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ANALYZING ALTERNATIVES IN REGIONAL RESOURCE DEVELOPMENT*

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In Minnesota, a multi-county scale of resource planning and development is being established. Today, all of the 13 Minnesota planning regions have been or are being organized by multi-county Regional Commissions. A major concern of these commissions is planning for the development of critical social and environmental services, ranging from health care to water supply and wastewater treatment.

To help in developing and testing alternative approaches to regional resource planning, a multi-county study area was selected several years ago in West Minnesota. This area is part of a multi-area region which focuses on the Fargo-Moorhead SMSA [4, 6, 8].

The multi-area region of which the 14-county study area is a part forms an intermediate level in a regional development system. The largest of the three regions -- the Upper Midwest Region -- is roughly equivalent to the Ninth Federal Reserve District.[1]

Future patterns of resource development in Minnesota and the Upper Midwest can be influenced by public policy choices on future population distribution. The choices are typified by two contrasting settlement alternatives. One alternative is a continuation of the historical trends in population redistribution from peripheral areas to the metropolitan core areas, particularly the Twin Cities Metropolitan Area (TCMA). The other alternative is illustrated by the emergence of one or more sub-regional growth poles to absorb part of the industry expansion and population growth which otherwise could occur in the TCMA. A Commission on Minnesota's Future was established by the State legislature in 1973 to consider these and other regional development alternatives.

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[1]The three geographical areas are delineated by Maki [8, 9, 10] and Ulrich and Maki [16].

INFRASTRUCTURE PLANNING

Each of the regional development alternatives implies certain infrastructure requirements, including public facilities for municipal and industrial water supply, wastewater treatment, solid waste collection and disposal, flood control, land treatment and drainage, irrigation, recreation, power, and planning and development [1, 12, 13, 17]. Each of the specified areas of infrastructure development is water-related in some degree at least. These nine areas, moreover, are of immediate concern to municipal, township and county government units and, especially, the West Minnesota Resource Conservation and Development Project Committee. This Committee, which includes representation from the Boards of Commissioners of seven of the 14 counties in the study area, prepared a work plan in 1972 where specified project proposals are identified. These proposals are summarized and presented in Table 1 as an indication of some current priorities and concern in infrastructure planning.

A regional focus for the infrastructure planning is provided in the concept of a hierarchy of regions. The multi-county region is a primary level for planning and provision of essential social and environmental services which enhance the quality of life for local residents.[2] Included in the study area is one of the 13 Minnesota planning regions (covering 9 of the 14 counties). Within this region are two important subregional planning units, namely, watersheds and functional communities.

The nine-county Planning Region 4 covers all or part of 10 watershed units of which four flow into the Red River and three each flow into the Minnesota and Mississippi Rivers, respectively. Minnesota Planning Regions 1 and 2 cover the remaining four Minnesota watershed units in the Red River Basin.

All or part of the seven functional community units also are included in Region 4. These units are service areas for a major social service, namely, hospitals and medical care. They delineate other service areas, too, and they identify groupings of rural communities within the commuting areas of the principal shopping centers in the region.

The boundaries of the watershed unit and the community unit are not coterminus with the planning region boundaries. Nevertheless, the Region 4 resource planning functions will involve these basic spatial building blocks. The two sets of building blocks may be involved also in more extensive statewide planning functions (e.g., those of the Department of Natural Resources and the Department of Health).

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[2]The grouping of multi-county regions into a larger economic development region is another level of public planning, but the primary concern here is the viability of the region's economic base and its export-producing, primarily private sector, activities rather than the provision of social and environmental services.

TABLE 1: Natural Resource-Related Projects Proposed for Funding, by West Minnesota Resource Conservation and Development Project Committee, 1972.[a]

Item	Estimated Cost		Assistance		FY 1973 Budget (proposed) Local		Federal			
	Annual	Total	Technical	Financial	Private	Public	State	RC and D	Other	Total
				($1,000)						
Function:[b]										
Water supply	0	1,485	0	0	0	0	0	0	0	0
Wastewater treatment	932	9,600	0	21	451	2	15	7	457	932
Solid waste disposal	41	40	0	0	0	40	0	0	1	41
Flood control	5	1,318	0	14	0	0	0	4	1	5
Land treatment and drainage	451	9,266	41	154	38	118	40	225	30	451
Irrigation	136	10,778	0	3	31	0	38	4	63	136
Recreation	189	8,209	20	78	19	44	19	17	84	183
Power	10	510	0	0	0	0	0	0	10	10
Planning and development	451	168,684	0	0	7	6	8	422	8	451
Sponsor:[b]										
State	1	213	0	0	0	0	1	0	0	1
County	119	2,042	0	2	13	33	10	46	17	119
Township	38	5,030	0	0	30	0	5	1	2	38
Municipal	153	6,933	20	69	10	116	5	7	15	153
Other local government	266	17,211	40	41	44	33	12	126	51	266
Community development group	1,075	39,883	0	48	440	7	74	60	487	1,068
Civic organization	56	1,015	0	1	0	1	0	1	55	57
Sports organization	99	1,040	1	49	2	18	12	42	25	99
Private industry	408	136,523	0	0	7	2	1	396	2	408
Priority:[b]										
1 to 14	193	5,019	61	145	15	11	14	130	53	223
Unspecified[c]	2,022	204,871	0	65	531	199	106	549	631	2,016
TOTALS	2,215	209,890	61	210	546	210	120	679	684	2,239

[a]Based on data presented in 1972 Work Plan for West Minnesota Resource Conservation and Development Project.

[b]Refer to totals listed in bottom line for each group of items.

[c]Total of 75 proposed projects, including a major planned new community (which was rejected by the State Legislature in 1973).

The Regional Commission provides the organizational umbrella for bringing together the watershed and community concerns as they relate to (1) the local environment and (2) the local resident (including seasonal and weekend residents). The territorial boundaries of the umbrella organization are somewhat arbitrary in terms of spatial distributions of resources and people. This does not detract, however, from the potential for effective exercise of planning, police, taxing and spending powers which may be delegated to the Regional Commission. The two sets of building blocks may use other organizational channels, including the ones cited earlier, in pushing particular environmental or societal viewpoints.

Citizen and professional task forces in critical problem areas represent an additional approach in the regional planning process [5]. Geographical representation on each task force could be specified in terms of watershed or community units. Because of the focus on people and access to, and relationships with, essential services, the community unit emerges as an appropriate geographical unit for area task force organization.

A regional planning thrust to the study occurs, also, in the delineation of the nine problem areas cited earlier. With reference to wastewater treatment, for example, data are available from the State Pollution Control Agency (PCA) reports which show that for a large majority of municipal service systems, rivers are the final place of disposal for both treated and untreated sewage. Data on the extensive use of lakes and soil for the disposal of wastewater from individual business and residential units outside municipalities, however, are not available.

Much of the untreated wastewater originates in small municipalities (Table 2). The larger municipalities depend largely on secondary treatment. For most of the larger municipalities, the secondary facilities have been constructed since 1946 (although the first sewers for these municipalities were built before 1921). However, a substantial part of the population resides in municipalities which require additional improvements in existing sewers and treatment systems.

The State PCA is establishing a priority ranking system for the issuance of sewage facility construction permits under the National Pollutant Discharge Elimination System and it has initiated a multi-level (area, region and state) planning process for the disposition of all residual wastes from point sources. The State has been divided into 10 basins and the TCMA and within each basin or area all streams are divided into segments. Each stream segment is identified by its pollution status and ranked according to the severity of pollution, the affected population, the need for pure water, and national priorities. Since the Minnesota share of federal funding under the 1972 Federal Water Pollution Control Act (approximately $101.5 million) is less than one-half of the $212 million in total requests received by April 1973 for such funding, use of a statewide priority ranking system is inevitable.

RESOURCE DEVELOPMENT

Given the severe fiscal constraints imposed on local governments in a lagging region, the continuing emphasis on efforts to expand a community's economic base

TABLE 2: Total Population and Municipalities with Specified Status of Wastewater Treatment Facilities and Sewers, West Minnesota, 1970-71.

Size class of Municipality	Level of Wastewater Treatment				Sewers were built before 1921	Wastewater treatment facilities were built before 1946	Total area[a]
	Primary	Secondary	Tertiary	None			
	(number)						
Under 200	52 (1)	1,325 (8)	156 (1)	3,915 (32)	171 (1)	52 (1)	5,448 (42)
200-499	1,684 (5)	4,827 (15)		3,346 (12)	455 (1)	977 (3)	9,857 (32)
500-999		15,353 (22)			5,190 (7)	2,314 (3)	15,353 (22)
1000-2499	1,371 (1)	19,325 (11)			10,980 (6)	5,938 (3)	20,696 (12)
2500-9999		31,857 (8)	5,797 (1)		28,000 (6)	7,305 (2)	37,654 (3)
10,000 and over		42,130 (2)			42,130 (2)	12,443 (1)	42,130 (2)
TOTAL	3,107 (7)	114,817 (66)	5,953 (2)	7,261 (44)	86,926 (23)	29,029 (13)	131,138 (119

[a]Total population in 119 municipalities of 14-county study area, 1970.

is not surprising. Still lacking, however, is a technical capability for identifying linkages between a community's economic base and its fiscal condition as one important tool in area wide infrastructure planning. This study attempts to provide a framework for analyzing resource development alternatives in terms of their fiscal implications for local governments. Again, water systems development is viewed as a constraint on urban expansion and regional growth [1]. Strict compliance with federal and state environmental standards and a population (growth) criterion in public revenue sharing reduces viable development potentials in lagging regions. Thus, infrastructure planning and, even more so, financing of water systems development, become important policy instruments for redirecting urban growth within a sub-state (or multi-state) region.

Resource Data

The Regional Commission is taken as the decision-making unit for area wide resource management. Both sectoral and spatial development issues are considered by the Commission. Among the sectoral issues are the infrastructure requirements listed earlier. Spatial issues pertain to the urbanization of the study area under each of the two regional settlement alternatives.

Sectoral development. A sectoral breakdown of an area economy is provided in a computable economic model which contains the critical economic relationships of the area -- internal and external [10]. The public sectors are differentiated from the private sectors and area building industries are differentiated from area serving industries. Twenty-three private industries (class 1 accounts) and six public industries (class 2 accounts) are identified in the area economic model (Tables 3 and 4). Data on the 23 private industries were prepared in accordance with established and accepted procedures of area input-output studies. Data on the purchases of the public industries were prepared, also, in accordance with these procedures. Data on the disposition of public industry output are confounded, however, by the lack of "markets" for most public goods. Thus, the disposition of public industry output requires an expansion of the conventional interindustry transactions table into a system of product and income accounts for both the private and the public sectors.

For purposes or resource development planning in West Minnesota, two departures from traditional interindustry (input-output) studies are noted. First, the public economy, which is represented by a 6 industry breakdown of locally provided public services, is treated like the 23 private industries only in terms of input purchases. A 10-sector institutional breakdown is included (i.e., Sectors 35-44), also, and additional detail is presented in the remaining eight (current, i.e., Sectors 30-34, and capital, i.e., Sectors 45-50) accounts. Sector 30 is the Class 3 account while Sectors 31 to 34 are in the Class 4 account.

A second departure from conventional area input-output studies is the inclusion of flow-of-funds data in the expanded interindustry transactions table. Preparation of the expanded table makes possible the introduction of a group of public industries -- construction, utilities, retail trade, health, education and administration -- as a buyer and a producer of goods and services.

TABLE 3: Income Receipts, from Specified Sectors, by Current Account Class, West Minnesota, 1967

(thousands of dollars)

Sector	Sector No.	Class 1	Class 2	Class 3	Class 4	Class 5
Agr. livestock	1	106028	0	872	0	0
Agr. crops	2	59147	0	0	0	0
Ag. serv. for.	3	11579	0	0	0	0
Mining Constr.	4	32767	4142	0	0	0
Meat prod. mfg.	5	1377	161	6540	0	0
Dairy prod.	6	941	360	3924	0	0
Other food prod.	7	21971	83	4796	0	0
Lumber, furn.	8	201	90	0	0	0
Printing, pub.	9	1520	4871	537	0	0
Stone, clay	10	2466	362	0	0	0
Machinery	11	2047	12	0	0	0
Other manufacturing	12	10580	606	3759	0	0
Transportation	13	9217	309	3052	0	0
Comm., utilities	14	7750	2521	5611	0	0
Wholesale agr.	15	6259	12	0	0	0
Other wholesale	16	11725	585	88	0	0
Eat, drink places	17	518	22	10900	0	0
Gas stations	18	2020	26	3488	0	0
Farm equipment	19	5830	0	0	0	0
Other retail	20	927	439	27032	0	0
FIRE	21	6105	200	12799	0	0
Per., bus. services	22	6839	1503	14388	0	0
Prof. services	23	5395	1496	18312	0	0
Public construction	24	0	0	0	0	6609
Utilities	25	1710	615	1525	0	0
Other retail	26	0	0	1308	0	0
Health	27	0	0	2616	0	5844
Education	28	0	0	1042	0	50074
Administration	29	0	0	0	0	23800
Household cons.	30	0	0	0	0	340447
Sales taxes	31	7763	16	12711	0	0
Property taxes	32	13532	0	21010	0	0
Assessments	33	609	250	492	0	0
Other taxes (indirect)	34	6818	175	8316	0	0
Business	35	25218	0	0	0	0
Household	36	279079	59238	0	0	51427
County	37	0	0	0	11467	15933
Municipal	38	0	0	0	6648	1130
Township	39	0	0	0	1590	262
School dist.	40	0	0	0	16935	23942

TABLE 3 - Continued

Sector	Sector No.	Class 1	Class 2	Class 3	Class 4	Class 5
Special dist.	41	0	0	0	36	30
State	42	0	0	0	22732	9329
Federal	43	0	0	0	12992	75643
Property inc.	44	0	0	0	0	2638
Private industry	45	50418	0	0	0	0
Public industry	46	0	8228	0	0	0
Household cons.	47	0	5397	36000	0	0
Institutional	48	0	0	20000	0	66458
Ecologic	49	0	0	0	0	0
ROW	50	234815	14581	119329	0	0
Totals	1-50	933170	95505	340447	72400	673566

TABLE 4: Income Receipts from Specified Sectors, by Capital Account Class, West Minnesota, 1967

(thousands of dollars)

Sector	Sector No.	Class 6	Class 7	Class 8	Class 9	Class 11	Totals
Agr. livestock	1	0	0	0	0	64,910	171,810
Agr. crops	2	0	0	0	0	109,484	168,631
Ag. serv. for.	3	0	0	0	0	3,448	15,027
Mining constr.	4	38,709	15,677	3,488	0	2,331	97,114
Meat prod. mfg.	5	0	0	0	0	35,139	43,217
Dairy prod.	6	0	0	0	0	91,789	97,014
Other food prod.	7	78	32	0	0	4,002	30,962
Lumber, furn.	8	78	32	436	0	6,578	7,415
Printing, pub.	9	0	0	0	0	0	6,928
Stone, clay	10	704	285	872	0	1,870	6,559
Machinery	11	1,276	516	0	0	0	3,851
Other mfg.	12	6,868	2,781	3,759	0	0	28,353
Transport	13	0	0	0	0	32,787	45,365
Comm., util.	14	0	0	0	0	0	15,882
Wholesale agr.	15	0	0	0	0	0	6,271
Other wholesale	16	94	38	87	0	0	12,617
Eat, drink pl.	17	0	0	0	0	11,643	23,083
Gas stations	18	0	0	0	0	9,062	14,596
Farm equip.	19	0	0	0	0	0	5,830
Other retail	20	0	0	0	0	2,660	31,057
FIRE	21	0	0	0	0	0	19,104
Per., bus. serv.	22	0	0	0	0	8,433	31,163
Prof. serv.	23	0	0	0	0	26,118	51,321
Public constr.	24	0	0	0	0	0	6,609
Utilities	25	0	0	0	0	0	3,850
Other retail	26	0	0	0	0	362	1,670
Health	27	0	0	0	0	0	8,460
Education	28	0	0	0	0	0	51,116
Administration	29	0	0	0	0	0	23,800
Household cons.	30	0	0	0	0	0	340,447
Sales taxes	31	382	0	327	0	0	21,199
Prop. taxes	32	0	0	0	0	0	34,541
Assessments	33	0	0	0	0	0	1,351
Other taxes	34	0	0	0	0	0	15,309
Business	35	0	0	0	0	0	25,218
Household	36	0	0	0	46,257	0	436,000
County	37	0	0	0	13,832	0	41,232
Municipal	38	0	0	0	5,620	0	13,398
Township	39	0	0	0	24	0	1,876
School dist.	40	0	0	0	12,738	0	53,615

TABLE 4 - Continued

Sector	Sector No.	Class 6	Class 7	Class 8	Class 9	Class 11	Totals
Special dist.	41	0	0	0	195	0	216
State	42	0	0	0	0	24,635	56,697
Federal	43	0	0	0	0	-54,107	34,528
Property inc.	44	0	0	0	8,103	0	10,741
Private industry	45	0	0	0	5,428	0	55,846
Public industry	46	0	0	0	0	0	33,296
Household cons.	47	0	0	0	0	0	36,000
Institutional	48	0	0	0	0	36,205	117,265
Ecologic	49	0	0	0	0	0	0
ROW	50	7,657	13,935	27,031	0	0	417,348
Totals	1-50	55,846	33,296	36,000	117,265	417,348	2,774,843

The financing of industry output is the key difference between the public and private sectors. Only by use of the expanded interindustry table is this key difference amenable to economic analysis. This study of area financing thus depends upon the preparation of a system of local fiscal accounts which introduce financing activities as key elements in an expanded system of private and public accounts.

Among the uses of the fiscal-ecologic accounts is the assessment of the balance-of-payments position of an area. Disagreement occurs about the net balance of current and capital accounts in the public and private sectors. Lagging areas generally experience a net outflow of capital to profitable private investment opportunities outside the area [14]. Lagging areas also may experience a net outflow of funds in the public sector (because of high income and state taxes and large public outlays for high technology goods, such as defense, which are not produced in the area).

For West Minnesota, a net capital outflow occurred in both the public and the private sectors. The net inflow of $24,636,000 of state monies was more than balanced by a net outflow of federal monies of $54,107,000. Thus, the total net outflow of these two sectors was $29,491,000 in 1967. If the estimated 1967 rate were to continue to 1980, the net outflow would total more than $380,000,000 or approximately $1,500 per person. Additional job creating investments of this magnitude would represent a significant change in the investment climate in this area.

Projected 1980 net capital outflows in the public and private sector are substantially larger ($34,143,000 in total) than the estimated 1967 levels. Built into the projected 1980 fiscal accounts is, of course, the lack of significant change in new job creating, private investment opportunities. Hence, because of increasing productivity per worker, the larger aggregate output could result in larger capital outflows in 1980 as compared with 1967.

Significant shifts in levels of public and private investment will require changes in current perceptions of private investment potential and the uses of public investment in state and regional economic development. Private investment opportunities are perceived as being more favorable in high growth areas. Rapid population expansion reduces adverse consequences of faulty decisions in the private sector. And public outlays are increased in response to the unimpeded and uncontrolled economic growth.

Spatial linkages. Resource development in the 14-county area is conditioned, also, by the spatial organization of industry and urban growth in the Upper Midwest. Because of distance from major urban centers, together with marginal agricultural activity, the area economic base has declined sharply relative to other areas. Dependence on a single basic industry, namely, agriculture, has contributed to community decline and below average growth in residentiary activities. Only trade and service employment has increased significantly, primarily because of the growth of Fargo-Moorhead as a subregional metropolitan service center.

Besides the growth of a subregional center of roughly 100,000 population, the study area is affected by the influx of 40,000 summer residents. They come

from the Twin Cities area and neighboring states to summer homes and resorts, typically on some lakeshore near a small trade center.

The expansion of manufacturing activity and the influx of summer residents is a familiar pattern in high amenity rural areas outside the daily commuting zone of major metropolitan centers. The new activity impacts eventually add to the pressures of local government which lack resources to handle the emerging problems. In the study area, however, the newly-organized Regional Commission has a potential role in area wide resource management that significantly enhances the alternative futures projected for the study area.

Spatial linkages are important in delineating the several levels of public planning in resource development. In the study area, three levels of public planning can be identified -- local, area and regional. While critical public financing gaps occur at the local level, success in reducing these gaps depends on mobilizing citizen support and improving the scale and quality of service enterprise management at the area level. Improving the long run viability of the area's economic base depends on the implementation of growth pole and river basin strategies for urban regional development. An activity location programming capability has been developed within the overall input-output framework as a computer simulation model (15). This model is being used in assessing public facility investment and location alternatives in the study area.

Performance Evaluation

A technical capability for performance evaluation is needed, also, in the regional resource planning. The two categories of regional development accounts cited earlier -- the fiscal and the ecologic -- are a part of this technical capability.

In the fiscal accounts, local government revenues are identified by source and level of government (Table 5). The fiscal accounts include, not only the indirect tax accounts, but also their linkages with other accounts. While the system of accounts may strike the layman as rather complicated, it really is not intended for popular consumption, but rather as an organizing rationale for achieving accuracy and consistency in the data for resource development planning. A summary tabulation of local government revenue, as in Table 5, is identified in Table 3 as part of submatrix 5.4 (i.e., Sectors 35-44 and Sectors 31-34 in the overall matrix).

Local government expenditures also are identified in the fiscal accounts (Table 6). In the summary matrix, the local expenditure data are part of Submatrix 4.5. The two data sets are also incorporated in the flow of funds summary presented earlier. Changes in demand or cost conditions facing industry or municipal service sectors, or in totally exogenous conditions can be translated into corresponding changes in the local fiscal accounts. Thus, given the necessary technical capability, an area wide impact analysis is feasible for the Regional Commission.

TABLE 5: Local Government Revenues, by Type of Local Government, West Minnesota, 1967[a]

Source	County	Municipal	Township	School district	Special district	Total
			(thousands of dollars)			
Current local						
Taxes	11,443	4,423	1,590	15,898	35	33,389
Charges	548	1,641	0	1,337	132	3,653
Other	24	2,224	0	1,037	1	3,286
Subtotal	12,015	8,288	1,590	18,272	168	40,334
Transfers						
Federal	157	41	0	0	19	217
State	15,776	910	160	21,208	0	38,054
County	0	179	102	2,424	11	2,716
School district .	0	0	0	310	0	310
Other	0	9	0	0	0	9
Subtotal	15,933	1,140	262	23,942	30	41,306
Borrowing	640	2,470	20	5,598	33	8,762
Net nonrevenue. .	12,644	530	0	546	0	13,720
Net fund withdrawal.	0	970	3	5,257	30	6,260
Subtotal	13,284	3,970	23	11,401	63	23,742
Total	41,232	13,398	1,875	53,615	261	110,382

Source: Reference [16].

[a]Sum of column rows may not equal area totals because of rounding.

TABLE 6: Total Current and Capital Expenditures (net of local transfers) for Specified Functions, by Type of Local Government, West Minnesota, 1967 (16)[a]

(thousands of dollars)

Type of Local Government	General Government	Safety	Sanitation	Health	Education	Welfare
Current						
County	2,191	502	0	253	937	11,318
Municipal	875	1,452	767	19	0	81
Township	266	20	0	0	0	91
School District .	0	0	0	0	38,455	0
Special District.	0	0	0	0	0	0
Total	3,332	1,974	767	273	39,394	11,491
Capital						
County	74	0	0	0	0	0
Municipal	260	145	1,785	0	0	0
School District .	0	0	0	0	11,583	0
Special District.	0	0	0	0	0	0
Total	334	145	1,785	0	11,583	0
Total all exp. .	3,666	2,119	2,552	273	50,977	11,491

Type of Local Government	Libraries	Recreation	Roads	Natural Resources	Other	Total
County	52	7	3,927	414	441	20,044
Municipal . . .	238	438	1,270	0	1,616	6,758
Township	0	0	1,412	0	66	1,855
School District .	0	0	0	0	0	38,455
Special District.	0	0	0	164	42	206
Total	290	446	6,609	577	2,166	67,318
County	0	0	4,424	0	343	4,870
Municipal	0	222	1,160	0	745	4,318
School District .	0	0	0	0	0	11,583
Special District.	0	0	0	4	1	6
Total	0	222	5,584	4	1,119	20,777
Total all exp. .	290	668	12,193	581	3,285	88,095

[a]Sum of county totals may not equal area totals because of rounding.

Like the fiscal accounts, the ecologic accounts provide data on natural resource inputs and waste emissions associated with each production and consumption subsector in the overall accounting system. Data on land and water inputs and waste emission of economic activities in West Minnesota generally are adapted from secondary sources [7, 12, 13]. Local data sources are being tapped, however, to prepare additional detailed entries for non-industry submatrices of the expanded input-output model. For the most part, these submatrices treat the ecologic subsectors as exogenous to the area economy.

FINANCING STRATEGIES

Financing gaps exist, not only for municipal water and sewer facilities construction, but also for capital improvements in regional facilities. The first task in assessing financing alternatives is, therefore, the preparation of a set of regional development accounts.

Regional development accounts are transformed into regional development issues by a series of maps which show the time scheduling and location of proposed development projects. The project sponsors and others affected by a proposed capital improvements program are able to identify the specific time and place in which their interests are endangered, or reinforced, by the proposed development program.

Financing alternatives for resource development also are provided in the regional development accounts. These alternatives would include a combination of federal, state and local income sources and financing arrangements. Each government level, however, would exercise a particular bias in assessing the costs and benefits of alternate financing arrangements.

Federal

A federal bias is asserted in efforts to minimize financing costs to the federal treasury. These costs may be direct, or they may take into account estimated income tax earnings, or they may include some part of the total cost to borrowers. For example, given a total cost of $12 billion (or an annual cost of $1.2 billion over a 10-year period) for water and sewer facilities needed by rural communities, the least expensive financing plan calls for use of direct loans at a market interest rate of, say, 5 1/2 percent [15]. When income tax earnings are considered, however, the least expensive plan shifts to direct loans at a market interest rate of 8 percent. From the borrowers' viewpoint the least expensive plan would be grants only, but this plan would be one of the most expensive for the Federal government.

Similar decision criteria may apply in choosing among federal financing plans for other natural resource development activities. In flood control, land treatment and drainage, irrigation, recreation and energy production, however, the organizational and spatial scale of local development is more extensive than for municipal water and sewer and solid waste disposal. For these functions, the spillover effects of proposed development programs may

justify additional state and federal commitments. The indirect effects on the federal treasury may result in additional tax receipts to cover part of the total program costs for the borrowers.

Local

Local financing plans, exclusive of federal revenues, depend mostly on revenue bonds which are amortized from special assessments and service charges. For some municipalities, property tax receipts supplement receipts from service charges, while in a few municipalities, excess receipts accrue which are transferred to other functions [16]. For many small municipalities, however, capital outlays are severely limited by capital rationing simply because of the non-marketability of their revenue bonds.

Given the place bias of natural resource development, we may expect less dependence on federal sources and more dependence on local sources of income in the future for this form of public investment. Thus, special assessments, property taxes and services charges must assume a greater burden in supporting development functions which primarily enhance local property values.

Area

Financing alternatives are extended by area wide pooling of part of the local tax base. Thus, the Regional Commission may realize an important function in its evaluation of the area wide consequences of resource development alternatives on both the local environment and the fiscal condition of local governments. Of concern to the Regional Commission are not only the direct development impacts, but also, the indirect and the induced impacts which require a period of years to work out their full implications for particular groups and communities within the planning area.

Finally, the Regional Commission has a responsibility for economy in area wide capital improvements. To achieve a less expensive set of public facilities for a given area population, criteria for determining a viable minimal (as well as maximal) size of municipality are needed. For some municipalities, the costs of environmental management are high, not because of too many, but too few people. Below a certain cut-off level, say in the range of 50 to 250 households, construction and operating costs may be excessive for local income sources. For these residents, there may be no support of local services inasmuch as the same services are provided more economically by other municipalities which have a larger population base. The high service charges may be motivation enough for individual households to relocate within the area. Relocation allowances may be needed, however, for the least mobile residents as a further public inducement to reduce the social costs of settlement within a particular planning region.

Each of the financing strategies can be described in terms of alternate series of regional fiscal accounts. The development implications of the alternative fiscal futures can be worked at (1) the multi-county level and (2) the local level by use of the technical capabilities prepared as part of this study.

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