTHUMBERLAND
RAPPAHANNOCK	NOTTOWAY
SHENANDOAH	ORANGE
WARREN	

Appendix B
SURVEY CORRESPONDENCE

DATE

NAME
ADDRESS

DEAR _____

This letter asks you to contribute information to a study being conducted by Virginia Tech about a matter both farmers and nonfarmers in Culpeper County consider important--the future of agriculture in Culpeper County. This study focuses on the Agricultural and Forestal District program currently in effect in Culpeper County and devotes special attention to attitudes toward this program and its potential effect on agriculture in your county.

You are among the specially-selected landowners in Culpeper County who are being asked to contribute information about the role of agriculture and Agricultural and Forestal Districts in your community. For the results of this study to represent the thinking of the landowners in Culpeper County, it is important that each questionnaire be completed and returned. We ask that you personally complete the questionnaire. If this is not possible, then it should be completed by the person who is making decisions about the use of your land.

You may be assured of complete confidentiality. Each questionnaire has an identification number for mailing purposes only. This is so that we may check your name off of the mailing list when your questionnaire is returned. Your name will never be placed on the questionnaire.

A summary of the research will be made available to you, Culpeper County officials, interested county residents and citizens of Virginia. You may receive a summary by writing "copy of results requested" on the back of the return envelope and printing your name and address below it. Please do not put this information on the questionnaire itself.

I would be pleased to answer any questions you might have. Please write or call. My telephone number is .
Thank you for your assistance.

Sincerely,

E. Jane Luzar
Research Associate

DATE

NAME

ADDRESS

Dear _____

This letter asks you to contribute information to a study being conducted by Virginia Tech about a matter both farmers and nonfarmers consider important--the future of agriculture in Virginia. This study focuses on the Agricultural and Forestal District program currently in effect in many of Virginia's counties and devotes special attention to attitudes toward this program and its potential effect on agriculture in your county.

You are among the specially-selected County Supervisors or former Supervisors in Virginia who are being asked to contribute information about agricultural land use and about the decisions made in your county to deal with agricultural land use conflicts. For the results of this study to represent the thinking of local land use decision makers, it is important that each questionnaire be completed and returned. We ask that you personally complete the questionnaire.

You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so that we may check your name off of the mailing list when your questionnaire is returned. Your name will never be placed on the questionnaire.

A summary of research will be made available to members of Boards of Supervisors, interested local officials and citizens of Virginia. You may receive a summary of results by writing "copy of results requested" on the back of the return envelope and printing your name and address below it. Please do not put this information on the questionnaire itself.

I would be pleased to answer any questions you might have. Please write or call. My telephone number is .

Thank you for your assistance.

Sincerely,

E. Jane Luzar
Research Associate

TEXT OF FOLLOW-UP POST CARD

DATE

About a week ago, you received a letter and a questionnaire seeking your opinion about agriculture in your community and local agricultural land use policies. If you have already completed and returned the questionnaire to us, please accept our thanks. If not, we would appreciate you doing so today as your answers are important to us. If you have lost the survey form or if it did not reach you, we will be sending you another copy in about a week. We are looking forward to hearing from you.

Sincerely,

E. Jane Luzar
Research Associate

DATE

NAME

ADDRESS

Dear _____

About three weeks ago I wrote to you asking you to contribute information to a study of agricultural land use issues being conducted by Virginia Tech. As of today, we have not received your completed questionnaire.

This study is being conducted because of the belief that citizen opinions should be taken into account in the development of agricultural land use policies in Virginia.

I am writing to you again because of the importance each questionnaire has to the study. In order for the results of this study to be truly representative, it is essential that each person in the study return their completed questionnaire.

In the event that your questionnaire has been misplaced, a replacement and a return envelope are enclosed. All responses will remain strictly confidential.

Your cooperation is appreciated.

Sincerely,

E. Jane Luzar
Research Associate

DATE

NAME

ADDRESS

Dear _____

I am writing to you about our study of agricultural land use in Virginia. We have not yet received your completed questionnaire.

The large number of questionnaires returned is very encouraging, but our ability to accurately describe decisions made about local agricultural land use issues depends on you and others who have not yet responded. Past experiences suggest that those of you who have not yet sent in your questionnaires may hold quite different opinions about agricultural land use issues than those who have.

Results from this study will be of importance to land owners, community planners and lawmakers who are considering the future of Virginia's agricultural land. The usefulness of our results depends on how accurately we are able to describe local land use decision making processes and the opinions of local decision makers like yourself toward agricultural land use issues.

It is for this reason that I am sending you a replacement questionnaire. Please complete and return it as soon as possible. If you would like a copy of the results from this study, simply put your name, address and "copy of results requested" on the back of the return envelope.

Your contribution to the success of this study will be greatly appreciated.

Sincerely,

E. Jane Luzar
Research Associate

Appendix C
VIRGINIA COUNTY SUPERVISOR SURVEY

**AGRICULTURAL LAND USE IN CHANGING TIMES: A SURVEY
OF VIRGINIA COUNTY SUPERVISORS ABOUT AGRICULTURAL
LAND USE IN THEIR COMMUNITY**

This survey is part of a study of agricultural land use in Virginia. Please answer every question. If you wish to comment on any of the questions or qualify your answers, please feel free to use the space in the margins. Your comments are especially requested.

Thank you for your help.

This study is being conducted by the Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

QUESTIONNAIRE

We would like to know more about the alternative land use programs which have been considered or adopted by the Board of Supervisors for use in all or part of your county. Use the following categories to indicate whether your county Board of Supervisors considered, adopted or implemented any of the following agricultural land use programs during your term in office. (circle all answers which apply)

C = CONSIDERED BY THE BOARD OF SUPERVISORS

A = ADOPTED BY THE BOARD OF SUPERVISORS BUT NOT IN USE

U = ADOPTED BY THE BOARD OF SUPERVISORS AND IN USE

R = ADOPTED BY BOARD OF SUPERVISORS BUT RESCINDED

NF = I AM NOT FAMILIAR WITH THE PROGRAM

(circle your answer)

- Q-1. USE VALUE TAXATION OF AGRICULTURAL LAND C A U R NF
- Q-2. AGRICULTURAL AND FORESTAL DISTRICTS C A U R NF
- Q-3. TRANSFER OF DEVELOPMENT RIGHTS C A U R NF
- Q-4. PURCHASE OF DEVELOPMENT RIGHTS OR
SCENIC EASEMENTS C A U R NF
- Q-5. EXCLUSIVE ZONING FOR AGRICULTURAL USE C A U R NF
- Q-6. OTHER (please specify) _____ C A U R NF

A number of Virginia Counties have recently authorized the establishment of Agricultural and Forestal Districts as a local land use option. In the following section, we would like to learn more about the process which led to your county's decision to allow the establishment of Agricultural and Forestal Districts.

Q-7. Who initiated your county's consideration of Agricultural and Forestal Districts? (circle the number)

1. LOCAL AGRICULTURAL LANDOWNERS
2. MEMBERS OF THE BOARD OF SUPERVISORS
3. COUNTY PLANNING OFFICIALS
4. ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
5. FARM RELATED ORGANIZATIONS (Farm Bureau, NFO, Grange, etc.)
6. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
7. VIRGINIA COOPERATIVE EXTENSION SERVICE
8. LOCAL CHURCH GROUP
9. OTHER (please specify) _____

Q-8. How did YOU personally learn about Virginia's Agricultural and Forestal District program? (circle the numbers)

1. LOCAL AGRICULTURAL LANDOWNERS
2. NEIGHBORING COUNTY'S EXPERIENCE
3. VIRGINIA TECH COOPERATIVE EXTENSION SERVICE
4. COUNTY PLANNING OFFICIALS
5. POPULAR PRESS (NEWSPAPER, MAGAZINE, etc.)
6. FARM RELATED ORGANIZATION
7. RADIO, TV
8. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
9. LOCAL CHURCH GROUP
10. LOCAL ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
11. OTHER (please specify) _____

Q-9. Which of the following was the MOST HELPFUL source of information to you personally? (circle the number)

1. LOCAL AGRICULTURAL LANDOWNERS
2. NEIGHBORING COUNTY'S EXPERIENCE
3. VIRGINIA TECH COOPERATIVE EXTENSION SERVICE
4. COUNTY PLANNING OFFICIALS
5. POPULAR PRESS (NEWSPAPER, MAGAZINE, etc.)
6. FARM RELATED ORGANIZATION
7. RADIO, TV
8. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
9. LOCAL CHURCH GROUP
10. LOCAL ENVIRONMENTAL OR HISTORICAL PRESERVATION GROUP
11. OTHER (please specify) _____

Q-10. Which of the following was the MOST INFLUENTIAL in your county's decision to adopt the use of Agricultural and Forestal Districts (circle the number)

1. LOCAL AGRICULTURAL LANDOWNERS
2. MEMBERS OF THE BOARD OF SUPERVISORS
3. COUNTY PLANNING OFFICIALS
4. LOCAL ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
5. LOCAL CHURCH GROUP
6. FARM RELATED ORGANIZATION
7. VIRGINIA TECH COOPERATIVE EXTENSION SERVICE
8. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
9. TV, RADIO
10. NEIGHBORING COUNTY
11. OTHER (please specify) _____

Q-11. Which of the following do you feel BEST describes WHY your county adopted the use of Agricultural and Forestal Districts? (circle the number)

1. PROVIDE TAX RELIEF FOR AGRICULTURAL LANDOWNERS
2. PROTECTION FOR FARMERS FROM ANTI-NUISANCE SUITS
3. PRESERVATION OF SCENIC OR OPEN SPACE
4. ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER
5. PROTECTION OF FAMILY FARM BUSINESSES
6. PLAN FOR ORDERLY COMMUNITY DEVELOPMENT
7. KEEP AGRICULTURE A PART OF THE LOCAL ECONOMY
8. DIDN'T COST MUCH TO IMPLEMENT
9. OTHER (please specify) _____

Q-12. Which of the following do you feel BEST describes why landowners in your county choose to join Agricultural and Forestal Districts (circle the number)

1. PROPERTY TAX RELIEF
2. PROTECTION FROM ANTI-NUISANCE SUITS
3. INFLUENCE OF NEIGHBORS
4. DOESN'T COST MUCH TO JOIN
5. PRESERVATION OF SCENIC OR OPEN SPACE
6. ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER
7. PROTECTION OF FAMILY FARM BUSINESSES
8. INTEREST IN ORDERLY COMMUNITY DEVELOPMENT
9. HOPE TO KEEP AGRICULTURE STRONG IN THE COMMUNITY
10. HOPE TO KEEP AGRICULTURE STRONG IN THE COUNTY
11. PREVENT THE DEVELOPMENT OF PUBLIC SERVICES (roads, waterlines, sewers) ON THEIR PROPERTY
12. OTHER (please specify) _____

Q-13. Which of the following do you feel BEST describes the PARTICIPATION in your county's decision to adopt Agricultural and Forestal Districts? (circle the number)

1. THERE WERE NO PUBLIC MEETINGS
2. PUBLIC MEETINGS CALLED BY AGRICULTURAL LANDOWNERS
3. PUBLIC MEETINGS CALLED BY LOCAL ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
4. PUBLIC MEETINGS CALLED BY PLANNING OFFICIALS
5. PUBLIC MEETINGS CALLED BY BOARD OF SUPERVISORS
6. PUBLIC MEETINGS CALLED BY LOCAL CHURCH GROUPS
7. PUBLIC MEETINGS CALLED BY FARM RELATED ORGANIZATIONS
8. PUBLIC MEETINGS CALLED BY VIRGINIA COOPERATIVE EXTENSION SERVICE
9. OTHER (please specify) _____

Q-14. Which of the following BEST describes the MOST ACTIVE PARTICIPANTS in your county's decision to adopt Agricultural and Forestal Districts? (circle the number)

1. FARM RELATED ORGANIZATIONS
2. LOCAL AGRICULTURAL LANDOWNERS
3. LOCAL ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
4. LOCAL CHURCH GROUP
5. VIRGINIA TECH COOPERATIVE EXTENSION SERVICE
6. LOCAL PLANNING OFFICIALS
7. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE OFFICIALS
8. MEMBERS OF THE BOARD OF SUPERVISORS
9. OTHER (please specify) _____

Q-15. Is membership in an Agricultural and Forestal District a requirement for landowners seeking use value assessment of agricultural land in your county? (circle the number)

1. YES
2. NO
3. UNSURE

Q-16. Which of the following BEST describes your personal vote as a member of the Board of Supervisors on whether or not to allow the establishment of Agricultural and Forestal Districts in your county? (circle the number)

1. YES, ADOPT AGRICULTURAL AND FORESTAL DISTRICTS
2. NO, DO NOT ADOPT AGRICULTURAL AND FORESTAL DISTRICTS
3. ABSTAIN

Q-17. If your answer is YES in Q-16 above, which of the following BEST describes the reason for your vote? (circle the number)

1. PROVIDE TAX RELIEF FOR AGRICULTURAL LANDOWNERS
2. PROTECTION FOR FARMERS FROM ANTI-NUISANCE SUITS
3. PRESERVATION OF SCENIC OR OPEN SPACE
4. PLAN FOR ORDERLY COMMUNITY DEVELOPMENT
5. PROTECTION OF FAMILY FARM BUSINESSES
6. ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER
7. KEEP AGRICULTURE A PART OF THE LOCAL ECONOMY
8. DIDN'T COST MUCH TO IMPLEMENT
9. COMBINATION OF REASONS LISTED ABOVE (place an asterisk (*) by the reasons)
10. OTHER (please specify) _____

Q-18. If your answer is NO in Q-16 above, which of the following BEST describes the reason for your vote? (circle the number)

1. THE AGRICULTURAL AND FORESTAL DISTRICT PROGRAM IS TOO RESTRICTIVE FOR OUR LOCAL LAND USE PROBLEMS
2. FARMLAND RETENTION IS NOT AN IMPORTANT COUNTY ISSUE
3. THE PROGRAM ALLOWS AN UNFAIR TAX BREAK TO LANDOWNERS
4. THE PROGRAM IS NOT RESTRICTIVE ENOUGH FOR OUR LOCAL LAND USE PROBLEMS
5. THE PROGRAM IS TOO COSTLY TO ADMINISTER
6. THE PROGRAM CAUSES A SIGNIFICANT LOSS OF COUNTY TAX REVENUE
7. COMBINATION OF REASONS LISTED ABOVE (place an asterisk (*) by the reasons)
8. OTHER (please specify) _____

Q-19. If you were to vote again today (with information available to you at this time) on the establishment of Agricultural and Forestal Districts in your county, would your vote change? (circle the number)

1. YES
2. NO

If your answer to Q-19 is YES, please explain in the space below.

Q-20. Do you feel that the kind of land enrolled in Agricultural and Forestal Districts is the kind of land which the Board of Supervisors originally intended to protect in your county? (circle the number)

1. YES
2. NO

Q-21. Do you think members of your county's Agricultural and Forestal Districts would join a state level association of persons who have land in an Agricultural and Forestal District if such an association existed? (circle the number)

- 1. YES
- 2. NO

PLEASE EXPLAIN YOUR ANSWER _____

Q-22. Do you think members of your county's Agricultural and Forestal Districts would join a local level association of persons who have land in an Agricultural and Forestal District if such an association existed? (circle the number)

- 1. YES
- 2. NO

PLEASE EXPLAIN YOUR ANSWER _____

We would like to know what you feel are the attitudes of your county's residents toward some common agricultural land use issues. Although not necessarily correct or incorrect, the following statements have often been expressed. Use the categories which follow to indicate which of the following statements BEST describe the OPINIONS OF YOUR COUNTY'S RESIDENTS on these issues as you understand them. (circle the answer)

- 4 = OPINION STRONGLY HELD BY MAJORITY OF COUNTY RESIDENTS
- 3 = OPINION STRONGLY HELD BY AN INFLUENTIAL MINORITY OF COUNTY RESIDENTS
- 2 = OPINION WEAKLY HELD BY A MAJORITY OF COUNTY RESIDENTS
- 1 = OPINION WEAKLY HELD BY A MINORITY OF COUNTY RESIDENTS

(circle your answer)

Q-23. My county is experiencing a rapid rate of population growth due to a growing commuter population and/or the growth of nonagricultural industries. 4 3 2 1

Q-24. The conversion of farmland for rural subdivisions and/or other developments is becoming a major problem in my county. 4 3 2 1

- Q-25. Agriculture and agricultural services (such as equipment dealers, grain elevators or farm supply stores) are a valuable part of my county's economy and should be maintained even at the expense of higher local taxes or fewer jobs. 4 3 2 1
- Q-26. Cases of farm property damage, complaints about farm equipment on roads or nuisance suits that limit normal farming operations are a problem for farmers with nonfarm neighbors in this county. 4 3 2 1
- Q-27. Cases of nuisances due to farm smells or noises are a problem for nonfarm neighbors of farmers in my county. 4 3 2 1
- Q-28. There have been problems with environmental damage in this county due to nonagricultural development. 4 3 2 1
- Q-29. There have been problems with aesthetic damage in this county due to nonagricultural development. 4 3 2 1
- Q-30. Farmers in this county are paying an unfair proportion of local real property taxes. 4 3 2 1
- Q-31. Farmers are not paying a fair proportion of local real property taxes. 4 3 2 1
- Q-32. Decisions about local environmental issues are best made locally rather than by state or federal government. 4 3 2 1
- Q-33. Decisions about local agricultural land use issues are best made locally rather than by state or federal government. 4 3 2 1
- Q-34. Growth and development in all parts of my county's economy (both the agricultural and the nonagricultural) should be promoted equally by county officials. 4 3 2 1
- Q-35. Special concessions (such as land use taxes) should be made to local farmers in order to ensure agriculture's continued existence in this county. 4 3 2 1

Q-36. Land use issues in my county should be resolved by interested parties without any local government intervention. 4 3 2 1

In addition to the opinions on agricultural land use issues held by the residents of your county, we would also like to know more about how YOU personally feel about many of the same issues. The following statements are again neither necessarily correct or incorrect. Use the following categories to indicate whether YOU personally AGREE, DISAGREE or have NO OPINION about these statements. (circle your answer)

- A = AGREE OR GENERALLY AGREE WITH THE STATEMENT
 - D = DISAGREE OR GENERALLY DISAGREE WITH THE STATEMENT
 - N = NO OPINION
- (circle your answer)

- Q-37. My county is experiencing a rapid rate of population growth due to a growing commuter population and/or the growth of nonagricultural industries. A D N
- Q-38. The conversion of farmland in this county for rural subdivisions and/or other developments is becoming a major problem. A D N
- Q-39. Agriculture and agricultural services (such as equipment dealers, grain elevators or farm supply stores) are a valuable part of this county's economy and should be maintained even at the expense of higher local taxes or fewer jobs. A D N
- Q-40. Cases of farm property damage, complaints about farm equipment on roads or nuisance suits that limit normal farming operations are a problem for farmers with nonfarm neighbors in this county. A D N
- Q-41. Cases of nuisances due to farm smells or noises are a problem for nonfarm neighbors of farmers in this county. A D N

- Q-42. There have been problems with environmental damage in this county due to nonagricultural development. A D N
- Q-43. There have been problems with aesthetic damage in this county due to nonagricultural development. A D N
- Q-44. Farmers in my county are paying an unfair proportion of local real property taxes. A D N
- Q-45. Farmers are not paying a fair proportion of local real property taxes. A D N
- Q-46. Decisions about local environmental issues are best made locally rather than than by state or federal government. A D N
- Q-47. Decisions about local agricultural land use issues are best made locally rather than by state or federal government. A D N
- Q-48. Growth and development in all parts of this county's economy (both agricultural and non-agricultural) should be promoted equally by county officials. A D N
- Q-49. Special concessions (such as land use taxes) should be made to local farmers in order to ensure agriculture's continued existence in this county. A D N
- Q-50. Land use issues in the county should be resolved by interested parties without any local government intervention. A D N

In this final section we would like to ask you some questions about yourself. Your answers will help us compare the membership of Boards of Supervisors. ALL your answers are strictly confidential.

- Q-51. The person answering this questionnaire is: (circle the number)
- 1. MALE
 - 2. FEMALE

Q-52. What is your present age?

_____ YEARS

Q-53 In which of the following local organizations are you a member?
(circle the numbers which apply)

- 1. FARM BUREAU
- 2. GRANGE
- 3. NATIONAL FARM ORGANIZATION
- 4. LION'S CLUB
- 5. CHAMBER OF COMMERCE
- 6. LOCAL CHURCH GROUP
- 7. OTHER (please specify) _____

Q-54. How often does the Board of Supervisors in your county regularly meet on official business?

(circle time period)

_____ Times A WEEK MONTH YEAR

Q-55. Are you presently on the Board of Supervisors in your county?
(circle the number)

- 1. NO
- 2. YES

Q-56. Please describe your usual occupation (if retired, describe your usual occupation before retirement).

TITLE _____

KIND OF WORK YOU DO _____

KIND OF COMPANY OR BUSINESS _____

Q-57. Which is the highest level of schooling you have completed?
(circle the number)

- 1. NO FORMAL SCHOOLING
- 2. SOME GRADE SCHOOL
- 3. COMPLETED GRADE SCHOOL
- 4. SOME HIGH SCHOOL
- 5. COMPLETED HIGH SCHOOL
- 6. SOME COLLEGE
- 7. COMPLETED COLLEGE (specify major) _____

Q-58. Please use the following categories to describe how you used the land you owned in 1983. (circle the number and indicate acres)

- 1. AGRICULTURAL _____ ACRES
- 2. FOREST _____ ACRES
- 3. IDLE (farmland not farmed in 1983)..... _____ ACRES
- 4. COMMERCIAL (business) _____ ACRES
- 5. RESIDENTIAL _____ ACRES
- 6. INDUSTRIAL _____ ACRES
- 7. OTHER (please specify) _____ _____ ACRES

Q-59. Was all or any part of the land you owned in 1983 signed-up in an Agricultural and Forestal District? (circle the number)

- 1. NO
- 2. YES ... _____ ACRES

Is there anything else you would like to tell us about agricultural land use in your county? If so, please use the space below for that purpose. Also any comments you wish to make that you think may help us in future efforts to understand what your county residents want for agriculture in their community will be appreciated, either here or in a separate letter.

Your contribution to this effort is greatly appreciated. If you would like a summary of results, please print your name and address on the back of the return envelope (NOT on this questionnaire). We will see that you get the copy of the summary you requested.

AGRICULTURAL LAND USE IN CHANGING TIMES: A SURVEY
OF VIRGINIA COUNTY SUPERVISORS ABOUT AGRICULTURAL
LAND USE IN THEIR COMMUNITY

This survey is part of a study of agricultural land use in Virginia. Please answer every question. If you wish to comment on any of the questions or qualify your answers, please feel free to use the space in the margins. Your comments are especially requested.

Thank you for your help.

This study is being conducted by the Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

QUESTIONNAIRE

We would like to know more about the alternative land use programs which have been considered or adopted by the Board of Supervisors for use in all or part of your county. Use the following categories to indicate whether your county Board of Supervisors considered, adopted or implemented any of the following agricultural land use programs during your term in office. (circle all answers which apply)

C = CONSIDERED BY THE BOARD OF SUPERVISORS

A = ADOPTED BY THE BOARD OF SUPERVISORS BUT NOT IN USE

U = ADOPTED BY THE BOARD OF SUPERVISORS AND IN USE

R = ADOPTED BY BOARD OF SUPERVISORS BUT RESCINDED

NF = I AM NOT FAMILIAR WITH THE PROGRAM

(circle your answer)

- Q-1. USE VALUE TAXATION OF AGRICULTURAL LAND C A U R NF
- Q-2. AGRICULTURAL AND FORESTAL DISTRICTS C A U R NF
- Q-3. TRANSFER OF DEVELOPMENT RIGHTS C A U R NF
- Q-4. PURCHASE OF DEVELOPMENT RIGHTS OR SCENIC EASEMENTS C A U R NF
- Q-5. EXCLUSIVE ZONING FOR AGRICULTURAL USE C A U R NF
- Q-6. OTHER (please specify) _____ C A U R NF

A number of Virginia Counties have recently authorized the establishment of Agricultural and Forestal Districts as a local land use option. In the following section, we would like to learn more about the process which led to your county's decision NOT to allow the establishment of Agricultural and Forestal Districts.

Q-7. Who initiated your county's consideration of Agricultural and Forestal Districts? (circle the number)

1. LOCAL AGRICULTURAL LANDOWNERS
2. MEMBERS OF THE BOARD OF SUPERVISORS
3. COUNTY PLANNING OFFICIALS
4. ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
5. FARM RELATED ORGANIZATIONS (Farm Bureau, NFO, Grange, etc.)
6. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
7. VIRGINIA COOPERATIVE EXTENSION SERVICE
8. LOCAL CHURCH GROUP
9. OTHER (please specify) _____

Q-8. How did YOU personally learn about Virginia's Agricultural and Forestal District program? (circle the numbers)

1. LOCAL AGRICULTURAL LANDOWNERS
2. NEIGHBORING COUNTY'S EXPERIENCE
3. VIRGINIA COOPERATIVE EXTENSION SERVICE
4. COUNTY PLANNING OFFICIALS
5. POPULAR PRESS (NEWSPAPER, MAGAZINE, etc.)
6. FARM RELATED ORGANIZATION
7. RADIO, TV
8. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
9. LOCAL CHURCH GROUP
10. LOCAL ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
11. OTHER (please specify) _____

Q-9. Which of the following was the MOST HELPFUL source of information to you personally? (circle the number)

1. LOCAL AGRICULTURAL LANDOWNERS
2. NEIGHBORING COUNTY'S EXPERIENCE
3. VIRGINIA COOPERATIVE EXTENSION SERVICE
4. COUNTY PLANNING OFFICIALS
5. POPULAR PRESS (NEWSPAPER, MAGAZINE, etc.)
6. FARM RELATED ORGANIZATION
7. RADIO, TV
8. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
9. LOCAL CHURCH GROUP
10. LOCAL ENVIRONMENTAL OR HISTORICAL PRESERVATION GROUP
11. OTHER (please specify) _____

Q-10. Which of the following was the MOST INFLUENTIAL in your county's decision not to establish Agricultural and Forestal Districts (circle the number)

1. LOCAL AGRICULTURAL LANDOWNERS
2. MEMBERS OF THE BOARD OF SUPERVISORS
3. COUNTY PLANNING OFFICIALS
4. LOCAL ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
5. LOCAL CHURCH GROUP
6. FARM RELATED ORGANIZATION
7. VIRGINIA COOPERATIVE EXTENSION SERVICE
8. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
9. TV, RADIO
10. NEIGHBORING COUNTY
11. OTHER (please specify) _____

Q-11. Which of the following do you feel BEST describes the public participation in your county's decision NOT to adopt Agricultural and Forestal Districts? (circle the number)

1. THERE WERE NO PUBLIC MEETINGS
2. PUBLIC MEETINGS CALLED BY LOCAL AGRICULTURAL LANDOWNERS
3. PUBLIC MEETINGS CALLED BY LOCAL ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
4. PUBLIC MEETINGS CALLED BY LOCAL PLANNING OFFICIALS
5. PUBLIC MEETINGS CALLED BY BOARD OF SUPERVISORS
6. PUBLIC MEETINGS CALLED BY LOCAL CHURCH GROUPS
7. PUBLIC MEETINGS CALLED BY FARM RELATED ORGANIZATIONS
8. PUBLIC MEETINGS CALLED BY VIRGINIA COOPERATIVE EXTENSION SERVICE
9. OTHER (please specify) _____

Q-12. Which of the following BEST describes the most active participants in your county's decision to NOT adopt Agricultural and Forestal Districts? (circle the number)

1. FARM RELATED ORGANIZATIONS
2. LOCAL AGRICULTURAL LANDOWNERS
3. LOCAL ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP
4. LOCAL CHURCH GROUP
5. VIRGINIA COOPERATIVE EXTENSION SERVICE
6. LOCAL PLANNING OFFICIALS
7. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)
8. MEMBERS OF THE BOARD OF SUPERVISORS
9. OTHER (please specify) _____

Q-13. Which of the following do you feel BEST describes the deliberation of the Board of Supervisors on this issue? (circle the number)

1. NOT IMPORTANT ENOUGH FOR A FORMAL BOARD VOTE
2. LACKED ENOUGH INFORMATION TO MAKE A FORMAL VOTE
3. FORMAL BOARD VOTE AFTER REVIEWING THE ISSUE
4. IN THE COUNTY'S BEST INTEREST NOT TO VOTE FORMALLY
5. OTHER (please specify) _____

Q-14. In many Virginia counties, the local Board of Supervisors considered the adoption of Agricultural and Forestal Districts and often resolved the issue for their county without taking a formal vote. Which of the following Best describes YOUR personal vote (or if you did not vote on the issue, YOUR personal persuasion) on the issue? (circle the number)

1. YES, ADOPT AGRICULTURAL AND FORESTAL DISTRICTS
2. NO, DO NOT ADOPT AGRICULTURAL AND FORESTAL DISTRICTS
3. ABSTAIN

Q-15. If your answer is YES in Q-14 above, which of the following BEST describes the reasoning behind your vote? (circle the number)

1. PROVIDE TAX RELIEF FOR AGRICULTURAL LANDOWNERS
2. PROTECTION FOR FARMERS FROM ANTI-NUISANCE SUITS
3. PRESERVATION OF SCENIC OR OPEN SPACE
4. PLAN FOR ORDERLY COMMUNITY DEVELOPMENT
5. PROTECTION OF FAMILY FARMS
6. ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER
7. KEEP AGRICULTURE A PART OF THE LOCAL ECONOMY
8. DIDN'T COST MUCH TO IMPLEMENT
9. COMBINATION OF REASONS LISTED ABOVE
(place an asterisk (*) by the reasons)
10. OTHER (please specify) _____

Q-16. If your answer is NO in Q-14 above, which of the following BEST describes the reasoning behind your vote? (circle the number)

1. THE AGRICULTURAL AND FORESTAL DISTRICT PROGRAM IS TOO RESTRICTIVE FOR OUR LOCAL LAND USE PROBLEMS
2. FARMLAND RETENTION IS NOT AN IMPORTANT LOCAL ISSUE
3. THE PROGRAM ALLOWS AN UNFAIR LANDOWNER TAX BREAK
4. THE PROGRAM IS NOT RESTRICTIVE ENOUGH FOR OUR LOCAL LAND USE PROBLEMS
5. THE PROGRAM IS TOO COSTLY TO ADMINISTER
6. CAUSES A SIGNIFICANT LOSS OF COUNTY TAX REVENUE
7. COMBINATION OF REASONS LISTED ABOVE
(place an asterisk (*) by the reasons)
8. OTHER (please specify) _____

Q-17. If you were to vote again today (with information available to you at this time) on the establishment of Agricultural and Forestal Districts in your county, would your vote change? (circle the number)

- 1. YES
- 2. NO

If your answer to Q-17 is YES, please explain in the space below.

We would like to know what you feel are the attitudes of your county's residents toward some common agricultural land use issues. Although not necessarily correct or incorrect, the following statements have often been expressed. Use the categories which follow to indicate which of the following statements BEST describe the OPINIONS OF YOUR COUNTY'S RESIDENTS on these issues as you understand them. (circle the answer)

- 4 = OPINION STRONGLY HELD BY A MAJORITY OF COUNTY RESIDENTS
- 3 = OPINION STRONGLY HELD BY AN INFLUENTIAL MINORITY OF COUNTY RESIDENTS
- 2 = OPINION WEAKLY HELD BY A MAJORITY OF COUNTY RESIDENTS
- 1 = OPINION WEAKLY HELD BY A MINORITY OF COUNTY RESIDENTS

(circle your answer)

Q-18. My county is experiencing a rapid rate of population growth due to a growing commuter population and/or the growth of nonagricultural industries. 4 3 2 1

Q-19. The conversion of farmland for rural subdivisions and/or other developments is becoming a major problem in my county. 4 3 2 1

Q-20. Agriculture and agricultural services (such as equipment dealers, grain elevators or farm supply stores) are a valuable part of my county's economy and should be maintained even at the expense of higher local taxes or fewer jobs.	4	3	2	1
Q-21. Cases of farm property damage, complaints about farm equipment on roads or nuisance suits that limit normal farming operations are a problem for farmers with nonfarm neighbors in this county.	4	3	2	1
Q-22. Cases of nuisances due to farm smells or noises are a problem for nonfarm neighbors of farmers in my county.	4	3	2	1
Q-23. There have been problems with environmental damage in this county due to nonagricultural development.	4	3	2	1
Q-24. There have been problems with aesthetic damage in this county due to nonagricultural development.	4	3	2	1
Q-25. Farmers in this county are paying an unfair proportion of local real property taxes.	4	3	2	1
Q-26. Farmers are not paying a fair proportion of local real property taxes.	4	3	2	1
Q-27. Decisions about local environmental issues are best made locally rather than than by state or federal government.	4	3	2	1
Q-28. Decisions about local agricultural land use issues are best made locally rather than by state or federal government.	4	3	2	1
Q-29. Growth and development in all parts of my county's economy (both the agricultural and the nonagricultural) should be promoted equally by county officials.	4	3	2	1
Q-30. Special concessions (such as land use taxes) should be made to local farmers in order to ensure agriculture's continued existence in this county.	4	3	2	1

Q-31. Land use issues in my county should be resolved by interested parties without any local government intervention. 4 3 2 1

In addition to the opinions on agricultural land use issues held by the residents of your county, we would also like to know more about how YOU personally feel about many of the same issues. The following statements are again neither necessarily correct or incorrrect. Use the following catagories to indicate whether YOU personally AGREE, DISAGREE or have NO OPINION about these statements. (circle your answer)

A = AGREE OR GENERALLY AGREE WITH THE STATEMENT

D = DISAGREE OR GENERALLY DISAGREE WITH THE STATEMENT

N = NO OPINION

(circle your answer)

Q-32. My county is experiencing a rapid rate of population growth due to a growing commuter population and/or the growth of nonagricultural industries. A D N

Q-33. The conversion of farmland in this county for rural subdivisions and/or other developments is becoming a major problem. A D N

Q-34. Agriculture and agricultural services (such as equipment dealers, grain elevators or farm supply stores) are a valuable part of this county's economy and should be maintained even at the expense of higher local taxes or fewer jobs. A D N

Q-35. Cases of farm property damage, complaints about farm equipment on roads or nuisance suits that limit normal farming operations are a problem for farmers with nonfarm neighbors in this county. A D N

Q-36. Cases of nuisances due to farm smells or noises are a problem for nonfarm neighbors of farmers in this county. A D N

- Q-37. There have been problems with environmental damage in this county due to nonagricultural development. A D N
- Q-38. There have been problems with aesthetic damage in this county due to nonagricultural development. A D N
- Q-39. Farmers in my county are paying an unfair proportion of local real property taxes. A D N
- Q-40. Farmers are not paying a fair proportion of local real property taxes. A D N
- Q-41. Decisions about local environmental issues are best made locally rather than than by state or federal government. A D N
- Q-42. Decisions about local agricultural land use issues are best made locally rather than by state or federal government. A D N
- Q-43. Growth and development in all parts of this county's economy (both agricultural and non-agricultural) should be promoted equally by county officials. A D N
- Q-44. Special concessions (such as lower property taxes) should be made to local farmers in order to ensure agriculture's continued existence in this county. A D N
- Q-45. Land use issues in the county should be resolved by interested parties without any local government intervention. A D N

In this final section we would like to ask you some questions about yourself. Your answers will help us compare the membership of Boards of Supervisors. ALL your answers are strictly confidential.

Q-46. The person answering this questionnaire is: (circle the number)

1. MALE
2. FEMALE

Q-47. What is your present age?

_____ YEARS

Q-48 In which of the following local organizations are you a member?
(circle the numbers which apply)

- 1. FARM BUREAU
- 2. GRANGE
- 3. NATIONAL FARM ORGANIZATION
- 4. LION'S CLUB
- 5. CHAMBER OF COMMERCE
- 6. LOCAL CHURCH GROUP
- 7. OTHER (please specify) _____

Q-49. How often does the Board of Supervisors in your county regularly meet on official business?

(circle time period)

_____ Times A WEEK MONTH YEAR

Q-50. Are you presently on the Board of Supervisors in your county?
(circle the number)

- 1. NO
- 2. YES

Q-51. Please describe your usual occupation (if retired, describe your usual occupation before retirement).

TITLE _____

KIND OF WORK YOU DO _____

KIND OF COMPANY OR BUSINESS _____

Q-52. Which is the highest level of schooling you have completed?
(circle the number)

- 1. NO FORMAL SCHOOLING
- 2. SOME GRADE SCHOOL
- 3. COMPLETED GRADE SCHOOL
- 4. SOME HIGH SCHOOL
- 5. COMPLETED HIGH SCHOOL
- 6. SOME COLLEGE
- 7. COMPLETED COLLEGE (specify major) _____

Q-53. Do you presently own agricultural or forestal land in your county?
(circle the number)

1. NO
2. YES _____ ACRES

Q-54. If you answer YES to question Q-53 above, how many acres of
agricultural land did you own in your county in 1983?

_____ ACRES

Q-55 Use the following categories to describe how you used the land
you owned in 1983. (circle the number and indicate acres)

- | | | |
|---------------------------------------------|-------|-------|
| 1. AGRICULTURAL | _____ | ACRES |
| 2. FOREST | _____ | ACRES |
| 3. IDLE (farmland not farmed in 1983) | _____ | ACRES |
| 4. COMMERCIAL (business) | _____ | ACRES |
| 5. RESIDENTIAL | _____ | ACRES |
| 6. INDUSTRIAL | _____ | ACRES |

Is there anything else you would like to tell us about agricultural land use in your county? If so, please use the space below for that purpose. Also any comments you wish to make that you think may help us in future efforts to understand what your county residents want for agriculture in their community will be appreciated, either here or in a separate letter.

Your contribution to this effort is greatly appreciated. If you would like a summary of results, please print your name and address on the back of the return envelope (NOT on this questionnaire). We will see that you get the copy of the summary you requested.

Appendix D
CULPEPER COUNTY LANDOWNER SURVEY

AGRICULTURAL LAND USE IN CHANGING TIMES: A SURVEY
OF CULPEPER COUNTY LANDOWNERS ABOUT AGRICULTURAL
LAND USE IN THEIR COMMUNITY

This survey is part of a study of agricultural land use in selected Virginia counties. Please answer every question. If you wish to comment on any of the questions or qualify your answers, please feel free to use the space in the margins. Your comments are especially requested.

Thank you for your help.

This study is being conducted by the Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

QUESTIONNAIRE

We would like to know more about the land you owned in Culpeper County in 1983 and how you used this land. In the questions that follow, FARM and FARMLAND refer to the land you own. Do not, unless indicated, include land you lease but do not own.

Q-1. How many acres of land did you own in Culpeper County on December 31, 1983?

_____ ACRES

Q-2. Use the following categories to describe how you used the land you owned in 1983. (circle the number and indicate acres)

1. AGRICULTURAL	_____	ACRES
2. FOREST	_____	ACRES
3. IDLE (farmland not farmed in 1983)	_____	ACRES
4. COMMERCIAL (business)	_____	ACRES
5. RESIDENTIAL	_____	ACRES
6. INDUSTRIAL	_____	ACRES
7. OTHER (please specify) _____	_____	ACRES

Q-3. How many of these owned acres were operated as a farm by you or your family in 1983?

_____ ACRES

Q-4. How many of these owned acres were either rented or leased-out to nonfamily members in 1983?

_____ ACRES

Q-5. How many of these owned acres were either rented or leased-out to family members in 1983?

_____ ACRES

Q-6. How many additional acres of farmland lying in Culpeper County did you rent or lease in 1983?

_____ ACRES

Q-7. How many years has some part or all of your present farm been owned by your family (or the family of your spouse)?

_____ YEARS

Q-8. How many years have you owned your present farm in Culpeper County?

_____ YEARS

Q-9. If you use the land you own for agriculture, which of the following categories BEST describes the type of farm you operate? (circle the number)

1. DAIRY (including feed crop production)
2. CASH CROPS (corn, soybeans, wheat, etc.)
3. LIVESTOCK (beef cattle, hogs, etc.)
4. POULTRY
5. SPECIALITY CROPS (orchards, vegetables, etc.)
6. FOREST FOR COMMERCIAL HARVEST
(including Christmas trees)
7. MIXED (please specify) _____
8. OTHER (please specify) _____

Q-10. Which of the following BEST describes the community within which the farmland that you own lies? (circle the number)

1. THE COMMUNITY IS A RURAL AREA
(less than 100 population per square mile)
2. THE COMMUNITY CONTAINS A VILLAGE
(100 - 2,999 population)
3. THE COMMUNITY CONTAINS A TOWN
(3,000 - 7,000 population)

Q-11. Is your place of residence located on your farm?
(circle the number)

1. NO
2. YES

Q-12. Please estimate how far your farmstead is from the town limits of the Town of Culpeper.

_____ STRAIGHT LINE MILES

Q-13. For each of the following, estimate how many miles your farmland is from the NEAREST:

- 1. BUSINESS OR COMMERCIAL AREA _____ MILES
- 2. FEDERAL HIGHWAY _____ MILES
- 3. STATE HIGHWAY _____ MILES
- 4. RESIDENTIAL SUBDIVISION
(more than 10 houses)..... _____ MILES
- 5. RECREATION AREA _____ MILES

Q-14. Which one of the following statements BEST describes your plans for your farm operation for the next 10 years? (circle the number)

- 1. CONTINUE OPERATING PRESENT FARM AT CURRENT ACREAGE AND LEVEL OF INTENSITY
- 2. INCREASE ACREAGE AND/OR LEVEL OF INTENSITY OF PRESENT FARM
- 3. DECREASE ACREAGE AND/OR LEVEL OF INTENSITY OF PRESENT FARM
- 4. REDUCE MY TIME DEVOTED TO THE FARM BUT HAVE FAMILY MEMBER CONTINUE TO FARM
- 5. DISCONTINUE OPERATING FARM IN ORDER TO:
(check reason)

- _____ BEGIN NONFARM EMPLOYMENT
- _____ RETIRE WITHIN 10 YEARS
- _____ MOVE TO DIFFERENT LOCATION TO CONTINUE FARMING
- _____ OTHER (please specify) _____

6. OTHER (please specify) _____

Q-15. Which of the following statements BEST describes what you think you would most likely do with your farmland if you discontinued farming it at the end of 1984? (circle the number)

- 1. RENT IT TO SOMEONE OUTSIDE THE FAMILY WHO WOULD CONTINUE TO FARM IT
- 2. SELL IT TO A FAMILY MEMBER WHO WOULD CONTINUE TO FARM IT
- 3. SELL IT TO SOMEONE OUTSIDE THE FAMILY WHO WOULD CONTINUE TO FARM IT
- 4. SELL IT TO SOMEONE (including family members) TO DEVELOP FOR NON-FARM USE
- 5. OTHER (please specify) _____

Q-16. Indicate the real property improvements that you have made during the past 10 years on your land. (circle all numbers that apply)

1. NEW FENCES FOR FIELDS
2. NEW BUILDINGS FOR LIVESTOCK, EQUIPMENT, OR FEED STORAGE
3. NEW PERMANENT SOIL CONSERVATION INVESTMENTS (terraces, waterways, etc.)
4. NEW WELLS OR OTHER WATER SOURCES
5. OTHER (please specify) _____

Q-17. Which of the statements below BEST describes your plans, over the next 10 years, for future real property improvements on your land? Assume that credit is available at what you consider to be an acceptable rate. Do not include livestock or machinery. (circle the number)

1. MAKE NO NEW INVESTMENTS IN FARM IMPROVEMENTS
2. MAKE NEW IMPROVEMENTS (LESS THAN \$15,000 TOTAL)
3. MAKE NEW IMPROVEMENTS (MORE THAN \$15,000 TOTAL)

Q-18. Currently, are any of your children or grandchildren planning to continue operating your farm when you retire? (circle the number)

1. YES
2. NO
3. I DO NOT HAVE CHILDREN

Q-19. Currently, are YOU planning for your children or grandchildren to continue operating your farm when you retire? (circle the number)

1. YES
2. NO
3. I DO NOT HAVE CHILDREN

Q-20. Has anyone made an offer to buy all or any part of your farmland for agricultural use during the past 10 years? (circle the number)

1. NO
2. YES

Q-21. Has anyone made an offer to buy all or any part of your farmland for nonagricultural use during the past 10 years? (circle the number)

1. NO
2. YES

Q-22. Have you advertised all or part of your farmland for sale during the past 10 years? (circle the number)

- 1. NO
- 2. YES

Q-23. Have you sold any part of your farmland in the last 10 years to be used for something other than agricultural or forestal uses? (circle the number)

- 1. NO
- 2. YES NUMBER OF ACRES _____
 TYPE OF LAND USE SOLD FOR _____
 YEAR SOLD _____

Q-24. Do you currently plan to sell your land for a nonfarm use? (circle the number)

- 1. YES, IN 0 - 5 YEARS
- 2. YES, IN 6 - 10 YEARS
- 3. YES, IN 11 - 20 YEARS
- 4. YES, IN MORE THAN 20 YEARS
- 5. NOT DURING MY LIFETIME

As Culpeper County adjusts to future changes, new issues concerning agriculture's role in your community may arise. We would like to know your opinion on some of these issues. Though not necessarily correct or incorrect, the following statements have often been expressed. Please indicate whether you AGREE, DISAGREE, or HAVE NO OPINION about these statements by using the following categories.

A = AGREE OR GENERALLY AGREE WITH THE STATEMENT

D = DISAGREE OR GENERALLY DISAGREE WITH THE STATEMENT

N = NO OPINION

Q-25. Culpeper is experiencing a rapid rate of population growth due to a growing commuter population and/or the growth of nonagricultural industries. circle your answer
 A D N

Q-26. The conversion of farmland in Culpeper for rural subdivisions and/or other forms of development are becoming a major problem. A D N

- | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
| Q-27. Agriculture and agricultural services (such as equipment dealers, grain elevators, or farm supply stores) are a valuable part of Culpeper County's economy and should be maintained even at the expense of higher local taxes or fewer jobs. | A | D | N |
| Q-28. Cases of farm property damage, complaints about farm equipment on roads, or nuisance suits that limit normal farming operations are a problem for farmers with nonfarm neighbors in Culpeper County. | A | D | N |
| Q-29. Cases of nuisances due to farm smells or noises are a problem for nonfarm neighbors of farmers in Culpeper County. | A | D | N |
| Q-30. There have been problems with environmental damage in Culpeper County due to nonagricultural development. | A | D | N |
| Q-31. There have been problems with aesthetic damage in Culpeper County due to nonagricultural development. | A | D | N |
| Q-32. Farmers in Culpeper County are paying an unfair proportion of local real property taxes. | A | D | N |
| Q-33. Farmers are not paying a fair proportion of local real property taxes. | A | D | N |
| Q-34. Decisions about local environmental issues are best made locally rather than than by state or federal government. | A | D | N |
| Q-35. Decisions about local agricultural land use issues are best made locally rather than by state or federal government. | A | D | N |
| Q-36. Growth and development in Culpeper County's economy (both the agricultural parts and the nongricultural parts) should be promoted equally by county officials. | A | D | N |
| Q-37. Special concessions (such as land use taxes) should be made to local farmers in order to ensure agriculture's continued existence in Culpeper County. | A | D | N |

Q-38. Land use issues in Culpeper County should be resolved by interested parties without any local government intervention.

A D N

In 1979 Culpeper County authorized the establishment of Agricultural and Forestal Districts. We are interested in how you learned about this program and why you decided NOT to sign-up your land in an Agricultural and Forestal District.

Q-39. Are you ware of the existence of the Agricultural and Forestal District currently in effect in Culpeper County? (circle the number)

1. YES
2. NO

If you answer NO in question Q-39 above, please skip to question Q-44.

Q-40. Where did you get information about the Agricultural and Forestal District program authorized by Culpeper County? (circle each number which applies to you)

1. RADIO OR TV
2. NEWSPAPER
3. FAMILY OR RELATIVES
4. FARM RELATED ORGANIZATION (Farm Bureau, NFO, Grange, etc.)
5. FRIENDS OR NEIGHBORS
6. INFORMATIONAL MEETING CALLED BY AGRICULTURAL LANDOWNERS
7. INFORMATIONAL MEETING CALLED BY BOARD OF SUPERVISORS
8. INFORMATIONAL MEETING CALLED BY COUNTY EXTENSION OFFICE
9. INFORMATIONAL MEETING CALLED BY COUNTY PLANNING OFFICE
10. OTHER (please specify) _____

Q-41. Please go back to question Q-40 (above) and place an asterisk (*) by the source or sources that provided you with the BEST information about the Agricultural and Forestal District program.

Q-42. Which of the following people most influenced your decision NOT to sign-up your land in an Agricultural and Forestal District? (circle the number)

1. CHILDREN OR SPOUSE
2. GRANDCHILDREN
3. NEIGHBOR
4. COUNTY EXTENSION AGENT
5. ANOTHER FARMER WHO SIGNED AN AGREEMENT
6. PEOPLE FROM FARM RELATED ORGANIZATIONS
7. PEOPLE FROM MY CHURCH
8. MY PERSONAL DECISION
9. OTHER (please specify) _____

Q-43. Which of the following BEST describes why you decided NOT to sign-up your land in an Agricultural and Forestal District? (circle the number)

1. THE PROGRAM IS TOO RESTRICTIVE
2. I PLAN TO SELL MY LAND FOR DEVELOPMENT WITHIN 8 YEARS
3. NOT ENOUGH BENEFITS FOR WHAT THE PROGRAM WOULD COST ME IN TIME OR MONEY
4. FARMLAND PROTECTION IS NOT A PROBLEM FOR ME
5. NOT ENOUGH INFORMATION ON THE PROGRAM
6. I DECIDED TO WAIT AND SEE HOW THE PROGRAM WORKS FOR A FEW YEARS
7. I DON'T WANT MY LAND USE DECISIONS TO BE TIED UP BY OTHER LANDOWNERS
8. I PREFER NOT TO PARTICIPATE IN GOVERNMENT PROGRAMS
9. COMBINATION OF REASONS LISTED ABOVE (place an asterisk (*) by the reasons)
10. OTHER (please specify) _____

Q-44. Are you interested in getting additional information about the Agricultural and Forestal District program? (circle the number)

1. NO
2. YES

Q-45. If you answered YES to question Q-44 above, do you know where to get this information? (circle the number)

1. NO
2. YES

In this final section, we would like to ask you some questions about yourself. Your answers will help us compare farmers throughout Culpeper County. Please remember, ALL your answers are strictly confidential.

Q-46. The person completing this questionnaire is: (circle the number)

1. MALE
2. FEMALE

Q-47. What is your present age?

_____ YEARS

Q-48. Indicate the number of children and grandchildren that you have in each age group. If you have none, check "NONE".

CHILDREN	GRANDCHILDREN
_____ NONE	_____ NONE
_____ UNDER 5 YEARS OF AGE	_____ UNDER 5 YEARS OF AGE
_____ 5 to 18 YEARS OF AGE	_____ 5 to 18 YEARS OF AGE
_____ 19 AND OVER	_____ 19 AND OVER

Q-49. Do you provide the primary money income for your household?
(circle the number)

1. NO
2. YES

Q-50. What is the highest level of schooling you have completed?
(circle the number)

1. NO FORMAL SCHOOLING
2. SOME GRADE SCHOOL
3. COMPLETED GRADE SCHOOL
4. SOME HIGH SCHOOL
5. COMPLETED HIGH SCHOOL
6. SOME COLLEGE
7. COMPLETED COLLEGE (please specify major) _____

Q-51. Which of the following BEST describes the form of organization used by your farm business in 1983? (circle the number)

1. SOLE PROPRIETORSHIP
2. PARTNERSHIP
3. SUBCHAPTER S CORPORATION
4. SUBCHAPTER C CORPORATION
5. CASH LEASE/RENT
6. SHARE CROP/SHARE LEASE
7. OTHER (please specify) _____

Q-52. Use the categories below to indicate how the title of your farmland was held in 1983. (circle the number)

1. SOLE OWNERSHIP/INDIVIDUALLY HELD
2. JOINT TENANCY WITH RIGHT OF SURVIVOR
3. TENANCY IN COMMON
4. PARTNERSHIP
5. CORPORATION (title held by the corporation)
6. OTHER (please specify) _____

Q-53. Which category includes the GROSS receipts earned from the sale of products from your farmland in 1983? (circle the number)

- | | |
|--------------------------|---------------------------|
| 1. 0 - \$19,999 | 7. \$150,000 - \$199,999 |
| 2. \$20,000 - \$39,999 | 8. \$200,000 - \$249,999 |
| 3. \$40,000 - \$59,999 | 9. \$250,000 - \$299,999 |
| 4. \$60,000 - \$79,999 | 10. \$300,000 - \$349,999 |
| 5. \$80,000 - \$99,999 | 11. \$350,000 - \$399,999 |
| 6. \$100,000 - \$149,999 | 12. OVER \$400,000 |

Q-54. Which category includes the farm business NET farm income before taxes for 1983? (circle the number)

- | | |
|------------------------|-------------------------|
| 1. LESS THAN 0 | 7. \$25,000 - \$29,000 |
| 2. 0 - \$4,999 | 8. \$30,000 - \$34,999 |
| 3. \$5,000 - \$9,999 | 9. \$35,000 - \$39,999 |
| 4. \$10,000 - \$14,999 | 10. \$40,000 - \$44,999 |
| 5. \$15,000 - \$19,999 | 11. \$45,000 - \$49,999 |
| 6. \$20,000 - \$24,999 | 12. OVER \$50,000 |

Q-55. What was your total real property tax bill for your farmland in Culpeper County in 1983?

\$ _____

Q-56. Was your agricultural and/or forestal land assessed at the land use tax value in 1983? (circle the number)

- 1. NO
- 2. YES _____ ACRES

Q-57. If your answer to question Q-56 above is YES, how much did you pay in real property taxes on your farmland in 1983?

\$ _____

Is there anything else you would like to tell us about agricultural land use or participation in your county's Agricultural and Forestal District program? If so, please use the space below for that purpose. Also any comments you wish to make that you think may help us in future efforts to understand what your county residents want for agriculture in their community will be appreciated, either here or in a separate letter.

Your contribution to this effort is greatly appreciated. If you would like a summary of results, please print your name and address on the back of the return envelope (NOT on this questionnaire). We will see that you get a copy of the summary you request.

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Thank you for your help.

This study is being conducted by the Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

QUESTIONNAIRE

We would like to know more about the land you owned in Culpeper County in 1983 and how you used this land. In the questions that follow, FARM and FARMLAND refer to the land you own. Do not, unless indicated, include land you lease but do not own.

Q-1. How many acres of land did you own in Culpeper County on December 31, 1983?

_____ ACRES

Q-2. Use the following categories to describe how you used the land you owned in 1983. (circle the number and indicate acres)

- | | | |
|--------------------------------------------|-------|-------|
| 1. AGRICULTURAL | _____ | ACRES |
| 2. FOREST | _____ | ACRES |
| 3. IDLE (farmland not farmed in 1983)..... | _____ | ACRES |
| 4. COMMERCIAL (business) | _____ | ACRES |
| 5. RESIDENTIAL | _____ | ACRES |
| 6. INDUSTRIAL | _____ | ACRES |
| 7. OTHER (please specify) _____ | _____ | ACRES |

If you did not use the land you owned in 1983 for either agriculture or forest, please skip to Q-10.

Q-3. How many of these owned acres were operated as a farm by you or your family in 1983?

_____ ACRES

Q-4. How many of these owned acres were either rented or leased-out to nonfamily members in 1983?

_____ ACRES

Q-5. How many of these owned acres were either rented or leased-out to family members in 1983?

_____ ACRES

Q-6. How many additional acres of farmland lying in Culpeper County did you rent or lease in 1983?

_____ ACRES

Q-7. How many years has some part or all of your present farm been owned by your family (or the family of your spouse)?
 _____ YEARS

Q-8. How many years have you owned your present farm in Culpeper County?
 _____ YEARS

Q-9. If you use the land you own for agriculture, which of the following categories BEST describes the type of farm you operate? (circle the number)

1. DAIRY (including feed crop production)
2. CASH CROPS (corn, soybeans, wheat, etc.)
3. LIVESTOCK (beef cattle, hogs, etc.)
4. POULTRY
5. SPECIALITY CROPS (orchards, vegetables, etc.)
6. FOREST FOR COMMERCIAL HARVEST
(including Christmas trees)
7. MIXED (please specify) _____
8. OTHER (please specify) _____

In 1979 Culpeper County authorized the establishment of Agricultural and Forestal Districts. We are interested in how you learned about this program and why you decided to sign-up your land in an Agricultural and Forestal District.

Q-10. Where did you get information about the Agricultural and Forestal District program authorized by Culpeper County?
 (circle each number which applies to you)

1. RADIO OR TV
2. NEWSPAPER
3. FAMILY OR RELATIVES
4. FARM RELATED ORGANIZATION (Farm Bureau, NFO, Grange, etc.)
5. FRIENDS OR NEIGHBORS
6. INFORMATIONAL MEETING CALLED BY AGRICULTURAL LANDOWNERS
7. INFORMATIONAL MEETING CALLED BY BOARD OF SUPERVISORS
8. INFORMATIONAL MEETING CALLED BY COUNTY EXTENSION OFFICE
9. INFORMATIONAL MEETING CALLED BY COUNTY PLANNING OFFICE
10. OTHER (please specify) _____

Q-11. Please go back to question Q-10 (above) and place an asterisk (*) by the source or sources that provided you with the BEST information about the Agricultural and Forestal District program.

Q-12. Which of the following people most influenced your decision to join an Agricultural and Forestal District? (circle the number)

1. CHILDREN OR SPOUSE
2. GRANDCHILDREN
3. NEIGHBOR
4. COUNTY EXTENSION AGENT
5. ANOTHER FARMER WHO SIGNED AN AGREEMENT
6. PEOPLE FROM FARM RELATED ORGANIZATIONS
7. PEOPLE FROM MY CHURCH
8. MY PERSONAL DECISION
9. OTHER (please specify) _____

Q-13. Which of the following BEST describes why you decided to join an Agricultural and Forestal District? (circle the number)

1. PROTECTION FROM ANTI-NUISANCE SUITS
2. HELP KEEP AGRICULTURE STRONG IN MY COMMUNITY
3. ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER
4. DIDN'T COST MUCH TO JOIN
5. PROTECTION OF SCENIC OR OPEN SPACE
6. PROTECTION OF FAMILY FARM BUSINESS
7. INTEREST IN ORDERLY DEVELOPMENT OF MY COMMUNITY
8. INFLUENCE OF NEIGHBORS
9. HOPED TO KEEP MY TAXES DOWN
10. PREVENT THE DEVELOPMENT OF STATE AND COUNTY SERVICES (roads, waterlines, sewers) ON MY PROPERTY
11. INCREASE THE VALUE OF MY LAND BY PROTECTING IT FROM PREMATURE DEVELOPMENT
12. HELP KEEP AGRICULTURE STRONG IN CULPEPER COUNTY
13. COMBINATION OF REASONS LISTED ABOVE
(place an asterisk (*) by the reasons)
14. OTHER (please specify) _____

Q-14. Which of the following BEST describes your involvement in the formation of your Agricultural and Forestal District? (circle the number)

1. I WAS THE ORIGINAL ORGANIZER
2. I PARTICIPATED AS ONE MEMBER IN A GROUP DECISION
3. I WAS AMONG THE LAST TO JOIN OUR DISTRICT
4. OTHER (please specify) _____

Q-15. How many acres of the land that you owned on December 31, 1983 were in an Agricultural and Forestal District?

_____ ACRES

In the next section we would like to learn more about your future plans for your agricultural land in Culpeper County and more about where it is located in the county.

Q-16. Do you plan to continue your land's participation in your Agricultural and Forestal District when your District is reviewed by the county governing body? (circle the number)

1. NO
2. YES

Q-17. If YES, do you plan to add additional acres of your land to your Agricultural and Forestal District? (circle the number)

1. NO
2. YES _____ ACRES
3. ALL OF MY LAND IS ALREADY IN AN AGRICULTURAL AND FORESTAL DISTRICT

Q-18. Do you plan to withdraw your land from your Agricultural and Forestal District before your District's review date? (circle the number)

1. NO
2. YES _____ ACRES

Q-19. Would you join a community association of persons who have land in an Agricultural and Forestal District if such an association existed? (circle the number)

1. NO
2. YES

PLEASE EXPLAIN YOUR ANSWER _____

Q-20. Would you join a state level association of persons who have land in an Agricultural and Forestal District if such an association existed? (circle the number)

1. NO
2. YES

PLEASE EXPLAIN YOUR ANSWER _____

Q-21. Which of the following BEST describes the community within which your Agricultural and Forestal District land lies? (circle the number)

1. THE COMMUNITY IS A RURAL AREA (less than 100 population per square mile)
2. THE COMMUNITY CONTAINS A VIILLAGE (100 - 2,999 population)
3. THE COMMUNITY CONTAINS A TOWN (3,000 - 7,000 population)

Q-22. Is your place of residence located on land that is in an Agricultural and Forestal District? (circle the number)

1. NO
2. YES

Q-23. Please estimate how far your farmstead is from the town limits of the Town of Culpeper.

_____ STRAIGHT LINE MILES

Q-24. For each of the following, estimate how many miles your farmstead in the Agricultural and Forestal District is from the NEAREST:

1. BUSINESS OR COMMERCIAL AREA _____ MILES
2. FEDERAL HIGHWAY _____ MILES
3. STATE HIGHWAY _____ MILES
4. RESIDENTIAL SUBDIVISION
(more than 10 houses)..... _____ MILES
5. RECREATION AREA _____ MILES

Q-25. Which one of the following statements BEST describes your plans for the next 10 years for your Agricultural and Forestal District land? (circle the number)

1. CONTINUE OPERATING PRESENT FARMLAND AT CURRENT ACREAGE AND LEVEL OF INTENSITY
2. INCREASE ACREAGE AND/OR LEVEL OF INTENSITY OF PRESENT FARM
3. DECREASE ACREAGE AND/OR LEVEL OF INTENSITY OF PRESENT FARM
4. REDUCE MY TIME DEVOTED TO THE FARM BUT HAVE FAMILY MEMBER CONTINUE TO FARM
5. DISCONTINUE OPERATING FARM IN ORDER TO:
 - _____ BEGIN NONFARM EMPLOYMENT
 - _____ RETIRE WITHIN 10 YEARS
 - _____ MOVE TO DIFFERENT LOCATION TO CONTINUE FARMING
 - _____ OTHER (please specify) _____
6. OTHER (please specify) _____

Q-26. Which of the following statements BEST describes what you think you would most likely do with your land if you discontinued operating it at the end of 1984? (circle the number)

1. RENT TO SOMEONE OUTSIDE THE FAMILY WHO WOULD CONTINUE TO FARM IT
2. RENT TO FAMILY MEMBER TO CONTINUE TO FARM IT
3. SELL TO A FAMILY MEMBER TO CONTINUE TO FARM IT
4. SELL TO SOMEONE OUTSIDE THE FAMILY WHO WOULD CONTINUE TO FARM IT
5. SELL TO SOMEONE (including family members) TO DEVELOP FOR NON-FARM USE
6. OTHER (please specify) _____

Q-27. Indicate the real property improvements that you have made during the past 10 years on your land. (circle all numbers that apply)

1. NEW FENCES FOR FIELDS
2. NEW BUILDINGS FOR LIVESTOCK, EQUIPMENT, OR FEED STORAGE
3. NEW PERMANENT SOIL CONSERVATION INVESTMENTS (terraces, waterways, etc.)
4. NEW WELLS OR OTHER WATER SOURCES
5. OTHER (please specify) _____

Q-28. Which of the statements below BEST describes your plans, over the next 10 years, for future real property improvements on your land? Assume that credit is available at what you consider to be an acceptable rate. Do not include livestock or machinery. (circle the number)

1. MAKE NO NEW INVESTMENTS IN FARM IMPROVEMENTS
2. MAKE NEW IMPROVEMENTS (LESS THAN \$15,000 TOTAL)
3. MAKE NEW IMPROVEMENTS (MORE THAN \$15,000 TOTAL)

Q-29. Currently, are any of your children or grandchildren planning to continue operating your farm when you retire? (circle the number)

1. YES
2. NO
3. I DO NOT HAVE CHILDREN

Q-30. Currently, are YOU planning for your children or grandchildren to continue operating your farm when you retire? (circle the number)

1. YES
2. NO
3. I DO NOT HAVE CHILDREN

Q-31. Has anyone made an offer to buy all or any part of your farmland for agricultural use during the past 10 years?
(circle the number)

- 1. NO
- 2. YES

Q-32. Has anyone made an offer to buy all or any part of your farmland for nonagricultural use during the past 10 years?
(circle the number)

- 1. NO
- 2. YES

Q-33. Have you advertised all or part of your farmland for sale during the past 10 years? (circle the number)

- 1. NO
- 2. YES

Q-34. Have you sold any part of your farmland in the last 10 years to be used for something other than agricultural or forestal uses?
(circle the number)

- 1. NO
- 2. YES NUMBER OF ACRES _____
TYPE OF LAND USE SOLD FOR _____
YEAR SOLD _____

Q-35. Do you currently plan to sell your land for a nonfarm use?
(circle the number)

- 1. YES, IN 0 - 5 YEARS
- 2. YES, IN 6 - 10 YEARS
- 3. YES, IN 11 - 20 YEARS
- 4. YES, IN MORE THAN 20 YEARS
- 5. NOT DURING MY LIFETIME

As Culpeper County adjusts to future changes, new issues concerning agriculture's role in your community may arise. We would like to know your opinion on some of these issues. Though not necessarily correct or incorrect, the following statements have often been expressed. Please indicate whether you AGREE, DISAGREE, or HAVE NO OPINION about these statements by using the following categories.

A = AGREE OR GENERALLY AGREE WITH THE STATEMENT

D = DISAGREE OR GENERALLY DISAGREE WITH THE STATEMENT

N = NO OPINION

(circle your answer)

- Q-36. Culpeper is experiencing a rapid rate of population growth due to a growing commuter population and/or the growth of nonagricultural industries. A D N
- Q-37. The conversion of farmland in Culpeper for rural subdivisions and/or other forms of development are becoming a major problem. A D N
- Q-38. Agriculture and agricultural services (such as equipment dealers, grain elevators, or farm supply stores) are a valuable part of Culpeper County's economy and should be maintained even at the expense of higher local taxes or fewer jobs. A D N
- Q-39. Cases of farm property damage, complaints about farm equipment on roads, or nuisance suits that limit normal farming operations are a problem for farmers with nonfarm neighbors in Culpeper County. A D N
- Q-40. Cases of nuisances due to farm smells or noises are a problem for nonfarm neighbors of farmers in Culpeper County. A D N
- Q-41. There have been problems with environmental damage in Culpeper County due to nonagricultural development. A D N

- Q-42. There have been problems with aesthetic damage in Culpeper County due to nonagricultural development. A D N
- Q-43. Farmers in Culpeper County are paying an unfair proportion of local real property taxes. A D N
- Q-44. Farmers are not paying a fair proportion of local real property taxes. A D N
- Q-45. Decisions about local environmental issues are best made locally rather than than by state or federal government. A D N
- Q-46. Decisions about local agricultural land use issues are best made locally rather than by state or federal government. A D N
- Q-47. Growth and development in Culpeper County's economy (both the agricultural parts and the nongricultural parts) should be promoted equally by county officials. A D N
- Q-48. Special concessions (such as land use taxes) should be made to local farmers in order to ensure agriculture's continued existence in Culpeper County. A D N
- Q-49. Land use issues in Culpeper County should be resolved by interested parties without any local government intervention. A D N

In this final section, we would like to ask you some questions about yourself. Your answers will help us compare farmers throughout Culpeper County. Please remember, ALL your answers are strictly confidential.

Q-50. The person completing this questionnaire is: (circle the number)

1. MALE
2. FEMALE

Q-51. What is your present age?

_____ YEARS

Q-52. Indicate the number of children and grandchildren that you have in each age group. If you have none, check "NONE".

CHILDREN	GRANDCHILDREN
_____ NONE	_____ NONE
_____ UNDER 5 YEARS OF AGE	_____ UNDER 5 YEARS OF AGE
_____ 5 to 18 YEARS OF AGE	_____ 5 to 18 YEARS OF AGE
_____ 19 AND OVER	_____ 19 AND OVER

Q-53. Do you provide the primary money income for your household?
(circle the number)

1. NO
2. YES

Q-54. What is the highest level of schooling you have completed?
(circle the number)

1. NO FORMAL SCHOOLING
2. SOME GRADE SCHOOL
3. COMPLETED GRADE SCHOOL
4. SOME HIGH SCHOOL
5. COMPLETED HIGH SCHOOL
6. SOME COLLEGE
7. COMPLETED COLLEGE (please specify major) _____

Q-55. Which of the following BEST describes the form of organization used by your farm business in 1983? (circle the number)

1. SOLE PROPRIETORSHIP
2. PARTNERSHIP
3. SUBCHAPTER S CORPORATION
4. SUBCHAPTER C CORPORATION
5. CASH LEASE/RENT
6. SHARE CROP/SHARE LEASE
7. OTHER (please specify) _____

Q-56. Use the categories below to indicate how the title of your farmland was held in 1983. (circle the number)

1. SOLE OWNERSHIP/INDIVIDUALLY HELD
2. JOINT TENANCY WITH RIGHT OF SURVIVOR
3. TENANCY IN COMMON
4. PARTNERSHIP
5. CORPORATION (title held by the corporation)
6. OTHER (please specify) _____

Q-57. Which category includes the GROSS receipts earned from the sale of products from your farmland in 1983? (circle the number)

- | | |
|--------------------------|---------------------------|
| 1. 0 - \$19,999 | 7. \$150,000 - \$199,999 |
| 2. \$20,000 - \$39,999 | 8. \$200,000 - \$249,999 |
| 3. \$40,000 - \$59,999 | 9. \$250,000 - \$299,999 |
| 4. \$60,000 - \$79,999 | 10. \$300,000 - \$349,999 |
| 5. \$80,000 - \$99,999 | 11. \$350,000 - \$399,999 |
| 6. \$100,000 - \$149,999 | 12. OVER \$400,000 |

Q-58. Which category includes the farm business NET farm income before taxes for 1983? (circle the number)

- | | |
|------------------------|-------------------------|
| 1. LESS THAN 0 | 7. \$25,000 - \$29,000 |
| 2. 0 - \$4,999 | 8. \$30,000 - \$34,999 |
| 3. \$5,000 - \$9,999 | 9. \$35,000 - \$39,999 |
| 4. \$10,000 - \$14,999 | 10. \$40,000 - \$44,999 |
| 5. \$15,000 - \$19,999 | 11. \$45,000 - \$49,999 |
| 6. \$20,000 - \$24,999 | 12. OVER \$50,000 |

Q-59. What was your total real property tax bill for your farmland in Culpeper County in 1983?

\$ _____

Q-60. Was your agricultural and/or forestal land assessed at the land use tax value in 1983? (circle the number)

1. NO
2. YES _____ ACRES

Q-61. If your answer to question 60 above is YES, how much did you pay in real property taxes on your farmland in 1983?

\$ _____

Is there anything else you would like to tell us about agricultural land use or your participation in Culpeper County's Agricultural and Forestal District program? If so, please use the space below for that purpose. Also any comments you wish to make that you think may help us in future efforts to understand what Culpeper County residents want for agriculture in their community will be appreciated, either here or in a separate letter.

Your contribution to this effort is greatly appreciated. If you would like a summary of results, please print your name and address on the back of the return envelope (NOT on this questionnaire). We will see that you get the copy of the results you request.

Appendix E

SUMMARY OF LANDOWNER AND SUPERVISOR SURVEY RESPONSES

TABLE E.1
FREQUENCY OF FARMLAND RETENTION POLICY CONSIDERATIONS: AFD COUNTY SUPERVISORS

POLICY	POLICY CONSIDERATION					
	CONSIDERED	ADOPTED NOT USED	ADOPTED IN USE	ADOPTED AND RESCINDED	NOT FAMILIAR	NOT CONSIDERED
USE VALUE TAXATION	5	1	53	0	0	1
AGRICULTURAL DISTRICTS	60	1	59	0	0	0
TRANSFER OF DEVELOPMENT RIGHTS (TRD)	16	1	1	0	20	21
PURCHASE OF DEVELOPMENT RIGHTS (PDR)	14	1	2	0	20	22
EXCLUSIVE ZONING FOR AGRICULTURE	17	1	17	0	7	17
ALTERNATIVE POLICY	5	0	4	1	0	1

N = 60

TABLE E.2

FREQUENCY OF FARMLAND RETENTION POLICY CONSIDERATIONS: NON-AFD COUNTY SUPERVISORS

POLICY	POLICY CONSIDERATION					
	CONSIDERED	ADOPTED NOT USED	ADOPTED IN USE	ADOPTED AND RESCINDED	NOT FAMILIAR	NOT CONSIDERED
USE VALUE TAXATION	15	1	34	0	0	0
AGRICULTURAL DISTRICTS	49	0	0	1	0	0
TRANSFER OF DEVELOPMENT RIGHTS (TDR)	1	0	0	0	36	13
PURCHASE OF DEVELOPMENT RIGHTS (PDR)	2	1	1	0	34	12
EXCLUSIVE ZONING FOR AGRICULTURE	17	1	5	0	12	14
ALTERNATIVE POLICY	1	0	0	1	0	49

N = 50

TABLE E.3
SOURCE OF INITIAL CONSIDERATION OF AFD PROGRAM IN COUNTIES

INITIAL SOURCE	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
LOCAL AGRICULTURAL LANDOWNERS	27	25	45.00	50.00
BOARD OF SUPERVISORS	5	10	8.33	20.00
ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	8	1	13.33	2.00
FARM RELATED ORGANIZATION	7	10	11.66	20.00
ASCS	1	1	1.66	2.00
VIRGINIA COOPERATIVE EXTENSION SERVICE	1	1	1.66	2.00
LOCAL CHURCH GROUP	0	0	0	0
COMBINATION OF THOSE LISTED LISTED ABOVE	6	1	10.00	2.00
OTHER	2	0	23.72	0.76

AFD = 60

NON-AFD = 50

TABLE E.4
SOURCES OF SUPERVISORS' INFORMATION ABOUT AFD PROGRAM

INFORMATION SOURCE	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
LOCAL AGRICULTURAL LANDOWNERS	12	13	20.00	26.00
NEIGHBORING COUNTY	3	1	5.00	2.00
VIRGINIA COOPERATIVE EXTENSION SERVICE	15	16	25.00	32.00
COUNTY PLANNING OFFICIALS	19	3	31.66	6.00
POPULAR PRESS (NEWSPAPER)	1	3	1.66	6.00
FARM RELATED ORGANIZATION	0	6	0	12.00
RADIO, TV	0	0	0	0
ASCS	1	1	1.66	2.00
LOCAL CHURCH GROUP	0	0	0	0
ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	4	0	6.66	0
OTHER	4	2	6.66	4.00
COMBINATION OF THOSE ABOVE	1	5	1.66	10.00

AFD = 60

NON-AFD = 50

TABLE E.5
 "BEST" SOURCE OF SUPERVISORS' INFORMATION ABOUT AFD PROGRAM

INFORMATION SOURCE	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
LOCAL AGRICULTURAL LANDOWNERS	7	9	11.66	18.00
NEIGHBORING COUNTY	0	3	0	6.00
VIRGINIA COOPERATIVE EXTENSION SERVICE	21	20	35.00	40.00
COUNTY PLANNING OFFICIALS	28	5	46.66	10.00
POPULAR PRESS	0	3	0	6.00
FARM RELATED ORGANIZATION	1	3	1.66	6.00
RADIO OR TV	0	0	0	0
ASCS	1	3	1.66	6.00
LOCAL CHURCH GROUP	0	0	0	0
ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	2	2	2.33	4.00
OTHER	1	2	1.66	4.00

AFD = 60

NON-AFD = 50

TABLE E.6
SUPERVISORS' DESCRIPTION OF MOST ACTIVE PARTICIPANTS IN
COUNTY DECISION TO NOT ESTABLISH AFD PROGRAM

ACTIVE PARTICIPANTS	FREQUENCY	PERCENT
FARM RELATED ORGANIZATIONS	3	6.00
LOCAL AGRICULTURAL LANDOWNERS	6	12.00
ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	0	0
LOCAL CHURCH GROUP	0	0
VIRGINIA COOPERATIVE EXTENSION SERVICE	0	0
LOCAL PLANNING OFFICIALS	2	4.00
ASCS	1	2.00
COUNTY BOARD OF SUPERVISORS	33	66.00
OTHER	0	0
COMBINATION OF THOSE LISTED ABOVE	5	10.00

N = 50

TABLE E.7
SUPERVISORS' DESCRIPTION OF MOST ACTIVE PARTICIPANTS IN
COUNTY DECISION TO ESTABLISH AFD PROGRAM

ACTIVE PARTICIPANTS	FREQUENCY	PERCENT
FARM RELATED ORGANIZATIONS	8	13.33
LOCAL AGRICULTURAL LANDOWNERS	33	55.00
ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	5	8.33
LOCAL CHURCH GROUP	1	1.66
VIRGINIA COOPERATIVE EXTENSION SERVICE	1	1.66
LOCAL PLANNING OFFICIALS	1	1.66
ASCS	0	0
COUNTY BOARD OF SUPERVISORS	3	5.00
OTHER	0	0
COMBINATION OF THOSE LISTED ABOVE	8	13.33

N = 60

TABLE E.8

MOST INFLUENTIAL FACTOR IN COUNTY'S DECISION TO ESTABLISH AFD PROGRAM

INFLUENTIAL FACTORS	FREQUENCY	PERCENT
LOCAL AGRICULTURAL LANDOWNERS	39	65.00
MEMBERS OF BOARD OF SUPERVISORS	3	5.00
COUNTY PLANNING OFFICIALS	5	8.33
ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	6	10.00
LOCAL CHURCH GROUP	0	0
FARM RELATED ORGANIZATION	1	1.66
VIRGINIA COOPERATIVE EXTENSION SERVICE	2	3.33
ASCS	1	1.66
TV OR RADIO	0	0
NEIGHBORING COUNTY	0	0
OTHER	3	5.00

AFD = 60

NON-AFD = 50

TABLE E.9

MOST INFLUENTIAL FACTOR IN COUNTY'S DECISION NOT TO ESTABLISH AFD PROGRAM

INFLUENTIAL FACTORS	FREQUENCY	PERCENT
LOCAL AGRICULTURAL LANDOWNERS	18	28.00
MEMBERS OF BOARD OF SUPERVISORS	22	44.00
COUNTY PLANNING OFFICIALS	8	16.00
ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	0	0
LOCAL CHURCH GROUP	0	0
FARM RELATED ORGANIZATION	1	2.00
VIRGINIA COOPERATIVE EXTENSION SERVICE	1	2.00
ASCS	1	2.00
TV OR RADIO	0	0
NEIGHBORING COUNTY	0	0
OTHER	3	6.00

N = 50

TABLE E.10
 SUPERVISORS' DESCRIPTION OF PUBLIC PARTICIPATION IN
 COUNTY DECISION TO ESTABLISH AFD PROGRAM

PUBLIC PARTICIPATION	FREQUENCY	PERCENT
THERE WERE NO PUBLIC MEETINGS	1	1.66
PUBLIC MEETINGS CALLED BY AGRICULTURAL LANDOWNERS	5	8.33
PUBLIC MEETINGS CALLED BY ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	2	3.33
PUBLIC MEETINGS CALLED BY LOCAL PLANNING OFFICIALS	8	13.33
PUBLIC MEETINGS CALLED BY BOARD OF SUPERVISORS	27	45.00
PUBLIC MEETINGS CALLED BY CHURCH GROUPS	0	0
PUBLIC MEETINGS CALLED BY FARM RELATED ORGANIZATION	4	6.66
PUBLIC MEETING CALLED BY VIRGINIA COOPERATIVE EXTENSION SERVICE	1	1.66
OTHER	1	1.66
COMBINATION OF THOSE LISTED ABOVE	11	18.33

N = 60

TABLE E.11
SUPERVISORS' DESCRIPTION OF PUBLIC PARTICIPATION IN
COUNTY DECISION TO NOT ESTABLISH AFD PROGRAM

PUBLIC PARTICIPATION	FREQUENCY	PERCENT
THERE WERE NO PUBLIC MEETINGS	8	16.00
PUBLIC MEETINGS CALLED BY AGRICULTURAL LANDOWNERS	1	2.00
PUBLIC MEETINGS CALLED BY ENVIRONMENTAL OR HISTORIC PRESERVATION GROUP	0	0
PUBLIC MEETINGS CALLED BY LOCAL PLANNING OFFICIALS	13	26.00
PUBLIC MEETINGS CALLED BY BOARD OF SUPERVISORS	23	46.00
PUBLIC MEETINGS CALLED BY CHURCH GROUPS	0	0
PUBLIC MEETINGS CALLED BY FARM RELATED ORGANIZATION	3	6.00
PUBLIC MEETING CALLED BY VIRGINIA COOPERATIVE EXTENSION SERVICE	0	0
OTHER	2	4.00
COMBINATION OF THOSE LISTED ABOVE	0	0

N = 50

TABLE E.12
MOTIVES FOR COUNTY ESTABLISHMENT OF AFD PROGRAM

MOTIVES FOR COUNTY ESTABLISHMENT OF AFD PROGRAM	FREQUENCY	PERCENT
PROVIDE TAX RELIEF FOR AGRICULTURAL LANDOWNERS	31	51.66
PROTECTION FOR FARMERS FROM ANTI-NUISANCE SUITS	0	0
PRESERVATION OF SCENIC OR OPEN SPACE	0	0
ENSURE ADEQUATE SUPPLY OF FOOD OR FIBER	9	15.00
PROTECTION OF FAMILY FARM BUSINESS	3	5.00
PLAN FOR ORDERLY COMMUNITY DEVELOPMENT	3	5.00
KEEP AGRICULTURE A PART OF LOCAL ECONOMY	10	16.66
DID NOT COST MUCH TO IMPLEMENT	0	0
OTHER	0	0
COMBINATION OF REASONS LISTED ABOVE	4	6.66

N = 60

TABLE E.13
 SUPERVISORS' MOTIVES FOR VOTING FOR ESTABLISHMENT OF AFD PROGRAM
 (COUNTIES WITH AFD ESTABLISHED)

MOTIVES FOR VOTING FOR AFD PROGRAM	FREQUENCY	PER CENT
PROPERTY TAX RELIEF	18	30.00
PROTECTION FROM ANTI-NUISANCE SUITS	5	8.33
PRESERVATION OF SCENIC OR OPEN SPACE	5	8.33
ORDERLY COMMUNITY DEVELOPMENT	0	0
PROTECTION OF FAMILY FARM BUSINESS	4	6.66
ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER	0	0.00
KEEP AGRICULTURE A PART OF THE LOCAL ECONOMY	0	0
DID NOT COST MUCH TO IMPLEMENT	0	0
COMBINATION OF REASONS LISTED ABOVE	10	16.66
OTHER	10	18.33

N = 52

TABLE E.14
 SUPERVISORS' MOTIVES FOR VOTING AGAINST ESTABLISHMENT OF AFD PROGRAM
 (COUNTIES WITH AFD ESTABLISHED)

MOTIVES FOR VOTING AGAINST AFD PROGRAM	FREQUENCY	PER CENT
AFD PROGRAM TOO RESTRICTIVE FOR OUR LOCAL LAND USE PROBLEMS	2	25.00
FARMLAND RETENTION IS NOT AN IMPORTANT COUNTY ISSUE	1	12.50
AFD PROGRAM ALLOWS AN UNFAIR TAX BREAK TO LANDOWNERS	3	37.50
AFD PROGRAM IS NOT RESTRICTIVE ENOUGH FOR LOCAL LAND USE PROBLEMS	1	12.50
AFD PROGRAM IS TOO COSTLY TO ADMINISTER	0	0
AFD PROGRAM CAUSES A SIGNIFICANT LOSS OF COUNTY TAX REVENUE	0	0
COMBINATION OF REASONS LISTED ABOVE	1	12.50
OTHER	0	0

N = 8

TABLE E.15

SUPERVISORS' MOTIVES FOR VOTING FOR ESTABLISHMENT OF AFD PROGRAM
(COUNTIES WHICH DID NOT ESTABLISH AFD)

MOTIVES FOR VOTING FOR AFD PROGRAM	FREQUENCY	PER CENT
PROPERTY TAX RELIEF	17	85.00
PROTECTION FROM ANTI-NUISANCE SUITS	1	5.00
PRESERVATION OF SCENIC OR OPEN SPACE	0	0
ORDERLY COMMUNITY DEVELOPMENT	0	0
PROTECTION OF FAMILY FARM BUSINESS	1	5.00
ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER	0	0
KEEP AGRICULTURE A PART OF THE LOCAL ECONOMY	0	0
DID NOT COST MUCH TO IMPLEMENT	0	0
COMBINATION OF REASONS LISTED ABOVE	1	5.00
OTHER	0	0

N = 20

TABLE E.16
SUPERVISORS' MOTIVES FOR VOTING AGAINST ESTABLISHMENT OF AFD PROGRAM
(COUNTIES WHICH DID NOT ESTABLISH AFD PROGRAM)

MOTIVES FOR VOTING AGAINST AFD PROGRAM	FREQUENCY	PER CENT
AFD PROGRAM TOO RESTRICTIVE FOR OUR LOCAL LAND USE PROBLEMS	5	19.23
FARMLAND RETENTION IS NOT AN IMPORTANT COUNTY ISSUE	2	7.60
AFD PROGRAM ALLOWS AN UNFAIR TAX BREAK TO LANDOWNERS	2	7.60
AFD PROGRAM IS NOT RESTRICTIVE ENOUGH FOR LOCAL LAND USE PROBLEMS	1	3.80
AFD PROGRAM IS TOO COSTLY TO ADMINISTER	1	3.80
AFD PROGRAM CAUSES A SIGNIFICANT LOSS OF COUNTY TAX REVENUE	13	50.00
COMBINATION OF REASONS LISTED ABOVE	2	7.60
OTHER	0	0

N = 26

TABLE E.17

SUPERVISORS' PERCEPTIONS OF WHY LANDOWNERS JOIN THE AFD PROGRAM

MOTIVES FOR JOINING AFD PROGRAM	FREQUENCY	PERCENT
PROPERTY TAX RELIEF	40	66.66
PROTECTION FROM ANTI-NUISANCE SUITS	0	0
INFLUENCE OF NEIGHBORS	0	0
DID NOT COST MUCH TO JOIN	0	0
PRESERVATION OF SCENIC OR OPEN SPACE	4	6.66
ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER	0	0
PROTECTION OF FAMILY FARM BUSINESS	7	11.66
INTEREST IN ORDERLY DEVELOPMENT OF MY COMMUNITY	0	0
KEEP AGRICULTURE STRONG IN THE COMMUNITY	1	1.66
KEEP AGRICULTURE STRONG IN THE COUNTY	8	13.33
PREVENT THE DEVELOPMENT OF STATE AND COUNTY SERVICES ON MY PROPERTY	0	0
OTHER	0	0

N = 60

TABLE E.18
FREQUENCY OF CONSTITUENTS' OPINIONS ON LOCAL LAND USE ISSUES
AS PERCEIVED BY NON-AFD COUNTY SUPERVISORS

LAND USE ISSUE	CONSTITUENTS' OPINIONS			
	STRONGLY HELD BY MAJORITY	STRONGLY HELD BY INFLUENTIAL MINORITY	WEAKLY HELD BY MAJORITY	WEAKLY HELD BY MINORITY
NON-AGRICULTURAL POPULATION GROWTH	19	13	3	15
AGRICULTURAL LAND CONVERSION	19	15	9	7
KEEP AGRICULTURE STRONG IN COMMUNITY	22	6	12	10
NUISANCE SUITS AGAINST FARMERS	39	7	1	3
AGRICULTURE VIEWED AS NUISANCE	42	4	2	2
AESTHETIC DAMAGE FROM NON-AGRICULTURAL DEVELOPMENT	33	1	3	4
FARMERS PAYING UNFAIR TAXES	31	5	10	4

N = 50

TABLE E.18
(CONTINUED)

FREQUENCY OF CONSTITUENTS' OPINIONS ON LOCAL LAND USE ISSUES
AS PERCEIVED BY NON-AFD COUNTY SUPERVISORS

LAND USE ISSUE	CONSTITUENTS' OPINIONS			
	STRONGLY HELD BY MAJORITY	STRONGLY HELD BY INFLUENTIAL MINORITY	WEAKLY HELD BY MAJORITY	WEAKLY HELD BY MINORITY
FARMERS NOT PAYING ENOUGH TAXES	29	9	6	6
DECISIONS ABOUT LOCAL ENVIRONMENTAL ISSUES BEST MADE LOCALLY	5	9	4	32
DECISIONS ABOUT LOCAL AGRICULTURAL ISSUES BEST MADE LOCALLY	3	3	6	38
EQUAL PROMOTION OF GROWTH AND DEVELOPMENT	5	7	5	33
SPECIAL CONCESSIONS FOR AGRICULTURE	11	9	11	19
NO GOVERNMENT IN LOCAL AGRICULTURE ISSUES	32	4	7	7

TABLE E.19
FREQUENCY OF CONSTITUENTS' OPINIONS ON LOCAL LAND USE ISSUES
AS PERCEIVED BY AFD COUNTY SUPERVISORS

LAND USE ISSUE	CONSTITUENTS' OPINIONS			
	STRONGLY HELD BY MAJORITY	STRONGLY HELD BY INFLUENTIAL MINORITY	WEAKLY HELD BY MAJORITY	WEAKLY HELD BY MINORITY
NON-AGRICULTURAL POPULATION GROWTH	19	10	8	23
AGRICULTURAL LAND CONVERSION	24	6	12	18
KEEP AGRICULTURE STRONG IN COMMUNITY	22	16	17	5
NUISANCE SUITS AGAINST FARMERS	46	5	5	4
AGRICULTURE VIEWED AS NUISANCE	48	4	7	1
AESTHETIC DAMAGE FROM NON-AGRICULTURAL DEVELOPMENT	29	10	12	9
FARMERS PAYING UNFAIR TAXES	36	6	12	6

N = 60

TABLE E.19
(CONTINUED)

FREQUENCY OF CONSTITUENTS' OPINIONS ON LOCAL LAND USE ISSUES
AS PERCEIVED BY AFD COUNTY SUPERVISORS

LAND USE ISSUE	CONSTITUENTS' OPINIONS			
	STRONGLY HELD BY MAJORITY	STRONGLY HELD BY INFLUENTIAL MINORITY	WEAKLY HELD BY MAJORITY	WEAKLY HELD BY MINORITY
FARMERS NOT PAYING ENOUGH TAXES	37	13	3	7
DECISIONS ABOUT LOCAL ENVIRONMENTAL ISSUES BEST MADE LOCALLY	11	5	8	36
DECISIONS ABOUT LOCAL AGRICULTURAL ISSUES BEST MADE LOCALLY	8	4	8	40
EQUAL PROMOTION OF GROWTH AND DEVELOPMENT	11	9	15	25
SPECIAL CONCESSIONS FOR AGRICULTURE	11	20	15	14
NO GOVERNMENT IN LOCAL AGRICULTURE ISSUES	39	15	3	3

TABLE E.20

FREQUENCY OF AFD COUNTY SUPERVISORS' OPINIONS ON LOCAL LAND USE ISSUES

LAND USE ISSUE	SUPERVISORS' OPINIONS		
	AGREE	DISAGREE	NO OPINION
NON-AGRICULTURAL POPULATION GROWTH	39	21	0
AGRICULTURAL LAND CONVERSION	27	31	2
KEEP AGRICULTURE STRONG IN COMMUNITY	26	27	7
NUISANCE SUITS AGAINST FARMERS	11	44	5
AGRICULTURE VIEWED AS NUISANCE	16	39	5
AESTHETIC DAMAGE FROM NON-AGRICULTURAL DEVELOPMENT	24	32	4
FARMERS PAYING UNFAIR TAXES	14	41	5

N = 60

TABLE E.20
(CONTINUED)

FREQUENCY OF AFD COUNTY SUPERVISORS' OPINIONS ON LOCAL LAND USE ISSUES

LAND USE ISSUE	SUPERVISORS' OPINIONS		
	AGREE	DISAGREE	NO OPINION
FARMERS NOT PAYING ENOUGH TAXES	12	43	5
DECISIONS ABOUT LOCAL ENVIRONMENTAL ISSUES BEST MADE LOCALLY	54	5	1
DECISIONS ABOUT LOCAL AGRICULTURAL ISSUES BEST MADE LOCALLY	55	4	1
EQUAL PROMOTION OF GROWTH AND DEVELOPMENT	51	8	1
SPECIAL CONCESSIONS FOR AGRICULTURE	53	6	1
NO GOVERNMENT IN LOCAL AGRICULTURE ISSUES	6	51	4

TABLE E.21
FREQUENCY OF NON-AFD COUNTY SUPERVISORS' OPINIONS ON LOCAL LAND USE ISSUES

LAND USE ISSUE	SUPERVISORS' OPINIONS		
	AGREE	DISAGREE	NO OPINION
NON-AGRICULTURAL POPULATION GROWTH	24	26	0
AGRICULTURAL LAND CONVERSION	13	36	1
KEEP AGRICULTURE STRONG IN COMMUNITY	16	29	5
NUISANCE SUITS AGAINST FARMERS	2	47	1
AGRICULTURE VIEWED AS NUISANCE	3	40	7
AESTHETIC DAMAGE FROM NON-AGRICULTURAL DEVELOPMENT	10	33	7
FARMERS PAYING UNFAIR TAXES	8	40	7

N = 50

TABLE E.21
(CONTINUED)

FREQUENCY OF NON-AFD COUNTY SUPERVISORS' OPINIONS ON LOCAL LAND USE ISSUES

LAND USE ISSUE	SUPERVISORS' OPINIONS		
	AGREE	DISAGREE	NO OPINION
FARMERS NOT PAYING ENOUGH TAXES	6	42	2
DECISIONS ABOUT LOCAL ENVIRONMENTAL ISSUES BEST MADE LOCALLY	42	6	1
DECISIONS ABOUT LOCAL AGRICULTURAL ISSUES BEST MADE LOCALLY	47	2	1
EQUAL PROMOTION OF GROWTH AND DEVELOPMENT	47	1	1
SPECIAL CONCESSIONS FOR AGRICULTURE	22	19	8
NO GOVERNMENT IN LOCAL AGRICULTURE ISSUES	11	38	1

TABLE E.22
FARMING ENTERPRISE MIXES: CULPEPER COUNTY AFD AND NON-AFD LANDOWNERS

FARM ENTERPRISE MIX	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
DAIRY (INCLUDING FEED CROP PRODUCTION)	14	9	11.86	6.92
CASH CROPS (CORN, SOYBEANS, WHEAT, ETC.)	8	11	6.87	8.46
LIVESTOCK (BEEF, CATTLE, HOGS, ETC.)	65	78	55.08	60.00
POULTRY	0	0	0	0
SPECIALTY CROPS (ORCHARDS, VEGETABLES, ETC.)	0	0	0	0
FOREST FOR COMMERCIAL HARVEST (INCLUDING CHRISTMAS TREES)	6	4	5.08	3.07
MIXED	13	9	11.01	6.92
OTHER	12	18	10.16	13.84

AFD = 118

NON-AFD = 130

TABLE E.23
DESCRIPTION OF COMMUNITY WITHIN WHICH AGRICULTURAL LAND LIES

COMMUNITY DESCRIPTION	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
COMMUNITY IS A RURAL AREA (POPULATION LESS THAN 100 PER SQUARE MILE)	98	93	75.38	76.66
COMMUNITY CONTAINS A VILLAGE (100 - 2,000 POPULATION)	14	13	10.76	11.01
COMMUNITY CONTAINS A TOWN (3,000 - 7,000 POPULATION)	18	11	13.84	9.32

AFD = 118

NON-AFD = 130

TABLE E.24
FARM BUSINESS ORGANIZATION

FARM BUSINESS ORGANIZATION	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
SOLE PROPRIETORSHIP	85	113	72.03	86.92
PARTNERSHIP	12	12	10.16	9.23
SUBCHAPTER S CORPORATION	7	1	5.93	.76
SUBCHAPTER C CORPORATION	2	0	1.69	0
CASH LEASE / RENT	10	4	8.97	3.07
SHARE CROP / SHARE LEASE	2	0	1.69	0
OTHER	0	0	0	0

AFD = 118

NON-AFD = 130

TABLE E.25
FARM BUSINESS TITLE

FARM BUSINESS TITLE	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
SOLE OWNERSHIP / INDIVIDUALLY HELD	60	78	50.89	60.00
JOINT TENNANCY WITH RIGHT OF SURVIVOR	40	48	33.89	36.92
TENNANCY IN COMMON	3	1	2.54	.76
PARTNERSHIP	8	3	6.78	2.30
CORPORATION (TITLE HELD BY THE CORPORATION)	7	0	5.93	0
OTHER	0	0	0	0

AFD = 118

NON-AFD = 130

TABLE E.26
GROSS RECEIPTS FROM SALES OF FARM PRODUCTS

GROSS RECEIPTS	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
0 - \$19,999	73	98	61.86	75.38
\$20,000 - \$39,999	11	10	9.32	7.69
\$40,000 - \$59,999	8	8	6.78	6.15
\$60,000 - \$79,999	3	4	2.54	3.07
\$80,000 - \$99,999	2	0	1.69	0
\$100,000 - \$149,999	2	6	1.69	4.61
\$150,000 - \$199,999	3	2	2.54	1.53
\$200,000 - \$249,999	3	0	2.54	0
\$250,000 - \$299,999	2	1	1.69	.76
\$300,000 - \$349,999	0	0	0	0
\$350,000 - \$399,999	0	1	0	.76
OVER \$400,000	11	0	9.32	0

AFD = 118

NON-AFD = 130

TABLE E.27
NET FARM BUSINESS INCOME BEFORE TAXES

NET FARM INCOME	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
0 - \$4,999	17	40	14.40	30.76
\$5,000 - \$9,999	57	62	48.30	47.69
\$10,000 - \$14,999	19	16	16.10	12.30
\$15,000 - \$19,999	6	4	5.00	3.07
\$20,000 - \$24,999	3	3	2.54	2.30
\$25,000 - \$29,999	2	3	1.69	2.30
\$30,000 - \$34,999	1	0	.84	0
\$35,000 - \$39,999	1	0	.84	0
\$40,000 - \$44,999	1	0	.84	0
\$45,000 - \$49,999	4	0	3.39	0
OVER \$50,000	5	0	4.23	0

AFD = 118

NON-AFD = 130

TABLE E.28
PLANS FOR AGRICULTURAL LAND OVER THE NEXT TEN YEARS

OPERATING PLANS	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
CONTINUE OPERATING PRESENT FARMLAND AT CURRENT ACREAGE AND LEVEL OF INTENSITY	79	68	60.76	57.62
INCREASE ACREAGE AND/OR LEVEL OF INTENSITY OF PRESENT FARM	13	14	10.00	11.86
DECREASE ACREAGE AND/OR LEVEL OF INTENSITY OF PRESENT FARM	6	4	4.61	3.39
REDUCE MY TIME DEVOTED TO THE FARM BUT HAVE A FAMILY MEMBER CONTINUE TO FARM IT	8	10	6.15	8.47
DISCONTINUE OPERATING FARM	22	21	16.92	17.79
OTHER	2	1	1.53	.84

AFD = 118

NON-AFD = 130

TABLE E.29
PLANS FOR CHILDREN OR GRANDCHILDREN TO CONTINUE FARMING

PLANS CHILDREN OR GRANDCHILDREN	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
CHILDREN OR GRANDCHILDREN PLAN TO CONTINUE FARMING	53	33	39.23	27.96
CHILDREN OR GRANDCHILDREN HAVE NO PLANS TO CONTINUE FARMING	75	71	57.69	60.16
I PLAN FOR MY CHILDREN OR GRANDCHILDREN TO CONTINUE FARMING	58	42	44.61	35.59
I HAVE NO PLANS FOR MY CHILDREN OR GRANDCHILDREN TO CONTINUE FARMING	67	63	51.53	53.39
I HAVE NO CHILDREN	4	14	3.07	11.8

AFD = 118

NON-AFD = 130

TABLE E.30

PLANS FOR AGRICULTURAL LAND IF FARMING WERE DISCONTINUED IN 1984

OPERATING PLANS	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
RENT TO SOMEONE OUTSIDE THE FAMILY WHO WOULD CONTINUE TO FARM IT	23	24	17.69	20.33
RENT TO FAMILY MEMBER WHO WOULD CONTINUE TO FARM IT	52	33	40.00	27.96
SELL TO A FAMILY MEMBER WHO WOULD CONTINUE TO FARM IT	19	20	14.61	16.93
SELL TO SOMEONE OUTSIDE THE FAMILY WHO WOULD CONTINUE TO FARM IT	23	25	17.69	21.18
SELL TO SOMEONE (INCLUDING FAMILY MEMBERS) TO DEVELOP FOR NON-FARM USE	13	12	10.00	10.16
OTHER	0	4	0	3.39

AFD = 118

NON-AFD = 130

TABLE E.31
PLANS FOR FUTURE FARM IMPROVEMENTS OVER THE NEXT TEN YEARS

PLANS FOR FUTURE IMPROVEMENTS	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
MAKE NO NEW INVESTMENTS IN FARM IMPROVEMENTS	66	46	50.76	38.48
MAKE NEW IMPROVEMENTS (LESS THAN \$ 15,000 TOTAL)	43	47	33.07	39.83
MAKE NEW IMPROVEMENTS (MORE THAN \$ 15,000 TOTAL)	21	27	16.15	20.33

AFD = 118

NON-AFD = 130

TABLE E.32
REAL PROPERTY IMPROVEMENTS OVER THE LAST TEN YEARS

PROPERTY IMPROVEMENTS	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
NEW FENCES FOR FIELDS	25	23	21.18	17.53
NEW BUILDINGS FOR LIVESTOCK, EQUIPMENT OR FEED STORAGE	13	16	11.01	12.30
NEW PERMANENT SOIL CONSERVATION INVESTMENTS	2	4	1.69	3.07
NEW WELLS OR OTHER PERMANENT WATER SOURCES	2	3	1.69	2.30
NO NEW IMPROVEMENTS	0	2	0	1.53
MORE THAN ONE LISTED ABOVE	58	64	49.15	49.23
OTHER	18	0	15.25	0

AFD = 118

NON-AFD = 130

TABLE E.33
OFFERS TO BUY AND PLANS TO SELL AGRICULTURAL LAND

OFFERS TO BUY / PLANS TO SELL	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
I HAVE HAD OFFERS TO BUY ALL OR PART OF MY FARMLAND FOR AGRICULTURAL USE	23	34	19.47	26.15
I HAVE HAD OFFERS TO BUY ALL OR PART OF MY FARMLAND FOR NON-AGRICULTURAL USE	26	30	22.03	23.07
I HAVE ADVERTISED MY FARMLAND FOR SALE	8	23	6.70	17.69
I HAVE SOLD PART OF MY FARMLAND FOR NON-AGRICULTURAL USE	9	17	7.62	13.07
I PLAN TO SELL MY FARMLAND FOR NON-AGRICULTURAL USE WITHIN FIVE YEARS	12	19	10.16	14.61
I PLAN TO SELL MY FARMLAND FOR NON-AGRICULTURAL USE WITHIN TEN YEARS	7	3	5.93	2.30
I PLAN TO SELL MY FARMLAND FOR NON-AGRICULTURAL USE WITHIN TWENTY YEARS	8	13	6.78	10.00
I PLAN TO SELL MY FARMLAND FOR NON-AGRICULTURAL USE IN MORE THAN TWENTY YEARS	0	2	0	1.53
I HAVE NO PLANS TO SELL MY FARMLAND DURING MY LIFETIME	91	92	77.11	70.76

TABLE E.34
 LANDOWNER INFORMATION SOURCES: CULPEPER COUNTY AFD PROGRAM

INFORMATION SOURCE	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
RADIO OR TV	1	9	.84	6.92
NEWSPAPER	19	18	16.10	13.84
FAMILY OR RELATIVES	14	9	11.86	6.92
FARM RELATED ORGANIZATION	18	16	15.25	12.30
FRIENDS OR NEIGHBORS	44	20	37.28	15.38
MEETING CALLED BY AGRICULTURAL LANDOWNERS	4	2	3.39	1.53
MEETING CALLED BY BOARD OF SUPERVISORS	2	2	1.69	1.53
MEETING CALLED BY COUNTY EXTENSION OFFICE	10	4	8.47	3.07
MEETING CALLED BY COUNTY PLANNING OFFICE	5	2	4.23	1.53
OTHER	1	1	.84	.76
NOT FAMILIAR WITH PROGRAM	0	47	0	36.15

AFD = 118

NON-AFD = 130

TABLE E.35
 "BEST" LANDOWNER INFORMATION SOURCES: CULPEPER COUNTY AFD PROGRAM

INFORMATION SOURCE	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
RADIO OR TV	0	6	0	4.61
NEWSPAPER	18	25	15.25	19.23
FAMILY OR RELATIVES	8	3	6.78	2.30
FARM RELATED ORGANIZATION	17	14	14.40	10.76
FRIENDS OR NEIGHBORS	30	9	25.42	6.92
MEETING CALLED BY AGRICULTURAL LANDOWNERS	1	2	.84	1.53
MEETING CALLED BY BOARD OF SUPERVISORS	3	1	2.54	.76
MEETING CALLED BY COUNTY EXTENSION OFFICE	28	16	23.72	0.76
MEETING CALLED BY COUNTY PLANNING OFFICE	12	4	10.16	12.30
OTHER	1	3	.84	2.30
NOT FAMILIAR WITH PROGRAM	0	47	0	36.15

AFD = 118 NON-AFD = 130

TABLE E.36

PEOPLE INFLUENTIAL IN LANDOWNERS' DECISION TO PARTICIPATE OR
NOT PARTICIPATE IN THE CULPEPER COUNTY AFD PROGRAM

INFLUENTIAL PEOPLE	FREQUENCY		PERCENT	
	AFD	NON-AFD	AFD	NON-AFD
CHILDREN OR SPOUSE	1	2	.84	1.53
GRANDCHILDREN	0	1	0	.76
NEIGHBOR OR RELATIVE	16	2	13.55	1.53
COUNTY EXTENSION AGENT	5	0	4.23	0
FARMER WITH LAND IN AFD	28	0	23.72	0
FARM RELATED ORGANIZATION	2	0	1.69	0
PEOPLE FROM CHURCH	0	0	0	0
MY PERSONAL DECISION	53	73	44.91	56.15
OTHER	2	5	1.69	3.72
NOT FAMILIAR WITH PROGRAM	0	47	0	36.15

AFD = 118

NON-AFD = 130

TABLE E.37
MOTIVES FOR JOINING CULPEPER COUNTY AFD PROGRAM

MOTIVES FOR JOINING CULPEPER COUNTY AFD PROGRAM	FREQUENCY	PERCENT
PROTECTION FROM ANTI-NUISANCE SUITS	3	2.54
KEEP AGRICULTURE STRONG IN MY COMMUNITY	8	6.87
ENSURE ADEQUATE SUPPLY OF FOOD AND FIBER	0	0
DID NOT COST MUCH TO JOIN	0	0
PROTECTION OF SCENIC OR OPEN SPACE	3	2.54
PROTECTION OF FAMILY FARM BUSINESS	5	4.23
INTEREST IN ORDERLY DEVELOPMENT OF MY COMMUNITY	1	.84
INFLUENCE OF NEIGHBORS	1	.84
HOPED TO KEEP MY TAXES DOWN	68	57.62
PREVENT THE DEVELOPMENT OF STATE AND COUNTY SERVICES ON MY PROPERTY	0	0
INCREASE THE VALUE OF MY LAND BY PROTECTING IT FROM PREMATURE DEVELOPMENT	2	1.69
KEEP AGRICULTURE STRONG IN CULPEPER COUNTY	1	.84
COMBINATION OF REASONS LISTED ABOVE	26	22.03

N = 118

TABLE E.38
MOTIVES FOR NOT JOINING CULPEPER COUNTY AFD PROGRAM

MOTIVES FOR NOT JOINING CULPEPER COUNTY AFD PROGRAM	FREQUENCY	PERCENT
NOT FAMILIAR WITH THE PROGRAM	47	36.15
THE PROGRAM IS TOO RESTRICTIVE	15	11.53
PLAN TO SELL MY LAND FOR DEVELOPMENT WITHIN EIGHT YEARS	4	3.07
NOT ENOUGH BENEFITS FOR WHAT IT WOULD COST IN TIME OR MONEY	4	3.07
FARMLAND PROTECTION IS NOT A PROBLEM	8	6.15
NOT ENOUGH INFORMATION ON THE PROGRAM	5	3.84
DECIDED TO WAIT AND SEE HOW THE PROGRAM WORKS	5	3.84
DO NOT WANT MY LAND USE DECISIONS TIED UP BY OTHERS	25	19.23
PREFER NOT TO PARTICIPATE IN GOVERNMENT PROGRAMS	12	9.23
COMBINATION OF REASONS LISTED ABOVE	0	0
OTHER	5	3.84

N = 118

TABLE E.39
 PLANS FOR FUTURE INVOLVEMENT IN CULPEPER COUNTY AFD PROGRAM

PLANS FOR FUTURE INVOLVEMENT	FREQUENCY	PERCENT
CONTINUE IN AFD AFTER EIGHT YEAR REVIEW	112	94.91
DISCONTINUE IN AFD AFTER EIGHT YEAR REVIEW	6	5.05
ADD ACRES TO AFD AFTER EIGHT YEAR REVIEW	3	2.54
KEEP AFD ACREAGE THE SAME AFTER EIGHT YEAR REVIEW	17	14.40
ALL MY LAND IS IN AN AFD	98	83.05
WITHDRAW FROM AFD BEFORE EIGHT YEAR REVIEW	2	1.69
NO PLAN TO WITHDRAW FROM AFD BEFORE EIGHT YEAR REVIEW	116	98.03
INTERESTED IN JOINING A COMMUNITY ASSOCIATION OF AFD MEMBERS	56	47.45
INTERESTED IN JOINING A STATE ASSOCIATION OF AFD MEMBERS	39	33.05

N = 118

TABLE E.40

FREQUENCY OF CULPEPER COUNTY NON-AFD LANDOWNERS' OPINIONS ON LOCAL LAND USE ISSUES

LAND USE ISSUE	NON-AFD LANDOWNERS' OPINIONS		
	AGREE	DISAGREE	NO OPINION
NON-AGRICULTURAL POPULATION GROWTH	96	19	15
AGRICULTURAL LAND CONVERSION	76	40	14
KEEP AGRICULTURE STRONG IN COMMUNITY	72	46	12
NUISANCE SUITS AGAINST FARMERS	32	70	28
AGRICULTURE VIEWED AS NUISANCE	20	83	27
AESTHETIC DAMAGE FROM NON-AGRICULTURAL DEVELOPMENT	42	39	49
FARMERS PAYING UNFAIR TAXES	62	44	24

N = 130

TABLE E.40
(CONTINUED)

FREQUENCY OF CULPEPER COUNTY NON-AFD LANDOWNERS' OPINIONS ON LOCAL LAND USE ISSUES

LAND USE ISSUE	NON-AFD LANDOWNERS' OPINIONS		
	AGREE	DISAGREE	NO OPINION
FARMERS NOT PAYING ENOUGH TAXES	18	93	19
DECISIONS ABOUT LOCAL ENVIRONMENTAL ISSUES BEST MADE LOCALLY	99	13	18
DECISIONS ABOUT LOCAL AGRICULTURAL ISSUES BEST MADE LOCALLY	115	10	5
EQUAL PROMOTION OF GROWTH AND DEVELOPMENT	108	11	11
SPECIAL CONCESSIONS FOR AGRICULTURE	122	5	3
NO GOVERNMENT IN LOCAL AGRICULTURE ISSUES	64	50	16

TABLE E.41
 FREQUENCY OF CULPEPER COUNTY AFD LANDOWNERS' OPINIONS ON LOCAL LAND USE ISSUES

LAND USE ISSUE	AFD LANDOWNERS' OPINIONS		
	AGREE	DISAGREE	NO OPINION
NON-AGRICULTURAL POPULATION GROWTH	83	20	15
AGRICULTURAL LAND CONVERSION	62	41	15
KEEP AGRICULTURE STRONG IN COMMUNITY	68	32	18
NUISANCE SUITS AGAINST FARMERS	36	64	18
AGRICULTURE VIEWED AS NUISANCE	27	72	19
AESTHETIC DAMAGE FROM NON-AGRICULTURAL DEVELOPMENT	39	38	41
FARMERS PAYING UNFAIR TAXES	60	42	16

N = 118

TABLE E.41
(CONTINUED)

FREQUENCY OF CULPEPER COUNTY AFD LANDOWNERS' OPINIONS ON LOCAL LAND USE ISSUES

LAND USE ISSUE	AFD LANDOWNERS' OPINIONS		
	AGREE	DISAGREE	NO OPINION
FARMERS NOT PAYING ENOUGH TAXES	10	94	14
DECISIONS ABOUT LOCAL ENVIRONMENTAL ISSUES BEST MADE LOCALLY	89	16	13
DECISIONS ABOUT LOCAL AGRICULTURAL ISSUES BEST MADE LOCALLY	97	11	10
EQUAL PROMOTION OF GROWTH AND DEVELOPMENT	90	10	18
SPECIAL CONCESSIONS FOR AGRICULTURE	109	6	3
NO GOVERNMENT IN LOCAL AGRICULTURE ISSUES	43	57	18

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the scanned document**