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RURAL COMMUNITY DEVELOPMENT:
A COMMUNITY STATE APPROACH†

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Research in rural community development is being pursued in a number of different directions. One of these is the identification and analysis of economic development alternatives facing rural communities. A second is the clarification and study of the preferences that rural communities may have with respect to these alternatives. The purpose of this paper is to provide a conceptual framework for integrating these two thrusts in rural development research.

In Section I we provide a conceptual overview of the community development process, emphasizing community change. In Section II we inquire into the nature of community preferences, the concept of community welfare and the possibility for a transitive community ordering over alternative community states. Section III provides a simplified example of community change and community choice based on the arguments of Sections I and II. Section IV discusses some of the difficulties encountered in the preliminary attempts to implement the community state methodology; the final section contains a summary.

I. A Conceptual Approach to Community Change

The central concept of this paper is the community state. A community state is depicted by a collection of indices that show the values of a number of variables chosen to characterize the position of the community at any particular point in time. In symbols, let

$$(1) \quad S_t = \begin{bmatrix} s_{1,t} \\ \vdots \\ s_{n,t} \end{bmatrix}$$

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represent the state of a particular community in time t where $s_{i,t}$ is the level of the i^{th} community variable ($i = 1, 2, \dots, n$; $t = 1, 2, \dots, T$). For example $s_{1,t}$ might be the property tax rate, $s_{2,t}$ community population, $s_{3,t}$ the amount of public open space, and so on, each evaluated at time t . Quite clearly, n may be very large and we postpone until Section IV a discussion of the problems of devising state vectors that give a reasonably complete characterization of a community's activity and identity.

Community change will be defined as a displacement of community state variables such that a new (distinct) community state evolves one period hence. The structure of this change is formulated as a series of first order difference equations where

$$(2) \begin{bmatrix} \Delta s_{1,t} \\ \vdots \\ \Delta s_{n,t} \end{bmatrix} = \begin{bmatrix} s_{1,t+1} - s_{1,t} \\ \vdots \\ s_{n,t+1} - s_{n,t} \end{bmatrix} = \begin{bmatrix} c_{1,t}(a_{1,t}, \dots, a_{m,t}; e_{1,t}, \dots, e_{K,t}) \\ \vdots \\ c_{n,t}(a_{1,t}, \dots, a_{m,t}; e_{1,t}, \dots, e_{K,t}) \end{bmatrix}$$

where $a_{j,t}$ is the value of the j^{th} community policy variable in time t , $j = 1, 2, \dots, m$ and $e_{k,t}$ is the value of the k^{th} exogenous variable in time t , $k = 1, 2, \dots, K$. The concept of a community policy variable is roughly equivalent to the concept of a "self-help" policy defined by Hildreth and Schaller (1972). Such variables are regarded as collective actions which can be undertaken by the community given their immediate resources. An exogenous variable is regarded as an external factor over which the community exercises no control. Such factors will, however, play a role in determining future community states, and an internal community policy might be the result of anticipated exogenous "shocks."^{1/}

Community policy variables might take such forms as changes in the property tax rate or assessment procedures, changes in the number of acres of land publicly held for conservation or recreation purposes, or changes in acreage zoned for industrial, residential or agricultural uses. Exogenous variables might take such forms as land use decisions in neighboring towns, changes in transportation networks, term structure

^{1/}It has been brought to our attention that in many situations the distinction between exogenous and community policy variables might be obscure. This could occur when a community does not have a clear perception of all policy alternatives. Thus actions which they could undertake appear infeasible.

For simplicity we have omitted specifying any relationships which might exist between policy variables at a point in time or through time. While such simultaneous or recursive relationships undoubtedly exist (especially where $a_{j,t}$ is a community investment necessitating a particular $a_{j,t+1}$, $a_{j,t+2}$, etc.) we have purposely suppressed them in this formulation.

of interest rates, and rates of inflation.

The system of equations represented by (2) might be more compactly written as

$$(3) \quad S_{t+1} = S_t + C_t(A_t, E_t).$$

The difference equations represented by C_t are likely to range from simple to highly complex. A major difficulty in estimating the functions is the dominance that the exogenous variables can have in small, open economies, particularly when some $e_{k,t}$ are highly volatile.

II. The Nature of Community Preferences

Residents in the community are assumed to have preferences with respect to changes in the community state variables defining the community state. We assume, furthermore, that these preferences yield a consistent ordering of all possible community states.

The viewpoint that individuals have preferences over alternative community states is not new; it is basic to much of the public finance literature that concerns itself with the level of public goods output. The evaluation of alternative policy decisions on a community level, a major preoccupation of the public choice school, depends on the assumption that individuals have preferences over the alternative community states that these policies will bring about (Bish [4]). Furthermore, in the Tiebout [12] model of public goods output, peoples' preferences over alternative community states are the motivating force behind the interjurisdictional migration that is supposed to lead toward optimal output levels of local public goods.

But while it seems plausible that individuals can order alternative community states is it possible to speak of consistent community orderings over alternative states? Early work by Arrow [2] showed that imposing reasonable conditions on social decision rules precluded the possibility of transitive social (community) orderings.^{2/}

This rather pessimistic result was not joyously received by the profession, particularly those who felt it damaging to social programs. A particularly troublesome problem was that the majority voting rule, a bastion of democratic decision making, resulted in an inconsistent or

^{2/}The conditions imposed by Arrow aside from consistency, were that the social welfare function (1) be defined for every admissible pair of individual orderings, (2) that it bear a positive association to individual values, (3) that it be independent of "irrelevant alternatives," (4) shall not be imposed and (5) shall not be dictatorial.

irrational ordering of social states. Several economists set about to uncover the source of the inconsistency in hopes of defining when the majority voting rule could be used to move from individual orderings of community states to a rational community ordering of those states. Restoration of the majority voting rule to the pedestal of rational social choice was only achieved by placing additional restrictions on the preferences of individuals within the community.^{3/} The more generalized statement of these additional restrictions has been called the "Possibility Theorem for Value-Restricted Preferences."

Following Sen [11] we will define a concerned individual as one who is not indifferent between all community states. An individual who is indifferent is unconcerned. The majority decision rule will order s_i as preferred to s_j if and only if the number of individuals regarding s_i as preferred or indifferent to s_j is at least as great as the number of individuals that regard s_j as preferred or indifferent to s_i . Sen has shown that if among the total set of community states there exists no triple (three states) which causes the majority decision rule to yield inconsistent results then the majority rule will give a consistent community ordering for all states. For any individual the value of a particular state within a triple is its property of being "best, worst or medium."^{4/} A value-restricted preference pattern occurs if one alternative in a triple is excluded from having any one of the above three values. The formal definition states:

"Assumption of Value-Restricted Preferences: A set of individual preferences over a triple of alternatives such that there exist one alternative and one value with the characteristic that the alternative never has that value in any individual's preference ordering, is called a Value-Restricted Preference pattern over that triple for those individuals."
(Sen [11], p. 492)

In a community development setting such a restriction might be assumed if the community was composed of like-minded individuals (at least with respect to development alternatives). The assumption itself is capable

^{3/}Arrow [3] and earlier Black [5] noted that the inconsistency of the majority voting rule would be removed if the underlying preferences of individuals within the community were "single-peaked." Inada [9] examined two other types of preference restrictions which would permit consistency of the majority voting rule while Ward [14] examined a third such restriction. It was not until Sen [11] that these various restrictions were generalized.

^{4/}Sen notes: "Of course, in orderings involving indifference, an alternative can have more than one value, in fact, if individuals are not 'concerned' then each alternative has each value."

of being tested for any particular community and any particular set of community development states (alternatives).

The major contribution of Sen is a possibility theorem which is stated here without proof. It is a generalization of the additional restrictions which must hold for individual preferences within a community for the majority decision rule to be regarded as consistent and representative. The theorem is stated in terms of Arrow's Social Welfare Function (see footnote 3) as follows:

"Theorem 1 (Possibility Theorem for Value-Restricted Preferences): The method of majority decision is a social welfare function satisfying Arrow's Conditions 2-5 and the consistency condition for any number of alternatives, provided the preferences of concerned individuals over every triple of alternatives is Value-Restricted, and the number of concerned individuals for every triple is odd." (Sen [11], p. 493).^{5/}

An example of three community states for which the preferences of the concerned individuals are value-restricted is easily constructed. Consider the question of whether a community should increase, decrease or leave unchanged the budget appropriations for education. These three alternatives, when taken in conjunction with other budget considerations, are assumed to define three community states so that S_1 corresponds to an increase in educational appropriations, S_2 corresponds to a decrease, and S_3 an unchanged budget. If no individual in the community regarded a decrease in educational appropriations as the "best" state of community affairs then the assumption of value-restricted preferences would be satisfied for these three states. It would remain to be seen whether all such triples would satisfy this restriction.

What are the implications of this analysis and more importantly, perhaps, what sort of mandate would the existence of value-restricted preferences and a consistent and representative community ordering imply? At least three comments are in order. The assumption of value-restricted preferences is essentially a static property. As with all assumptions about an individual's preferences (or derivable artifacts of those preferences such as demand curves), they may change over time. Because the preferences of individuals in a community satisfy the assumption of value-restrictiveness at one point in time is no guarantee that such a restriction will hold at a later date. Secondly, value-restrictiveness is defined for a given set of alternative community states. If additional

^{5/}The requirement that the number of concerned individuals be odd would only be essential in a situation where an even numbered community of concerned individuals were evenly divided over the ranking of two community states. While this condition is necessary for the proof of the theorem it is unlikely to prove essential in an applied situation where a sizable community (say, greater than two hundred) is asked to order certain development states.

community states should become feasible there is the potential that these new alternatives might vitiate restrictiveness.

A third criticism is directed more at the majority decision rule than at the assumption of value-restrictiveness. Certain authors regard the majority rule as abstracting away the intensity of preferences which individuals have on certain issues. Dahl [7, p. 90] writes:

"What if the minority prefers its alternative much more passionately than the majority prefers a contrary alternative? Does the majority principle still make sense?"

This is the problem of intensity. And, as one can readily see, intensity is almost a modern psychological version of natural rights. For, much as Madison believed that government should be constructed so as to prevent majorities from invading the natural rights of minorities, so a modern Madison might argue that government should be designed to inhibit a relatively apathetic majority from cramming its policy down the throats of a relatively intense minority."

In spite of the possibly tenuous existence of value-restrictiveness and the shortcomings of the majority voting rule it is maintained that a survey into the nature of community preferences is essential if community policies are to be successful. If it can be established that the individuals in a community have a similarity of preferences which permit a consistent and representative ordering of community states, then a relatively clear program of action to achieve a preferred community state might be identified. If the preferences of individuals in a community are heterogeneous the source of these differences can be examined. If such differences are based on an unsatisfactory distribution of income a policy based on explicit equity assumptions might be advanced. Such an investigation into community preferences can help identify the target group within the community for which specific, equity-based programs are directed.6/

6/It has been questioned whether the presence of value-restrictiveness would alleviate any of the difficulties in real world community decision making where intense minorities, logrolling, and non-majority voting rules prevail. The role which a survey revealing value restrictiveness could play would be mainly informative. If, however, both decision makers and their constituents are aware of a preferred community policy (in the value-restricted sense) the responsibility of elected officials to the "will of the people" they represent will take on added weight.

III. An Example of the Community State Approach to Rural Community Development

As a means of illustrating the community state approach consider the following two period model, containing three community state variables, three policy variables, two exogenous variables, and where the community is limited to choosing among three distinct policy vectors. Specifically let

$s_{i,\ell,t}$ = the level of the i^{th} community state variable in time t for the ℓ^{th} community policy vector (and given exogenous variables) where: $i = 1, 2, 3$; $\ell = 1, 2, 3$; $t = 0, 1$

$a_{j,\ell,t}$ = level of j^{th} community policy variable in ℓ^{th} policy vector in time t , $j = 1, 2, 3$

$e_{k,t}$ = level of k^{th} external factor in time t , $k = 1, 2$

$$s_0 = \begin{bmatrix} s_{1,0} \\ s_{2,0} \\ s_{3,0} \end{bmatrix} = \text{initial community state}$$

Then

$$(4) \quad s_{\ell,1} = s_0 + C_0(A_{\ell,0}; E_0)$$

where

$$(5) \quad C_0(A_{\ell,0}; E_0) = \begin{bmatrix} C_{1,0} (a_{1,\ell,0}, a_{2,\ell,0}, a_{3,\ell,0}; e_{1,0}, e_{2,0}) \\ C_{2,0} (a_{1,\ell,0}, a_{2,\ell,0}, a_{3,\ell,0}; e_{1,0}, e_{2,0}) \\ C_{3,0} (a_{1,\ell,0}, a_{2,\ell,0}, a_{3,\ell,0}; e_{1,0}, e_{2,0}) \end{bmatrix}$$

and the above equations of community change are assumed to take the following form:

$$C_{1,0} (\dots) = 5a_{1,\ell,0} - 2a_{2,\ell,0}^{0.5} a_{3,\ell,0}^{0.5} + 2e_{1,0} - 0.7e_{2,0}$$

$$(6) \quad C_{2,0} (\dots) = 3a_{2,\ell,0} - 0.7a_{1,\ell,0}^{0.2} a_{3,\ell,0}^{0.8} - 0.7e_{1,0} + 0.2e_{2,0}$$

$$C_{3,0} (\dots) = 4a_{3,\ell,0} - 0.6a_{1,\ell,0}^{0.6} a_{2,\ell,0}^{0.4} - 0.2e_{1,0} - 0.3e_{2,0}$$

Suppose that the community state variables were index numbers on a scale from 0 to 100 representing the level of economic opportunity, the level of local tax liability, and the level of environmental quality. Further, suppose the initial community state were

$$(7) \quad S_0 = \begin{bmatrix} 20 \\ 40 \\ 55 \end{bmatrix}$$

indicating a relatively low index of economic opportunity, (20), a slightly below average index of tax liability, (40), and a slightly above average index of environmental quality, (55).

The exogenous variables for which the community has little if any control have been forecast to assume the following values:

$$(8) \quad E_0 = \begin{bmatrix} 9 \\ 2 \end{bmatrix}$$

The community's choice in this simplified example is between three possible policy vectors:

$$(9) \quad A_{1,0} = \begin{bmatrix} 3 \\ 9 \\ 6 \end{bmatrix} \quad A_{2,0} = \begin{bmatrix} 4 \\ 7 \\ 2 \end{bmatrix} \quad \text{and} \quad A_{3,0} = \begin{bmatrix} 10 \\ 1 \\ 0 \end{bmatrix}$$

Substituting the initial community state, the vector of exogenous values, and in turn each policy vector into equation (4) will result in three distinct community states evolving in the future ($t=1$).

$$S_{1,1} = \begin{bmatrix} 36.90 \\ 57.44 \\ 73.81 \end{bmatrix} \quad S_{2,1} = \begin{bmatrix} 49.12 \\ 53.49 \\ 57.60 \end{bmatrix} \quad S_{3,1} = \begin{bmatrix} 86.60 \\ 37.10 \\ 50.21 \end{bmatrix}$$

The nature of these three alternative community states might be interpreted as follows:

1. The vector of exogenous values and policy vector one resulted in a community state ($S_{1,1}$) which has a below average index of economic opportunity (36.90), a slightly above average index of local tax liability (57.44) and a moderately high index of environmental quality (73.81).

2. The vector of exogenous values and policy vector two resulted in a community state ($S_{2,1}$) which has an average index of economic opportunity (49.12), an average index of tax liability (53.49) and a slightly above average index of environmental quality (57.60).

3. The vector of exogenous values and policy vector three resulted in a community state ($S_{3,1}$) with a high index of economic opportunity (86.60), a below average index of tax liability (37.10) and an average index of environmental quality (50.21).

Residents of this community, faced with certain exogenous factors, have a choice between three policy vectors each of which results in a distinct community state. These states along with the initial community state are summarized in Table I.

Table I
Initial and Alternative Future Community States*

Community State Variable	S_0	S_1	S_2	S_3
Economic Opportunity $S_{1,l,1}$	20.00	36.90	49.12	86.60
Tax Liability $S_{2,l,1}$	40.00	57.44	53.49	37.10
Environmental Quality $S_{3,l,1}$	55.00	73.81	57.60	50.21

*The time subscript on the future community states has been omitted.

Which of the future community states contained in Table I is preferred from the community's point of view? Is it possible to talk of a preferred community State?

In Section II it was posited that the majority voting rule would yield a transitive community ordering if the preferences of residents within the community were value-restricted. Suppose our community were populated by three individuals, A, B, and C. Suppose further that after careful consideration A, B, and C ranked the three future states as shown in Table II.

Table II
A Value-Restricted Ranking of Alternative Community States

Ranking	A	B	C
Best	S_2	S_2	S_1
Medium	S_1	S_3	S_2
Worst	S_3	S_1	S_3

That the rankings contained in Table II qualify as a value-restricted preference pattern can be seen by examining the rankings (or value) "best" and noting that the community state S_3 is not regarded best by any of the individuals. Given the above rankings it is seen that the majority voting rule would rank S_2 above S_1 (two votes to one); S_1 above S_3 (two votes to one) and be transitive since S_2 is indirectly and directly revealed preferred to S_3 (three votes to none). Hence, policy vector two would be adopted as the preferred course of community action.

The above ranking of course is purely arbitrary, and it might well have been the case that the preferences of A, B, and C would not satisfy the property of value restrictiveness. Again, in communities of relatively like-minded individuals, restricted preferences might be expected to occur, but what if preferences over the proposed community states were heterogeneous? Suppose after surveying our three-individual community that the ranking in Table III was observed.

In Table III S_2 is preferred to S_1 by A and B, S_1 is preferred to S_3 by B and C, but S_2 is not revealed preferred to S_3 since A and C prefer S_3 to S_2 . This is an example of the paradox of the majority voting

Table III
A Nonvalue-Restricted Ranking of Alternative Community States

Ranking	A	B	C
Best	S ₃	S ₂	S ₁
Medium	S ₂	S ₁	S ₃
Worst	S ₁	S ₃	S ₂

rule alluded to earlier.^{7/} What is the proper course of community action? Sidestepping such alternatives as vote bargaining and logrolling, the problem may come down to making a decision on purely equity considerations. If B were regarded as a deserving "target group" within the community, a case might be made for adopting policy vector two (resulting in community state two). Were A regarded as the target group policy vector three would be implemented, whereas adoption of policy vector one would promote C's welfare.

IV. Some Difficulties With the Community State Approach

It was mentioned earlier that the community state approach assumes that a community can be adequately described by a vector of community state variables. This is a strong assumption in that it assumes that all the relevant dimensions which go into defining the activity, character and identity of a community can be measured or quantified by an index. The problem of constructing a satisfactory state vector is somewhat akin to the problem of nonmonetary impacts encountered in the literature on project evaluation. While certain impacts associated with public projects may be nonmonetary, in that they are not priced in the market, they need not be unquantifiable. Some recent studies, one on the evaluation of public water resources projects and the other on coastal zone management have attempted to array nonmonetary but quantifiable impacts in a display matrix (see Bromley, Schmid, and Lord [6] and Allbee and Storey

^{7/}The preference patterns of individuals in the voting paradox example have been criticized as unrealistic in that they do not follow a plausible continuum of preferences. Note, C ranks the relatively environment-intensive state S₁ as best but prefers the relatively developed (environmentally poor) state S₃ as his next best choice. To some this sort of "multi peaked" preference pattern seems irrational and should be disallowed, if encountered.

[1]). With the growing body of literature dealing with environmental impacts, social indicators and other measures of community well-being it is felt that the construction of an operational community state vector for a rural community is not an insurmountable task.

If a satisfactory set of community state variables can be assembled another problem can be expected to arise. In even the smallest and most simplified community an exhaustive (or near exhaustive) characterization of present and future community states is likely to result in a lengthy list of community state variables. Each alternative future state could conceivably result in a displacement of each of these variables and a community resident trying to evaluate even a limited number of states might quickly encounter an "information overload." As an example, consider the situation confronting a resident faced with the five future community states in Table IV. State S_1 is a state resulting from a continuation of present community policy and certain external factors, and in that sense is considered a "status quo." State S_2 results from successful community policies designed to encourage the location of a large particleboard plant; state S_3 results from location of a smaller particleboard plant; S_4 results from location within the community of a small electronics firm, and S_5 from a conscious community campaign of no growth and investments in improved environmental quality. Each of these states (and the present state) is characterized by population, employment, labor force, income, housing, land use, public sector, retail-professional, and recreational and environmental amenities. If a scheme of pair-wise comparisons were made each resident would be asked to state his preferences between ten community state pairing such as the comparison between S_1 and S_2 in Table V. Tables IV and V are felt to contain the significant dimensions of community development decisions. They are not exhaustive and probably omit other important community state variables. But even in their present form they run the risk of being too complex in the eyes of community residents.

This is unfortunate, but it stems from the nature of the problem. Community development is a complex process and any attempt to approximate even a limited range of community impacts runs into difficulties of communicating the relevant information. For "smaller" alternatives, or sector-specific alternatives, the entire community state may not require enumeration, under the assumption that many state variables are the same in all future states and we need only portray the community variables which change from state to state. In these circumstances the community state approach might be greatly simplified.

A final difficulty results from the dynamics of community development. The two period model of Section III is consistent with the comparative static approach of most current models used to depict community change. However, for those policies resulting in changes occurring over an extended time horizon a full multiperiod analysis is required. This introduces two significant complications. First, the difference equations represented by (2) must be assumed to hold for the entire period

Table IV: Summary of Community States Resulting from Alternative Economic Development Options

Community State Variable	S ₀	S ₁	S ₂	S ₃	S ₄	S ₅
	Present	Status Quo	Large p.b. Plant	Small p.b. Plant	Small Electronics Firm	No-Growth Improved Environment
Population						
Year round	2900	3100	3300	3200	3200	3050
Seasonal	500	550	450	450	550	550
Employment						
Manufacturing	190	200	297	259	247	190
Trade	156	163	205	185	180	156
Agr.	50	40	40	40	40	60
Other	233	243	271	264	260	233
Total	629	646	813	748	727	639
Labor force						
Residents working in town	529	546	663	628	610	539
Residents working elsewhere	250	290	260	270	275	310
Unemployed	60	65	40	50	55	65
Non-residents working in town	100	100	150	120	117	100
Income per capita (\$)	3,400	3,500	4,100	4,000	3,900	3,500
Housing						
Single-family homes	740	792	830	815	810	762
Multiple-family homes	2	2	3	3	2	2
Seasonal homes	130	140	130	130	135	150
Land-use						
Land in farms	1500	1200	1000	1100	1150	1500
Urban land	890	990	1100	1050	1050	900
Forest	13,000	13,000	13,000	13,000	13,000	13,000
Other	2530	2730	2820	2770	2720	2520
Public Sector						
Tax rate (\$/1000)	50	60	30	40	45	70
Expenditures (\$1,000)						
Schools	595	610	615	615	620	630
Public safety	140	150	155	155	155	160
Public welfare	130	135	135	140	145	150
Highways	151	155	170	170	155	155
Health & sanitation	86	95	95	100	100	120
Water	40	40	40	45	40	45
Other	258	265	270	270	265	300
Total	1400	1450	1480	1495	1480	1560
Retail & Professional Services						
Resident physicians	4	5	7	5	4	5
Retail stores	12	13	20	18	17	12
Recreational and Environmental Amenities						
Public open space (acres)	70	70	65	65	70	100
Miles of excellent quality stream	15	13	8	10	13	15

Table V: A Questionnaire Designed to Reveal Resident Preference Patterns for Two Community States

Community State Variable	Present	<u>S₁</u>	<u>S₂</u>
		Status Quo	Large Particle-board Plant
Population			
Year round	2900	+ 200	+ 400
Seasonal	500	+ 50	- 50
Employment			
Manufacturing	190	+ 10	+ 107
Trade	156	+ 7	+ 49
Agr.	50	- 10	- 10
Other	233	+ 10	+ 38
Total	629	Net + 17	Net + 183
Labor force			
Residents working in town	529	+ 17	+ 134
Residents working elsewhere	250	+ 40	+ 10
Unemployed	60	+ 5	- 20
Non-residents working in town	100	0	+ 50
Income per capita (\$)	3,400	+ 100	+ 700
Housing			
Single-family homes	740	+ 52	+ 90
Multiple-family homes	2	0	+ 1
Seasonal homes	130	+ 10	0
Land-use			
Land in farms	1500	- 300	- 500
Urban land	890	+ 100	+ 210
Forest	13,000	0	0
Other	2530	+ 200	+ 290
Public Sector			
Tax rate (\$/1000)	50	+ 10	- 20
Expenditures (\$1,000)			
Schools	595	+ 15	+ 20
Public safety	140	+ 10	+ 15
Public welfare	130	+ 5	+ 5
Highways	151	+ 4	+ 19
Health & sanitation	86	+ 9	+ 9
Water	40	0	0
Other	258	+ 7	+ 12
Total	1400	Net + 50	Net + 80
Retail & Professional Services			
Resident physicians	4	+ 1	+ 3
Retail stores	12	+ 1	+ 8
Recreational and Environmental Amenities			
Public open space (acres)	70	0	- 5
Miles of excellent quality stream	15	- 2	- 7

Please indicate by checking the appropriate box whether you:

1. Prefer S₁ to S₂ ☐
2. Prefer S₂ to S₁ ☐
3. Are indifferent between S₁ and S₂ ☐

of analysis or must be respecified for the appropriate subperiods. In communities embarking on a time path of significant change the latter is more likely to be the case. Second, and more importantly, the community must be able to evaluate alternative time paths for the vector of state variables. This may necessitate the existence of a community welfare functional. The analysis could be formulated as a discrete or continuous problem in the theory of optimal control; that is, maximizing community welfare over some time interval subject to the equations for community change, given the initial community state and possible terminal conditions on certain of the community state variables. Because of the further restrictions on community preferences necessary for the existence of a welfare functional the two period static model would seem the appropriate level at which to test the applicability of the community state approach within a real rural community.

V. Summary and Conclusions

The community state approach involves the specification of an equation of change (or motion) which relates the levels of certain endogenous (self-help) policy variables as well as exogenous factors to the community state variables that collectively define the community state. The community is viewed as having a limited amount of control over its future destiny depending on the values it selects for the internal policy variables. Given a vector of external factors it is assumed that the community can achieve two or more distinct community states as a result of their choice of a policy vector. The question then becomes, which achievable community state is socially (communally) preferred? To answer this question residents of the community should be surveyed to see if a value-restricted pattern of preferences exists for every triple of states over all individuals. If the property of value restrictiveness is present and the majority voting rule is deemed the appropriate decision rule, then a preferred community state and policy vector can be identified. If preferences are such as to preclude a community ordering (in the sense of Arrow) then a decision as to the preferred policy vector must be based on an explicit welfare weighting of "target groups" within the community.

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