

Characteristics of Effective Local Water Management Organizations in the Red River Basin

Craig C. Kritsky*

Robert R. Hearne**

Department of Agribusiness and Applied Economics
North Dakota State University

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*C.Kritsky@ndsu.edu

** Robert.Hearne@ndsu.edu

What do we know about Water Management Organizations?

In the United States, WMOs

- Are becoming more common
- Can be characterized as citizen-based, agency based, or public-private
- Many deal with Non-Point Pollution
- Many are supported by the Federal Government

Water Management Organizations in this study

- Local WMOs governed by a non-professional board of supervisors
 - Watershed Districts
 - Water and Soil Conservations Districts
 - Water Resource Districts
 - Soil Conservation Districts

What do we want to learn about WMOs in the Red River Basin

- What is working?
- How can water management be improved?
- What organizational formats can be considered to be most effective?
- What are the characteristics of WMOs that are most active?

What does the scientific literature say about WMOs?

- Very Little!!
 - Leach and Pelkey 2001
 - A number of other subjective studies
- Kathryne Draeger, UMn PhD
 - Surveyed Mn watershed districts
 - Graded different organizations
 - Characterized better performing districts
 - In general Red River Basin districts performed well

Survey Instrument Design

- Two survey's were conducted. One survey of organizations was lengthy another of Board members was relatively short.
- To assist in the development of the survey numerous meetings and trial surveys were conducted.
- A lot of questions were proposed. Many were paired down
- Mail survey was conducted following Dillman protocol
- All organizations and all board members were sent surveys
- The dataset merges board member surveys with the organization survey

Response Rates

Organization Type	Organization Survey		Board Member Survey	
	Surveys Sent	Surveys Returned	Surveys Sent	Surveys Returned
Watershed Districts	11	5	68	27
Soil and Water Conservation Districts	20	12	99	55
Soil Conservation Districts	20	11	100	56
Water Resource Districts	24	8	83	43
Tribal Governments	2	1		
Total	77	37	350	181

Employees

Average Employee Hours Per Week in Selected Functions

	WDs	WRDs	SWCDs	SCDs
Administrative	42	2	34	23
Engineering/ Construction	24	1	7	0
Education/Outreach	0	0	7	9
Technical	38	0	38	35
Legal	1	1	0	0
Secretarial	23	12	29	12
Other	12	6	7	13

Planning

	Short-Range Plan		Long-Range Plan	
	%	Average Annual Updates of Yes Responses	%	Average Annual Updates of Yes Responses
WDs	60	Twice	100	Once
WRDs	13	Twice	0	
SWCDs	82	Twice	75	Once
SCDs	64	Twice	36	Twice

Joint Powers Agreements

	Joint Powers Agreements	
	% Yes	Average Number for Yes Respondents
WDs	60	2.0
WRDs	88	2.0
SWCDs	92	2.9
SCDs	18	2.5

Revenue Sources

Percent Revenue from Selected Sources

	WDs	WRDs	SWCDs	SCDs
Organizational Taxes	31.0	0	0	0
County Taxes	1.6	73.1	27.4	25.4
Special Assessments	13.0	12.5	0.1	0.6
Loans	0.4	1.4	0	1.7
Project Funding Grants	0.4	0	9.7	1.1
Matching Funds Grants	13.4	0	2.1	1.6
Operating funds grants	0	0	9.7	2.9
State agencies	24.8	6.9	21.1	3.6
Federal agencies	1.6	0.1	1.9	2.6
Non-tree operations	0	2.5	10.1	14.9
Tree planting	0	0	15.9	31.2
319 Funding	0.2	0	0	10.6
Other	0.2	0	0	3.1

Expenditures

Percent Expenditures to Selected Sources

	WDs	WRDs	SWCDs	SCDs
Capital Outlay	6.0	0	5.5	17.9
Water Retention Projects	42.8	0	2.0	0
Water Movement Projects	14.2	52.8	1.7	0
Interest and Service Charge	0	0	2.5	1.0
Recreational Sites	0	8.9	0.5	0.1
Cost Sharing to Other WMOs	5.8	11.4	7.3	1.2
In-House Staff	13.2	4.1	58.3	35.9
Outside Contracts	4.0	2.5	0	0.1
Legal	2.1	5.2	0.3	0.6
Meetings	0.8	11.3	3.5	6.3
Other	9.3	5.1	18.3	35.7

Selected Practices

Percent of WMOs that

	WDs	WRDs	SWCDs	SCDs
Help Fund Wetland Buffer Strips	20.0	25.0	66.7	9.1
Help Fund Drainage Buffer Strips	20.0	0	58.3	0
Help Fund Holding Ponds	0	0	83.3	9.1
Conduct Educational Workshops	60.0	0	100	90.9
Conduct Educational Tours	80.0	83.3	100	94.6
Create/Maintain Recreational Sites	0	25.0	16.7	16.2
Improve Fish Habitat	60.0	12.5	50.0	18.2
Provide Rental Equipment	0	0	58.3	45.5
Fund Prescribed Grazing Practices	20.0	0	45.5	18.2
Fund Conservation Tillage	0	0	41.2	9.1

Revenue

	Total Revenue			
	WDs	WRDs	SWCDs	SCDs
Max	11,534,653	3,400,000	1,414,000	935,553
75 th Percentile	11,122,090	363,757	949,882	451,000
50 th Percentile	3,668,662	129,000	600,000	257,081
25 th Percentile	2,300,000	82,000	552,501	151,500
Min	982,442	5,000	341,985	46,000
Mean	5,921,569	632,216	738,645	389,526

Total Grant Revenue

	Total Grant Revenue			
	WDs	WRDs	SWCDs	SCDs
Max	3,114,356	0	225,710	556,514
75 th Percentile	759,000	0	153,234	40,856
50 th Percentile	366,866	0	56,775	20,781
25 th Percentile	0	0	0	1,128
Min	0	0	0	0
Mean	848,045	0	86,363	79,949

Data Analysis

- Preliminary review of data reveals some heterogeneity among WMS of different types
- More in depth analysis will occur with linear and logistic regression
- Linear regression will be used with continuous dependent variable as a function of the WMOs characteristics

Dependent Variable	F-Value	R-Square	Adjusted R-Square
Total Grand Funding	12.65	.9516	.8764
Variable	Parameter Estimate	Standard Error	T-Value
Meetings/Year	-11909	7005	-1.70
Admin. Hours/Week	-1574	4393	-0.36
ND or MN	22209	175846	1.32
Population	-2	3	-0.63
Total Area	574	91	6.34
# Matching Fund Requests	26175	16587	1.58
# Direct Fund Requests	-6777	22777	-0.30
# 319 Fund Requests	29936	44735	0.67
Ave. years Experience Board Members	-907	11931	-0.08
Education of Board Members	-98093	103743	-0.95
# of Board Members Employed by State Agency	-404850	564537	-0.72
If Org. has Short Range Management Plan	51065	112383	0.45
If Org. has Long Range Management Plan	-41883	157421	-0.27
# of Joint Powers Agreements	22209	25130	0.88

Data Analysis

- The previous linear regression model assesses the characteristics of WMOs who receive more grant funding
- Successful grant acquisition of considered to be one characteristic of a successful WMO
- Total grant funding includes matching funds, 319 funds, project funds, and operation funds
- A number of potential explanatory for grant funding were tested
- The previous table demonstrates that the impact of most regressors is not significantly different from zero
- It is not surprising that there is correlation among the listed explanatory variables, this leads to multicollinearity

Data Analysis

Dependent Variable	F-Value	R-Squared	Adjusted R-Squared
Total Grant Funding	44.20	0.9170	0.8963
Variable	Parameter Estimate	Standard Error	T-Value
ND or MN	264473	90836	2.91
Total Area	456	47	9.71
# Matching Fund Req.	25221	13039	1.93
# 319 Fund Req.	38374	27259	1.41
# of Joint Powers Agreements	19650	17233	1.14

Data Analysis

- This second linear regression model for the same dependent variable has fewer explanatory variable to eliminate the multicollinearity
- Some of these results are obvious
- Joint powers agreements have a positive influence on grants funding
- Minnesota WMOS receive more grant funding

What will be done in the near future and following years?

- Near Future: Identification of significant characteristics of effective WMOs
- More linear and non linear regression models
- What are the dependent variables that the audience are interested in?
- Thesis defended in April 2007
- Years to come: At least one more thesis from Graduate Students at NDSU