THE ORGANIZATION AND PROVISION OF FIRE PROTECTION SERVICES BY MUNICIPAL GOVERNMENTS IN HILLSDALE, JACKSON AND LENAWEE COUNTIES - MICHIGAN

BY

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TABLE OF CONTENTS

Table of Contents (cont.)

LIST OF TABLES

I. INTRODUCTION

Fire protection attempts to reduce the costs of fear, injury, death, uninsured property loss and high fire insurance payments.[1/] Municipalities[2/] in protecting the health, safety and welfare of the community have generally placed a high priority on providing fire protection with public revenues as one of the services to the residents.

Expenditures for fire protection by 87 municipalities in Hillsdale, Jackson and Lenawee County exceeded $4 million in fiscal year 1976-77. The expenditures for fire protection services represented 12.7% of all municipal general fund expenditures. The $4 million expenditure only includes the operating costs incurred by the municipalities in producing fire protection or the purchasing of fire protection services from a neighboring municipality. The expenditures do not reflect the fixed costs involved in fire protection, the private investments by individuals in fire prevention and suppression or losses suffered as the result of fire.

Local municipal officials face decisions on the allocation of financial resources. An expenditure for fire protection is a foregone opportunity for expenditure on parks for example. As growth occurs in a given area local officials must decide whether additional fire protection is needed, and if so, how should the protection be afforded? Should the local government unit start up their own department, purchase

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1/ Philip Favero, "Institutional Innovation: The Grand Traverse County Fire Department", County Scrapbook, Center For Rural Manpower And Public Affairs, M.S.U. 1975, p. 1.

2/ Townships, cities and villages.

additional service, pool resources with a neighboring municipality or select not to provide protection leaving community residents to collectively organize and produce protection in the private sector[3/]. Local communities chosing to produce fire protection services have several options from which to select regarding organization of fire protection services. Each option involves tradeoffs which officials and the community may wish to consider.

Uncertainty exists among the sellers of fire protection as to the price to charge for providing protection to a neighboring community. Contracts often are not updated as conditions, geographical area of coverage and costs change.

Municipalities in rural areas which do not produce fire protection but rely on contractual arrangements for protection often have to negotiate several different contracts with provider communities. The lack of standardization of contracts and pricing schedules often increases the transaction costs involved in obtaining an equitable contract. Municipalities may find themselves lacking comparative information form which to use in the contract negotiation process or in consideration of production options.

3/ Phillip Alber, Executive Secretary Fire Fighters Council of Michigan estimated that 10-12 private non-profit fire departments exist in Michigan. An exact count has not been possible since departments do not have to register with the Michigan State Police unless they are seeking permission to utilize flashing red lights and sirens on private vehicles.

The Rural - Metropolitan Fire Protection Company established in 1948 in Arizona for the purpose of supplying fire protection services to residents outside the city limits of Phoenix, mainly Scottsdale, is an example of a private company serving a more populous area. The Michigan private non-profit fire companies serve mainly rural areas.

Research on fire protection provision in rural Michigan is limited with few, if any, benefit-cost analysis available for use by decision makers.

II. PURPOSE AND SCOPE OF STUDY

The fire protection study was undertaken to: (1) Identify the methods utilized by the 87 municipalities in the three counties in the provision of fire protection services. (2) Identify the various organizational structures of municipal fire departments which provided fire protection in the three counties. (3) Determine the extent and the nature of fire protection being provided by intergovernmental contracts and/or agreements. (4) Identify the problems and issues encountered by municipalities in the contracting of fire protection. (5) Compare the per capita costs for fire protection based on the method selected for provision of fire services.

The three counties, Hillsdale, Jackson and Lenawee, were chosen based upon several factors: (a) The three counties geographically were consistent with the State Planning and Development Districts. (b) The counties represented a range from a rural county (Hillsdale) to an urban county (SMSA) Jackson. (c) Familiarity with the three counties in the study made it easier for data collection and personal interviews.

The study did not attempt to relate the quantity and quality of fire protection service being provided by the various municipalities and fire departments, since the objective of study was to examine the various institutional structures which existed in the provision of fire protection services. Relating the quantity and quality of fire protection services is a necessary second step and should be given priority for future research. The study of fire protection services detailed in the paper is viewed to be the front end of a larger term and more in-depth study. Section IX of the paper discusses possible areas for further research.

Total enumeration of the 87 municipalities in the three counties was accomplished by personal interviews (20%) and the balance by phone interviews with municipal officials (township supervisors, clerk, treasurer, city managers and clerks, village clerks and fire chiefs). Fire expenditure data was obtained from the final financial statements for the 1976-77 fiscal year.

III. ORGANIZATION OF FIRE PROTECTION SERVICES IN HILLSDALE, JACKSON AND LENAWEE COUNTIES

Municipalities have four options from which to select in providing fire protection service to their residents. Municipalities may choose to: (1) not provide protection (2) produce their own protection (3) jointly produce protection with another municipality or (4) contract or purchase fire protection services. The study aimed at determining the extent of the utilization of the four options by 87 municipalities in the three county area. The study area was made up of 8 cities, 20 villages and 59 townships. Table 1 summarizes the four options of fire protection provision selected by the municipalities.

TABLE 1

ORGANIZATION METHOD	NUMBER OF MUNICIPALITIES	PERCENT OF TOTAL
Do Not Provide Protection	7	8.1
Self-Production	33	37.9
Joint Production	28	32.2
Contract/Purchase	19	21.8
Total	87	100.0

Table 1 indicates that self-production and provision is the method of organization utilized most frequently by municipalities. Joint production of fire protection, two or more municipal units entering a contractual relationship for production and provision of fire protection, constituted the second most selected option. Seventy percent of the municipalities in the study are involved in the production of fire protection services either by self-producing or jointly producing the fire protection services.

The contracting or purchase option is being utilized by 19 or 21.8% of the municipalities in the three county study area. Contracting was more prevalent in Hillsdale County, with 9 of the 27 municipalities involved in the purchase of fire services. Hillsdale County has the smallest population of the counties in the study. Jackson County with the largest population in the study area exhibited the fewest cases of contracting for fire protection with only 2 out of the 26 municipalities selecting contracting as a provision method. It appears as population increases municipalities tend to become involved in producing fire protection. The size of the sample (three counties) does not allow more definite statements to be made relating population to production option selected.

Seven municipalities do not provide fire protection service, all seven are villages which rely upon the township for fire protection services. Since residents pay a township ad valorem tax, fire protection services in the seven villages is viewed as part of the services to be provided by the township.

Five of the twenty villages in the study area were involved in self-production of fire protection services. The village departments generally sold fire protection to the township. Village residents therefore were contributing both for operating the village fire department and for fire protection services contracted by the township. The same double contribution exists in the situation of fire protection being provided by a joint department formed by a village and a township pooling resources. Although the village residents may in some cases contribute both to the support of a village fire department and to the township which contracts fire protection, village residents usually

receive a savings in fire insurance premiums due to the close proximity of the fire department which results in lower fire insurance rating for insurance purposes. Residents may feel a greater sense of security knowing the response time of the department is reduced when compared to response time to a township residence outside of the village limits but serviced by the same village fire department.

Appendix B-1, 2 and 3 gives a complete breakdown of the method of provision of fire protection utilized by the 87 municipalities located in the three county study area.

Municipalities, in addition to having four options from which to select in the provision of fire protection services for citizens in their jurisdiction, also have several options from which to select in organizing their fire protection services.

IV. ORGANIZATION OF MUNICIPAL FIRE DEPARTMENTS

The actual production of fire protection services can be accomplished by either public sector production, private sector production or in combination. Private sector production of fire protection is limited, not only in the study area but in Michigan and the U.S. Only one such example was identified in the study.[4/] Therefore, the public sector production is the major focus of the following discussion.

Municipalities involved in the production of fire protection can choose to self-produce the service or produce the service jointly with a neighboring municipality. Table 1 indicated that sixty-one municipalities were involved in producing fire protection services. Forty-seven fire departments were identified in the three county area as providing fire protection (see Appendix A).[5/]

Municipalities producing fire protection in addition to having an option of whether to self-produce or jointly produce the service have several options available as how to organize the personnel for fire protection production. Fire departments traditionally have been classified by the manner in which their personnel is organized; that is, as fully volunteer, fully paid, paid-on-call, or a combination

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4/ Hillsdale County Rural Fire Department. Appendix D gives a more detailed description.

5/ Fire departments outside the three county area but some providing protection to areas within the three counties were not included in the study. But expenditures incurred by municipalities for services rendered by the department outside the study area were included.

of these.[6] Jones and Badenhop identified six options available for rural Tennessee municipalities.[7]

Six options were utilized in this study as a means of classifying municipal fire departments. The six options are (1) Municipal Fire Department - all volunteer (2) Municipal Fire Department - fully paid (3) Municipal Fire Department - mostly volunteer with some (less than 50%) full-time paid personnel (4) Joint Municipal Fire Department - all volunteer (5) Joint Municipal Fire Department - fully paid (6) Joint Municipal Fire Department - mostly volunteer with some (less than 50%) full-time paid personnel.

Examples of option 1-4 were identified in the study, however, no examples of options 5 and 6 were identified. Table 2 summarizes the various production options identified in Hillsdale, Jackson and Lenawee County. Appendix B-1, 2 and 3 given a detailed listing by municipality of the production option utilized by each unit of government in the study area.

6/ Municipal Fire Service Workbook, Research Triangle Institute, International City Management Association and National Fire Protection Association, May 1977, p. 8.

7/ T. Morris Jones and M. B. Badenhop, Fire Protection Alternatives for Rural Communities, Bulletin 568, The University of Tennessee, Knoxville, May 1977, p. 11.

TABLE 2

FIRE PROTECTION PRODUCTION SUMMARY

Production Option	City	Village	Township	C/T*	V/T*	T/T*	Total*
Municipal Department All Volunteer	2	5	19				26
Municipal Department Fully Paid	3		3				6
Municipal Department Mostly Volunteer	1		1				2
Joint Municipal Department All Volunteer				2	8	2	12
Total	6	5	23	2	8	2	46[8/]

* C/T = City/Township(s)
V/T = Village/Township(s)
T/T = Two or More Townships

Township production of fire protection represents the most common production option selected in the three counties. Nineteen out of the twenty-three township departments are volunteer departments. The four remaining township departments, which are either fully paid or mostly volunteer with some fully paid personnel, are located in townships with sizeable populations as compared to other townships ranging from 5,574 in Madison Township (Lenawee County) to 21,754 for Summit Township (Jackson County).

8/ Forty-seven Fire Departments deliver fire protection in the three county area. One township has two organized volunteer departments and therefore is counted as two township departments. The private non-profit volunteer fire department in Hillsdale County is not included therefore the discrepancy of one department in the total.

The cities of Hillsdale, Jackson and Adrian all supported fully paid departments with the city of Tecumseh providing services with a combination of fully paid and volunteer personnel. The three remaining cities in the study, Morenci, Reading and Litchfield have populations of less than 2,200 and maintain volunteer departments for fire protection.

The study indicates that as the population of a municipality approaches 5-6,000, a switch is made from producing fire protection with all volunteers to manning department with some fully paid personnel. The size of the sample of municipalities with populations exceeding 5,000 is small therefore an explicit statement regarding population level and the switch to full paid departments cannot be made.

Population is by no means the only factor in the consideration of switching from a volunteer to fully paid department since other factors such as the location of industry, hospitals, nursing homes, high rise buildings, and high value property all bear upon the decision.

Fire departments with fully paid and mostly volunteer personnel, although only representing 16% (8 of 47) of the total number of fire departments and 9% (8 of 87) municipalities in the three counties, amounted for 82% of the expenditures for fire protection in the study area. The eight departments provided protection to approximately 54% of the population in the three counties.

Volunteer fire departments while accounting for 18% of the total fire expenditures provide protection for 46% of the population in Hillsdale, Jackson and Lenawee counties.

A more detailed analysis of fire protection expenditures will be presented in Section VI of the paper.

V. MARKETING FIRE PROTECTION SERVICES

Previous sections of the paper have analyzed how local units have organized to provide fire protection services. Various institutional arrangements were identified which serve as vehicles for delivering the service to consumers (citizens of a community). Since 87 municipalities were enumerated in the study but only 61 were involved in actual production of fire protection services, a marketing arrangement must exist since all units of government are receiving fire protection. Some units of government sell fire protection, while other units, who have opted not to self-produce fire protection, are purchasing protection.

An objective of the study was to identify the buyers and sellers of fire protection in the three counties and to identify how the product (fire protection) is being sold or purchased. The study attempted to analyze the difference, if there were, in the provision of fire protection services depending on how local units of government organized the service. Analyzing differences implies that performance measures do exist for which performance comparisons between the various organizational methods can be made. Various performance indicators can be developed to measure the effectiveness and efficiency of alternative organizational structures to deliver fire protection services. Efficiency of fire protection service delivery generally is viewed as producing a given level of fire protection with the least resources or, given fixed resources, producing the greatest amount of fire protection.[9/]

9/ Arthur J. Swersey, Edward Ingall and et al., Fire Protection and Local Government: An Evaluation of Policy Relation Research, The New York City Rand Institute, September 1975, p. 20.

Ahlbrandt attempted to measure the efficiency in the provision of fire services between a municipal department and a private fire company by comparing average per capita costs between the two production methods.[10/]

Schaenman and Swartz asserted[11/]

> that the basic indicators of the effectiveness quality of fire protection are the rate at which fires occur (i.e. the lack of success in preventing fires) and the property and human losses when fire does occur.

The authors identified seven effectiveness indicators: the dollars of property loss per capita, the dollars of property loss per $1000 of market value, the dollars of property loss per fire, the number of civilian injuries and deaths per 100,000 population protected, the number of civilian injuries and deaths per 100 fires and the number of fire fighters injuries and deaths per 100 fires.

Many variables bear upon the measuring of fire protection effectiveness including, building inspection activity, housing density, age of homes, industry location and type, private and public investment in sprinkler systems, fire alarms and fire prevention education to name just a few.

Local decision makers charged with the responsibility of protecting the health and welfare of communities and citizens must determine the

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10/ Roger Ahlbrandt, "Efficiency In The Provision of Fire Services", Discussion Paper No. 72-10, Institute for Economic Research, University of Washington, 1972.

11/ Philip Schaenman and Joseph Swartz, Measuring Fire Protection Productivity In Local Government, International City Management Association and Urban Institute, Washington, D.C. 1974.

level of fire protection desired and at what costs. Therefore, performance measures are needed to assist in the decision making process.

Lois MacGillivray in her evaluation of organization of the delivery of fire services stated[12/]

> Most casual interjurisdictional comparisons of performance are based on relative expenditure per capita. This implies that the primary goal of decision makers is to reduce expenditures when it is likely that the goal is more complex. The ultimate goal is to minimize the community's entire fire burden, the incidence of fire, the losses due to fire as well as the expenditures for fire protection.

The performance indicator utilized in comparing the various organizational methods used to deliver fire protection service in this study is the relative expenditure per capita. Recognition is made of the weakness of the chosen performance indicator and that other performance indicators, as mentioned previously, should be included if an accurate measurement of performance is desired.

Relative expenditures per capita, as used in the study, do provide decision makers with benchmarks which can be used or examined in exploring alternative fire service delivery systems. The comparison utilizing per capita expenditures is useful in the comparison of alternate fire service delivery to two communities which possess similar characteristics such as the ratio of farmland to developed land, housing density, S.E.V.[13/], industrial patterns and types, water systems, and geographical area covered.

12/ Lois A. MacGillivray, "Evaluating The Organization Of Service Delivery: Fire, Center for Population and Urban Rural Studies, Research Triangle Institute, Research Triangle Park, North Carolina, September 1977, p. 4.

13/ State Equalized Value = 50% of True Cash Value.

A low per capita expenditure does not necessarily imply that a community is supplying "less" fire protection, or is "more efficient" in fire service delivery. Similiarly, high expenditure, as compared to a base, does not imply that "more fire services are being delivered or the municipality is "less efficient" in the delivery of fire services. In sum, per capita expenditures as used in the study, are not to be used as quantity or quality statements of fire protection delivered.

The question which remains is, what can be said about a comparison of fire protection on a per capita operating expenditure basis? The comparison does imply that given a fixed time frame, in this case fiscal 1976-77, community "X" utilizing delivery system "A", expended "Y" operating dollars per capita for fire protection.

The data to be presented in the following sections indicates that differences do exist when comparing per capita expenditure by municipality based on organizational method utilized for fire protection service delivery. Possible reasons for the differences will be put forth in the discussion of the various methods of fire service delivery.

VI. COST COMPARISONS BY METHOD OF FIRE PROTECTION PROVISION

Fire protection costs as used in the study include the operating costs incurred by local units of government in the provision of fire protection services for the fiscal year 1976-77. Revenue received from the sale of fire protection services are subtracted from the expenditure of the seller to give net fire expenditures. For municipalities which do not produce fire protection services, the costs for fire protection are the costs of contracting the service from a neighboring municipality. Fire protection costs in the study do not include past and current capital investment expenditures due to the variety of methods utilized by municipalities in financing capital purchases. Some municipalities establish a capital fund and budget money each year to be transferred to the fund for future capital purchases. Other units of government purchase the new fire truck, for example, by utilizing one year's Federal Revenue Sharing[14/] allocation or transferring one lump sum payment from the general fund. Therefore, including both operating and capital expenditures for the comparison of fire protection costs by method of provision would result in a distortion of per capita costs. Utilizing only operating costs tends to underestimate per capita costs for fire protection since capital

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14/ Martin, R. Thomas and Mary S. Patrick, General Revenue Sharing: The Michigan Experience, Report No. 33, Center for Rural Manpower and Public Affairs, Department of Agricultural Economics, Michigan State University, May 1974, p. 21-22.

A survey of 859 units of government indicated that the expenditure of federal revenue sharing funds for public safety (police and fire services) ranked first in the priority for cities and villages and second for townships for the period of Jan. 1, 1972 to June 30, 1974.

investment costs are not included. However, since each unit of government expends funds for the operating expenses of a fire department or for contracting fire protection services, a more accurate assessment of per capita operating costs were obtained, therefore,used as a basis for the comparison in this study.

Local officials were questioned when discussing the data solicited from final financial statements of what expenditures were included in the data. An attempt was made by the author to standarize as accurately as possible what was included or excluded. Differences in accounting systems between the various municipalities presented some difficulty in standarizing each and every expenditure for fire protection.

The expenditures by municipalities which contracted fire protection do accurately reflect the expenditures by the municipality for fire protection. The expenditures represent the only direct public expenditure for fire protection.

Table 3 summarizes the total general fund expenditure and fire protection expenditure for the 87 municipalities in the study. Fire protection accounted for 12.7% of the general fund expenditure in the three counties. Hillsdale County, with the least population in the study, had the lowest percent of general fund expenditure and lowest per capita costs, 7.7% and $6.77 respectively. Jackson County, with the largest population, had both the highest percent of general fund expenditure and highest per capita costs, 14.2% and $20.89 respectively. Excluding municipalities (8) with full-time paid fire department personnel lowers the overall average of fire expenditure as a percent of general fund from 12.7 to 10.3 and per capita costs from $15.81 to $5.80, a

TABLE 3

GENERAL FUND AND FIRE PROTECTION EXPENDITURES
FISCAL 1976-77

THREE COUNTY SUMMARY

Municipality	Population	Total General Fund Expenditures	Net Fire[15/] Expenditures	Fire Expenditures As A Percent Of General Fund Expenditures	Per Capita Cost of Fire Protection
Hillsdale County	37,702	$ 4,337,034	$ 255,333	7.7	$ 6.77
Jackson County	141,122	20,668,261	2,949,416	14.2	20.89
Lenawee County	81,814	8,521,123	916,513	10.7	11.20
Total (87 Units)	260,638	$32,526,418	$4,121,262	12.7	$15.81

SUMMARY EXCLUDING MUNICIPALITIES WITH FULL-TIME PAID FIRE DEPARTMENT PERSONNEL[16/]

Hillsdale County	29,974	$ 1,780,686	$ 124,063	7.0	$4.14
Jackson County	45,383	2,030,411	302,462	14.9	6.66
Lenawee County	48,857	3,135,926	293,437	9.4	6.01
Totals	124,214	$ 6,947,023	$ 719,962	10.3	$5.80

15/ Operating Costs

16/ Municipalities Excluded:
Hillsdale County - Hillsdale City
Jackson County - Blackman, Leoni and Summit Townships, Jackson City
Lenawee County - Adrian City, Madison Township and Tecumseh City

63% decrease in per capita costs. The above findings are consistent with similar fire research.[17/] As population increases total fire expenditure and per capita expenditure increase with substantial increases occuring in per capita costs as the switch is made from volunteer to full-time paid personnel. Salaries, unionization, specialized fire fighting apparatus, etc. all contribute to higher per capita expenditures. Individual consumers generally receive more benefits in the switch to full-time paid personnel in the form of lower insurance premiums, quicker response, more highly trained personnel and reduction in private losses as compared to all volunteer departments.

Table 4 summarizes per capita costs for fire protection based on the organization of fire protection services. Seven provision methods were utilized in the comparison. The comparision is divided into two parts based on the delivery of fire services by volunteer departments or departments will all or some full-time paid personnel.

Including the eight municipalities with full-time paid personnel results in a distortion of the per capita costs, therefore, the units are displayed separately. A distinction is made between departments

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17/ Municipal Fire Research Workbook, op cite, p. 47.

Arthur Swersey and Edward J. Ingall,, op cite, p. 21.

Lois A. MacGillivray, op cite 8.

Roger Ahlbrandt, op cite, p. 13.

Frederick J. Hitzhusen, Public-Private Fire Protection Cost Tradeoffs In Texas and New York: A Benefit Cost Analysis, A. E. Res. 73-9, Cornell University, Ithaca, New York 14850, May 1973.

T. Morris Jones and M. B. Badenhop, op cite, p. 33.

TABLE 4

SUMMARY

FIRE PROTECTION COSTS PER MUNICIPALITY BY
ORGANIZATION OF FIRE PROTECTION SERVICES
FISCAL 1976-77

Organization of Fire Protection Services	Mean Per Capita Cost	Range Per Capita Cost
All Volunteer Departments		
Joint Municipal Dept. - Selling Fire Protection	$4.80	$1.92 - $10.73
Contract or Purchase	$5.36	$2.37 - $8.42
Joint Municipal Dept. - Not Selling Fire Protection	$5.46	$2.67 - $21.56
Municipal Dept. - Not Selling Fire Protection	$5.71	$3.30 - $9.58
Municipal Dept. - Selling Fire Protection	$6.90	$1.24 - $12.05
All Paid And/Or Departments With Some Full-Time Paid Personnel		
Municipal Dept. - Selling Fire Protection	$9.22	$8.07 - $10.70
Municipal Dept. - Not Selling Fire Protection	$26.53	$13.69 - $38.52

which sell fire protection versus departments which elect not to sell fire protection.

RESULTS

Municipalities which pooled resources and jointly produced and sold fire protection services through the use of volunteers had the lowest per capita costs $4.80. Whereas, municipalities self-producing fire protection with volunteer personnel and selling protection exhibited the highest per capita costs $6.90.

Joint municipal departments which did not sell fire protection displayed higher per capita costs when compared to joint departments which sold protection $5.46 as compared to $4.80. Joint municipal departments selling protection may be achieving economies of scale or selling protection at a price which exceeds the marginal cost of production thereby reducing the average cost of production. The data used in the study does not allow an explicit statement to be made regarding the reason for the per capita cost difference between joint departments which sell and departments which do not sell protection.

Municipal departments self-producing protection, that is, a single unit of government producing fire protection and not selling services exhibited lower per capita costs when compared to municipal departments which sell fire protection $5.71 and $6.90 respectively. The finding was contrary to the previous case of joint municipal departments. Several reasons may exist why municipal departments selling protection exhibit higher per capita costs when compared to similar units not selling fire protection services. Municipal departments self-producing fire protection

and selling services may incur higher costs resulting from developing the capacity to sell protection. Municipal department may also be selling protection to buyers at a price less than the marginal cost of production. An analysis of the per capita costs of the municipalities which purchase fire protection from municipalities self-producing protection indicates that the sellers may be selling fire protection below the average costs of production. The per capita costs of the buyers from municipal departments is $5.42 as compared to $6.90 for the sellers.

Municipalities which contracted or purchased fire protection exhibited the second lowest per capita costs of the five options of volunteer departments. Local officials and municipalities contracting fire protection services may incur additional transaction costs resulting from the bargaining process with the supplier of services. The transaction costs are not reflected in the total expenditure for fire protection. Seven of the nineteen municipalities which contracted for fire protection, each negotiated four separate contracts in order to obtain protection for the entire municipality. The average number of separate contracts per municipality for contractors was 2.7. However, contracting for fire protection is often the only feasible alternative which the municipality may select. Barriers to establishing their own department such as a dispersed population, the high capital investment required for establishing fire protection services and the organizational costs involved have prompted the communities to contract fire protection.

The per capita costs comparisons indicate that contracting municipalities may benefit by receiving fire protection at something

between marginal and average costs of production. The data does not provide the basis for estimating the marginal costs, therefore, one may only describe the possible reasons for the differences in per capita costs by method of provision.

The finding that municipalities which contract fire protection services exhibit lower per capita costs than municipalities which are involved in production of fire services is consistent with Sinclair's[18/] research regarding police contracting in Michigan. Sinclair found that most of the sheriffs in the sample on police contracting priced contracts to municipalities at less than the variable costs of production.

In utilizing per capita costs for the cost of fire protection by method of production an assumption was made that all municipalities receive the same level of protection. Caution needs to be displayed in interperting results since the level of fire protection may be different between the various municipalities and the method utilized for fire protection. For example, although municipalities which contract for protection exhibit lower per capita costs when compared to a municipality producing their own fire protection, the contracting municipality may suffer higher losses due to fire as the result of residents being located at a greater distance from the nearest fire station.

Residents of a municipality which self-produces fire protection but at a higher per capita costs may have less property damage due to fire as the result of a quicker response time.

18/ Sinclair, William A., An Economic Analysis of Local Government Contracting For Police Patrols In Michigan, Report No. 40, Center for Rural Manpower and Public Affairs, Department of Agricultural Economics, Michigan State University, East Lansing, MI, August 1975, p. 19.

In order to make an accurate comparison by method of provision a researcher would need to calculate both fixed and variable costs of production of fire protection, standarize and measure level of performance of a fire department and account for fire losses. However, the study does indicate that differences in costs do exist based upon method of provision of fire protection. Further research is warranted to pinpoint the exact reasons for the differences.

VII. SELLING FIRE PROTECTION

Fire protection was purchased by 19 out of the 87 municipalities in the study. Thirty out of the forty-seven (63.8%) fire departments enumerated in the study sold fire protection (see Appendix A). Table 5 summarizes the institutional arrangements of the fire departments which sold fire protection by contract. Slightly more municipal

TABLE 5

SUMMARY OF FIRE DEPARTMENTS SELLING PROTECTION

Institutional Arrangement	No. Of Depts.	No. Selling Protection	% Selling Protection
Municipal Fire Depts.[19/]	33	21	63.6
Joint Municipal Fire Depts.	12	7	58.3
Private Non-Profit	1	1	100.0
Quasi - Municipal[20/]	1	1	100.0
Total	47	30	63.8

departments sell protection when compared to joint municipal departments; 63.6% to 58.3%. The six fire departments in the study with full-time paid personnel did not sell fire protection but would respond to an outside call as part of the mutual aid pacts which exist in each county.

19/ Municipal Department Self-Producing Protection

20/ Quasi Municipal is the author's term to describe the Sand Lake Fire Department (Lenawee Co.) The department is supported by an ad valorem tax levy on residents in seven sections of Franklin Township. The Department sells protection to the remaining sections by contract with the township and areas outside the township.

An objective of the study was the identification of the various schedules utilized by municipalities to sell fire protection. During the course of the research, interest was expressed by local officials in obtaining more information as to how fire protection was being sold by other municipalities. There appears to be no standardized method of selling fire protection. Municipalities were enumerated which were contracting fire protection from four different departments with four different schedules being utilized for pricing the services. Cases were also identified of municipalities selling fire protection utilizing three or four different schedules. The schedule utilized was often the result of a bargaining arrangement between the officials of the two municipalities.

Eight distinct schedules or methods of selling were identified in the study and are listed and described in the order of their frequency of use as a selling schedule.

A. Fire Run (13)

Selling protection by the run is the most frequently used method of selling fire protection. Fire run prices ranged from $150 to $750 with the median fire run charge of $275. The charge per run is usually arrived at by averaging the variable costs of previous fires and dividing by the runs per year. Fire runs tended not to account for fixed costs incurred in providing fire protection. Several of the departments did target a set amount of the fire run charge to be deposited in an escrow or capital equipment account. However, concern was expressed by sellers utilizing the fire run schedule of the lack of build up of a capital escrow account.

B. Annual Subscription Fee Which Includes A Set Number Of Runs (9)

Municipaliites selling protection by schedule B attempt to sell fire protection in a package. For

example, an annual subscription fee of $1200 is established which includes four fire runs. In essence the municipality is purchasing four fire runs each year. Uncertainty exists as to whether the purchaser will utilize all the included runs. Fire runs in excess of the runs included in subscription fee are charged out to the purchaser at a flat amount per run. Schedule B may work out to the disadvantage to the seller in the case of the first four runs being expensive fire runs. The opposite case could exist if the total costs of the first four runs are less than the average cost of the fire runs. Schedule B in essence is a variation of Schedule A.

C. Subscription By The Year (4)

Four municipalities sold protection for a flat amount per year, irrespective of the number of fire calls by the contracting municipality. Subscription charges ranged from $900 for partial coverage of a municipality, to $35,000 for full coverage. Due to the size of the sample and variability in the make of each of the four contracting municipalities, an accurate determination of the factors utilized in determining the subscription fee could not be made. However, officials indicated that historical usage by the contracting municipality was generally used by the seller to determine the size of the subscription fee.

D. Annual Subscription Fee + Fire Run Charge (3)

Schedule D attempts to account for the fixed costs involved in providing fire protection to a municipality with the fire run charge capturing the variable costs. The annual subscription fee was generally earmarked for the capital equipment fund and the fire run charge utilized to offset operating costs of the department.

E. Annual Subscription Fee + Vehicle Charge Per Run(2)

The annual subscription fee is treated as explained in Schedule D. Schedule E instead of attempting to account for variable costs by pricing the fire run, the seller charges a fixed amount for each vehicle which was dispatched to the fire. The vehicle charge per hour was calculated to include a fixed number of men who would respond to the fire to man the vehicle.

F. Per Vehicle Per Hour (2)

Schedule F is a variation of Schedule E with the exception that the annual subscription is not utilized. The two cases identified utilized Schedule F approached the pricing of the service quite differently. Case 1 charged out the first hour at a higher amount than the second hour charge accounting for the higher fixed costs involved in dispatching the equipment to the scene and the setup costs involved.

Case 2 provided a lower charge for the first hour and a higher charge for the second and subsequent hours at the scene. The lower first hour charge was utilized in an attempt to attract more buyers of the department's fire service. The neighboring township to which the department supplied protection was also serviced by another fire department from a neighboring community, therefore, a competition developed among the suppliers over supplying fire service to the same area. Competition between suppliers of fire protection is usually limited due to the limited number of fire departments physically able to provide timely service.

G. Annual Subscription Fee + Per Hour Charge (1)

The municipality utilizing Schedule G provides fire protection on a contractual basis to four municipalities. The subscription fee is actually an assessment for access to the service and attempts to partially cover the fixed costs of producing fire services. The per hour charge is a two-step charge with the first hour priced higher than the second and subsequent hours. The subscription fee to the largest subscriber is higher than to municipalites which use the services less. The differential pricing was established in recognition that the largest and most frequent user of the services also contributed the most to the wear and tear on the equipment. Servicing a larger rural area tends to decrease the useful life of fire equipment due to the road conditions and the sustained high speeds which equipment is moved to the scene.

H. Annual Individual Membership Fee + Fire Run Charge (1)

Schedule H is utilized by the Hillsdale Rural Fire Department, a private non-profit corporation, supplying fire protection to several municipalities in Hillsdale County. Lifetime membership subscriptions are sold to subscribing families and annual dues assessed. Families subscribing fire protection from the department receive

a reduced fire run charge for services as compared to non-subscribing families. The area serviced by the department is not served by any other department. Appendix D gives a more detailed analysis of the department and the schedule used in the pricing of fire protection services.

Summary

Fire protection can be marketed in various forms utilizing a variety of price schedules. Information to serve as guides to municipalities in pricing fire protection is limited. Uncertainty was expressed by local officials over how to sell and price fire protection services in lieu of definitive guidelines. Purchasers expressed concern over what they termed "overcharging" for fire protection. Contracting communities are generally unaware of the total costs involved in producing fire protection. Data from the study indicates that municipalities who contract for fire services may be receiving protection at a rate less than the average costs of production.

Sellers of protection need to as accurately as possible calculate the total costs of producing fire protection. If an accurate calculation of costs of fire protection production can be calculated, municipalities selling fire protection are in a better position to establish price schedules which reflect both fixed and variable cost. Municipalities selling fire protection often found themselves with an inadequate capital fund to replace existing equipment. Part of the reason for a lack of a fund can be attributed from the schedule utilized for selling fire protection. The price charged covered the variable costs but provided little, if any, contribution towards the fixed costs of fire protection production.

The transaction costs of arriving at an equitable pricing arrangement may exceed the total savings to either the seller or purchaser. Local officials do need to be aware of the alternative price schedules which are available. Appendix E offers several alternative approaches at pricing fire protection. Contracts need to be updated to reflect changing financial condition and protection requirements. As far as possible contracts should reflect the product being sold or purchased both in quantity and quality of services delivered. Standardization of contracts would be a useful first step for local officials and departments to review. Increased sharing of information between the municipalities on how fire protection can be bought and sold would aid in removing some of the uncertainty which currently exists among local officials.

Additional research is needed on the costs of providing fire protection. The need for increased attention to the accounting systems of rural municipalities is indicated by the study. The costs of producing fire protection often were difficult to determine due to expenditures being dispersed in several accounts or not directly attributed to fire production. A more inclusive display of the total costs of producing fire protection would aid local decision-makers in determining the schedules to utilize and the price(s) to establish for selling protection.

VIII. SUMMARY OF PROBLEMS AND ISSUES IN PROVIDING FIRE PROTECTION

The study thus far has examined how 87 municipalities have organized to provide fire protection services. The institutional arrangements for provision of fire services have been examined along with the identification of the buyers and sellers. The following is a brief summary of the basic problems and issues facing municipalities especially rural communities. The summary represents views as expressed by local officials during the interviews and assessment of the situation by the author.

The most frequently expressed concern centered on determining the desirable fire protection level. Due to the existence of many variables, which need to be included in determining the protection level, such as population, projected growth, density of housing, budget constraints, relative size of budget, time horizon and lumpiness of additional investment, the question of levels of protection remains a complex one to answer.

The change from an all volunteer fire department to a department with full-time paid personnel represents another frequently stated concern. The change over is often reflective of the bargaining power and influence of the fire chief and department personnel who serve as the primary source of information to local officials.

A concern was expressed by municipalities, relying upon contracting as a method of fire protection provision, should the municipality consider self-producing fire protection? The concern is often raised as municipalities are experiencing difficulty in bargaining and negotiating new contracts. The threat of exit is often used by contracting municipalites

in an attempt to negotiate a more favorable contract.[21/] However, the barriers to entry into self-production of fire protection often leave contracting municipalities with few, if any, options but to contract. Fire protection has a limited number of suppliers and municipalities which produce protection operate in a situation with few potential buyers and sellers.

The rising costs of fire protection production represented a frequent concern expressed by officials, especially in municipalities with full-time paid fire department personnel. The rising costs of equipment and personnel costs, especially with unionized departments, accounted for the concern. Fire protection operation accounted for 67.8% of general fund expenditures in one township with a full-time paid department. Several of the full-time paid departments are considering substituting paid standby volunteers in an effort to cut back on personnel costs.

The questions surrounding the buying and selling of fire protection as outlined in the previous section is an additional issue with municipalities. The provision of fire protection by joint production between two or more municipalities was mentioned by local officials as worth exploring. Local officials often used the term consolidation when referring to joint production. Both consolidation and joint production are issues which are certain to gain more impetus as municipalities struggle to deal with rising costs of fire protection production.

21/ See Albert O. Hirschman, Exit, Voice and Loyalty, Cambridge, Mass., Howard University Press, 1970 for a further discussion of the use of the threat of exit as a bargaining tool.

Little mention was made of the issues surrounding insurance rates as reflected by the Insurance Service Organization (ISO) classification of municipalities based upon the type of fire department servicing a given municipality. A majority of the municipalities received a 9 or 10 classification. Lower ISO rating were evident in larger cities. To receive a rating lower than a 9, a dwelling needed to be within 1000 feet of a fire hydrant. Communities with centralized water system generally received a 9 rating. Once a dwelling is more than five miles from the fire station a 10 rating is automatically assigned.[22/] Since a majority of the study area is classified as rural, ISO ratings or concern over insurance premium savings as reflected by improved ISO ratings is understandably lacking. The capital investment which would be required by rural areas to effectuate an insurance rate reduction would be prohibitive in most cases.

Readers interested in exploring the benefit-cost involved in obtaining lower ISO ratings are referred to research by Frederick J. Hitzhusen[23/] and a publication by the National League of Cities.[24/]

22/ Farm property that is 10 miles or less from a recognized fire department station can receive a reduction in insurance premiums according to the grading schedule. All other dwellings 5 miles or less to receive a reduction from 10 to a 9 ISO rating.

Marshall Valuation Service Book, Insurance Service Office of Michigan, Southfield, Michigan 1976, p. ii.

23/ Frederick J. Hitzhusen, op. cite.

24/ The Grading of Municipal Fire Protection Facilities, National League of Cities, 1612 K Street, N.W., Washington, D.C. 20006, July 1977.

Emphasis was notably lacking in fire prevention education. Several chiefs indicated that they were active in local schools in fire safety education, however, no planned fire prevention education programs were enumerated.[25/]

Research dealing with the effectiveness of fire prevention activity is lacking according to Swersey and Ignall.[26/] However, "In America Burning" a report by the National Commission on Fire Prevention and Control in 1973 two studies are cited as providing evidence that public education programs can dramatically reduce fire losses. However, both studies are weak methodologically[27/] according to Swersey and Ignall.

Local officials indicated that any additional information and research regarding fire protection in rural areas would be greatly appreciated. Genuine interest exists for continued efforts in fire protection research.

25/ That is not to say that fire prevention programs do not exist in the study area but simply that local officials or fire chiefs did not discuss the program if they did exist.

26/ Arthur J. Swersey and Edward J. Ignall, op cite, p. 32.

27/ Ibid.

IX. FUTURE RESEARCH NEEDS IN FIRE PROTECTION

Fire protection research, as a review of the literature suggested, is becoming a higher priority item. Major studies have been completed by Hitzhusen[28/] and Ahlbrandt.[29/] The Research Triangle Institute is sponsoring fire protection research on institutional delivery systems under the direction of Dr. Lois MacGillivray.[30/]

Childs, Doeksen and Frye contributed research to assist local decision-makers analyze alternative rural fire protection systems.[31/]

Jones and Badenhop's study [32/] on fire protection alternatives for rural communities can serve as a useful guide to local officials when used in conjunction with the Child et. al. study previously mentioned.

Despite the rather recent research reports mentioned above, several research needs, especially in the area of rural fire protection remain.

1. Research is needed in analyzing the relationships between fire prevention activities and fire incidence. For example, building inspection activity is rarely considered a fire prevention activity by local officials, yet it is generally accepted that the enforcement of construction, electrical and plumbing codes should reduce the incidence of fire. Local decision-makers have to make budget allocation decisions, for example,

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28/ Frederick J. Hitzhusen, op cite.

29/ Roger Ahlbrandt, op cite.

30/ Lois MacGillivray, op cite.

31/ Don Childs, Gerald Doeksen and Jack Frye, Economics of Rural Fire Protection, Agriculture Information Bulletin No. 407, Economic Development Division, Economic Research Service, U.S.D.A., Washington, D.C., June 1977.

32/ T. Morris Jones and M. B. Badenhop, op cite.

involving tradeoffs between inspection service and the purchase of new fire suppression equipment. New equipment often wins out over inspection and fire prevention education activities as evidenced by the expenditure pattern of federal revenue sharing monies on police and fire equipment.[33/]

2. Research regarding the selling of fire protection services would be especially useful to rural communities. As this study pointed out, contracting for fire protection occurs more frequent in rural counties. As the population of an area increases, the tendency exists to switch to self-production of fire protection. A more comprehensive economic analysis of the total costs involved in fire protection would prove to be beneficial to municipalities involved in fire protection production. Research, in this paper, has generally dealt with operating costs, while not accounting for past capital investments in equipment, municipal improvements, such as water systems and private investments.

3. Further research is needed in contracting for fire protection services. Model contracts could be researched and developed for use by municipalities whose only realistic option is contracting for the provision of fire services. This research will hopefully serve as a first step in fulfilling the research need.

4. Research surrounding private investment and fire prevention is lacking in all the research which was reviewed in preparation of this paper. For example, decision-makers in a given municipality might consider the purchase of fire alarms and/or fire detectors for all homes

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33/ Martin and Patrick op. cite., p. 21.

in a given area as an alternative to increasing fire suppression activity expenditures. The total cost outlay for the detectors or alarms may be less than purchasing a new piece of equipment, yet the alarms or detectors may contribute as much to minimizing property loss and personal injury due to fire.

Several communities are requiring smoke detectors in all new homes which are constructed as part of their construction code. Research which compares losses due to fire between communities requiring smoke detectors and communities not requiring smoke detectors in new construction is a related research topic.

5. Research is generally lacking regarding the provision of fire protection services by a private fire company. The limited number of existing private departments certainly contributes to the lack of research on the topic. Ahlbrandt's research regarding the Scottsdale situation is useful in respect to larger communities, but research is definitely lacking for private fire provisions in small rural communities. The Hillsdale County Rural Fire Department as described in Appendix D is a unique sample for which further study is warranted along with the identification and enumeration of the other 10-12 private fire companies in Michigan.

6. Research to assist decision-makers in determining when to switch from a volunteer fire department to a department with full-time paid personnel would be helpful. Research is available which categorizes and lists options from which to select the method of fire protection provision, but research is lacking which identifies the variables to consider in determining the changeover.

7. Table 6 represents a "research assessment" as developed by Swersey and Ingall on the evaluation of research available on fire protection.[34/]

[34/] Swersey and Ingall, op cite, p. IX

Table 6

RESEARCH ASSESSMENT

Major Policy Issues or Areas	Research Quantity[a]	Research Quality	Priority for Future Research
Chapter 3. Organization			
Volunteer versus paid departments	Little	Fair-good	Medium
Public versus private fire departments	Little	Fair-good	Medium
Regional Consolidation	Little	Fair-good	Medium
Police-fire consolidation	Some	Fair-good	Low
Chapter 4. The Cost, Distribution and Effectiveness of Fire Protection			
Measuring effectiveness and productivity	Little	Mixed[b]	High
The distribution of costs and benefits	Little	Good	Medium
Fire insurance grading	Little	Fair	High
Fire insurance rating	Substantial	Poor	High
Evaluating fire protection investments	Some	Fair-good	Medium
Chapter 5. Fire Protection			
Effectiveness of public education	Little	Fair	Very high
Effectiveness of inspections	Little	Fair-good	High
Arson	Little	Fair	Medium
False alarms	Little	Fair	Low
Chapter 6. High-Rise Safety			
Internal fire-fighting	Little	Fair-good	High
Occupant movement	Some	Fair	High
Smoke movement	Substantial	Fair-good	High
Chapter 7. Fire and Smoke Behavior			
Experimental Work	Substantial	Fair-good	Medium
Statistical analysis of unplanned actual fires	Some	Fair-good	High
Chapter 8. Life Safety			
Occupant Safety	Little	Fair	High
Rescue treatment	Some	Fair	Medium
Chapter 9. Early Detection and Sprinklers			
Detector costs and effectiveness	Substantial	Fair-good	Very high
Sprinkler costs and effectiveness	Little	Fair	Very high
Chapter 10. The Deployment and Control of Fire-Fighting Resources			
Number of companies needed and their location	Substantial	Mixed	High
Number of companies on duty by time of day	Some	Mixed	Low
Number of men to assign to each company	None		High
How many and which units to dispatch	Some	Mixed	Low
Relocation or moveup policy	Some	Good	Low
Reducing dispatching delays	Little	Good	Low
Chapter 11. Fire Department Operations			
Effectiveness of tactics	Little	Fair	Medium
Effectiveness of training	Little	Fair	High
Developing duty schedules	Little	Fair	Medium
Deciding how often to replace equipment	Little	Fair	Low
Chapter 12. Fire Reporting Systems and Statistics			
Fire reporting	Some	Fair	Very high
Data aggregation and analysis	Substantial	Poor-Fair	High

[a]Little means five papers or less; some means between six and ten; and substantial means more than ten.

[b]Ranging from poor to excellent.

X. SUMMARY AND CONCLUSIONS

Municipalities have four options in the provision of fire protection services: (1) self-production; (2) joint production; (3) contracting; and (4) do not provide protection. The study indicated that 70% of the 87 municipalities in three counties of Hillsdale, Jackson and Lenawee were involved in production of fire services. The balance of the communities either relied upon the township for fire protection or contracted fire protection from a neighboring community.

The study identified four organizational structures utilized by municipalities in producing fire protection in the three counties. Municipal departments all volunteer, municipal departments fully paid, municipal departments mostly volunteer and joint municipal departments all volunteer. While the all volunteer municipal department is the most common production arrangement identified, the fully paid and mostly volunteer accounted for 82% of the public fire operating expenditures and provided fire protection to 54% of the population in the three counties. The all volunteer departments provide protection to 46% of the population but do so with only 18% of the total public fire operating expenditures. Residents serviced by fully paid departments generally receive more benefits in the form of reduced fire insurance premiums, reduced private losses due to quicker response time and perhaps feeling a greater sense of security. While perhaps receiving more benefits residents protected by fully paid full-time departments also bear a higher per capita cost for the protection.

Rural residents while benefiting from a lower per capita expenditure by the municipality bear a higher burden of the costs of fire in the form of higher insurance rates and increased losses due to fire as a result of increased response time.

Joint production of fire protection lowers the per capita costs as compared to municipal self-production at least in the study area. Joint departments it appears are able to capture some economies of scale in production although the data was not definitive in this regard.

Contracting for fire protection services represented the second lowest per capita costs provision method identified in the study. Twenty-one percent of the municipalities ~~selected~~ have to contract for fire protection. Although contracting exhibits the second lowest per capita cost, the transaction costs of arriving at equitable fire contracts need to be taken into account by decision-makers. As population increases in an area, municipalities tend to become involved in producing fire protection services as evidenced by the differences in the number of municipalities which contract in Hillsdale County as compared to Jackson County.

Municipal departments, both joint and single, appear to be selling fire protection at less than the average costs of production. The data collected does not lend itself to a marginal cost analysis, therefore, only probable hypothesis can be drawn as to the nature of the selling arrangement.

The study also indicates that uncertainty exists over the pricing of fire protection services to neighboring municipalities. Municipalities selling fire protection by the fire run generally do not appear to be accounting for the fixed costs in the production of fire services.

Therefore municipalities producing fire protection may be bearing a larger burden in financing capital investments. Municipalities may wish to explore alternative pricing schedules such as the subscription fee arrangement as a means of accounting for both the fixed and variable or operating costs of providing fire protection.

Increased standardization of fire contracts and selling arrangements along with more detail in accounting for the costs of fire protection production will assist local decision-makers in reducing uncertainty over which of the methods to utilize in fire protection provision and the sale of fire protection services. Increased information in this area may aid in reducing transaction costs involved in negotiating fire protection contracts between the supplier and buyer of fire protection.

Additional research is warranted in the organization of fire protection services in rural areas. Little information is available regarding the organization of private non-profit fire departments. Only one example of a private non-profit department was identified in the study area. Communities or areas of the state which are without adequate protection may wish to explore the formation of a private non-profit department or a combination of private efforts and municipal involvement. The development of information regarding the private option could be of aid to community leaders in organizing efforts for fire protection.

A more detailed benefit-cost analysis on the various production options of fire services would be of benefit to local decision-makers faced with selecting organization provision and production choices. Increased research in related fire prevention activities such as construction code enforcement, private/public investments in fire

prevention and public education is also warranted. Research on the relationship between fire prevention activity undertaken by local communities and the resulting insurance rating for homeowners fire insurance premiums is needed in order to aid in the decisions regarding the merit of increased private/public investment in fire prevention and suppression activity.

EXTENSION'S ROLE

The Cooperative Extension Service, through the public policy program, can provide assistance in several areas to aid municipalities in the organization and provision of fire protection services.

The dissemination of research information on fire protection alternatives and intergovernmental contracting is a legitimate role for Extension and can fulfill an identified need which exists, especially with rural municipalities. Extension educational workshops on intergovernmental contracting could serve to reduce uncertainty and hesitancy which exists with many of the municipalities regarding contracting for public services such as fire protection.

The research results outlined in the paper and recent research by Sinclair[35/] support the hypothesis the communities may find contracting as a lower cost option when compared to self-production of services such as fire and police protection services.

This research also supports the expansion of Extension sponsored Local Governmental Budgeting workshops especially targeted to rural townships.

35/ William A. Sinclair, op. cite.

APPENDICES

APPENDIX A

MUNICIPAL FIRE DEPARTMENTS IN THREE COUNTY STUDY AREA

Hillsdale County - 13 Departments

Allen Township Fire Department

* Camden Fire Department - (village)

* Frontier Fire Department - (Woodbridge Township)

Hillsdale Fire Department - (city)

* Hillsdale Rural Fire Department - (private non-profit department)

* Jonesville Fire Department - (village)

* Litchfield Fire Department - (joint township and city)

* Montgomery Fire Department - (village)

* Moscow Township Fire Department

* North Adams Fire Department - (village)

* Pittsford - Jefferson Fire Department - (joint township)

* Reading Community Fire Department - (joint township and city)

* Wright - Waldron Fire Department - (joint township and village)

Jackson County - 15 Departments

Blackman Township Fire Department

* Columbia Township Fire Department

Concord - Pulaski Fire Department - (joint village and 2 townships)

* Grass Lake Township Fire Department

Hanover Township Fire Department

*Departments Selling Fire Protection

* Henrietta Township Fire Department

Jackson Fire Department (city)

* Liberty Township Fire Department

Leoni Township Fire Department

* Napoleon Township Fire Department

Parma - Sandstone Fire Department - (joint village and 2 townships)

Spring Arbor Township Fire Department

Rives - Tompkins Fire Department - (joint township)

Springport Regional Fire Department - (joint village and 2 townships)

Summit Township Fire Department

Lenawee County - 19 Departments

* Addison Fire Department - (joint village and 4 townships)

Adrian Fire Department - (city)

Blissfield Fire Department - (joint township and village)

Cement City Fire Department - (village)

* Clayton - Dover - Hudson Fire Department - (joint village and 2 townships)

* Clinton Fire Department - (joint village and township)

Deerfield Township Fire Department

* Fairfield Township Fire Department

* Hudson Fire Department - (city)

* Irish Hills Fire Department - (township)

* Madison Township Fire Department

* Morenci Fire Department - (city)

* Departments Selling Fire Protection

* Onsted Fire Department - (township)

* Palmyra Township Fire Department

  Raisin Township Fire Department

* Ridgeway Township Fire Department

* Riga Township Fire Department

* Sand Lake Fire Department - (seven sections of Franklin Township)

* Tecumseh Fire Department - (city)

* Departments Selling Fire Protection

APPENDIX B-1
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

HILLSDALE COUNTY MUNICIPALITIES

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Hillsdale (C)	7,728	(1-A)		1,556,348	131,270	8.7	$17.56
Litchfield (C)	1,243	(2-C)	*	386,865	5,688	1.4	4.57
Reading (C)	1,125	(2-C)	*	246,292	6,000	2.4	5.33
Allen (V)	See Allen Township	(0)		9,111	-0-	-0-	-0-
Camden (V)	405	(1-C)	*	54,023	3,468	6.4	8.56

1/ Operating Expenditures - Does Not Include Capital Purchases

2/ 1976 State Revenue Sharing Population Figures
Source: Officer of Intergovernmental Relations - Department of Management and Budget

3/ 0 - Municipality Does Not Provide Fire Protection
1 - Municipality Has Own Fire Department
2 - Municipality Is A Participant In A Joint Fire Department Involving Two Or More Municipalities
3 - Contract Or Purchase Fire Protection
A - Fully Paid Fire Department Personnel
B - Mostly Volunteer With Some (less than 50%) Full Time Paid Personnel
C - All Volunteer

APPENDIX B-1
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

HILLSDALE COUNTY MUNICIPALITIES (cont.)

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Jonesville (V)	2,081	(1-C)	*	179,069	9,493	5.3	$4.56
Montgomery (V)	404	(1-C)	*	42,315	3,804	8.9	9.41
North Adams (V)	574	(1-C)	*	25,933	849	3.2	1.47
Waldron (V)	564	(2-C)	*	47,869	1,325	2.7	2.34
Adams (T)	1,275	(3)		61,164	4,475	7.3	3.51
Allen (T)	1,371	(1-C)		30,480	8,191	26.8	5.97
Amboy (T)	844	(3)		29,825	5,100	17.1	6.04
Cambria (T)	1,871	(3)		44,911	4,450	9.9	2.37
Camden (T)	941	(3)		35,516	7,700	21.6	8.42
Fayette (T)	852	(3)		46,581	4,950	10.6	5.81
Hillsdale (T)	1,543	(3)		37,395	1,800	14.8	1.17

[2/] and [3/] see page 48 for Key

APPENDIX B-1
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

HILLSDALE COUNTY MUNICIPALITIES (cont.)

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Litchfield (T)	940	(2-C)	*	32,552	5,967	16.8	$6.35
Moscow (T)	1,093	(1-C)	*	43,630	4,517	10.3	4.13
Pittsford (T)	1,548	(2-C)	*	38,813	3,746	9.6	2.41
Ransom (T)	860	(3)		39,195	3,800	9.7	4.41
Reading (T)	1,194	(2-C)	*	30,056	6,391	21.3	5.35
Scipio (T)	1,173	(3)		31,370	3,150	10.0	2.68
Somerset (T)	2,491	(2&3)		106,497	8,750	8.2	3.51
Wheatland (T)	1,074	(2&3)		38,644	5,447	14.0	5.07
Woodbridge (T)	1,026	(1-C)	*	37,071	3,600	9.7	3.50
Wright (T)	1,219	(2-C)	*	52,300	7,015	13.4	5.75
Jefferson (T)	2,290	(2-C)	*	53,509	4,387	8.2	1.92

2/ and 3/ see page 48 for Key

APPENDIX B-1
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

HILLSDALE COUNTY MUNICIPALITIES (cont.)

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Total 27 Units	37,702			3,337,034	255,333	7.7	$ 6.77
Total Excluding Hillsdale (C)	29,974			1,780,686	124,063	7.0	$ 4.14

[2/] and [3/] see page 48 for Key

APPENDIX B-2
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

JACKSON COUNTY MUNICIPALITIES

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Jackson (C)	45,315	(1-A)		16,736,740	1,745,656	10.4	$38.52
Brooklyn (V)	See Columbia Township	(0)		96,600	-0-	-0-	-0-
Concord (V)	983	(2-C)		109,545	5,283	4.8	5.37
Grass Lake (V)	See Grass Lake Township	(0)		30,532	-0-	-0-	-0-
Hanover (V)	See Hanover Township	(0)		29,840	-0-	-0-	-0-
Parma (V)	880	(2-C)		66,004	3,886	5.9	4.42
Springport (V)	723	(2-C)	*	105,530	6,300	5.9	8.71
Blackman (T)	14,717	(1-A)		662,804	315,095	47.5	21.41
Columbia (T)	4,481	(1-C)	*	185,383	54,026	29.1	12.05
Concord (T)	1,221	(2-C)		59,026	10,508	17.6	8.60

[2/] and [3/] see page 48 for Key

APPENDIX B-2
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

JACKSON COUNTY MUNICIPALITIES (cont.)

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Grass Lake (T)	2,970	(1-C)	*	131,553	21,811	16.5	7.34
Hanover (T)	2,533	(1-C)		88,615	21,774	24.5	8.60
Henrietta (T)	3,594	(1-C)	*	107,541	29,316	27.2	8.15
Leoni (T)	13,953	(1-C)		424,894	288,340	67.8	20.66
Liberty (T)	1,840	(1-C)	*	53,218	10,654	20.0	5.79
Napoleon (T)	5,500	(1-C)	*	216,522	38,951	17.9	7.08
Norvell (T)	1,788	(3)		76,695	12,875	16.7	7.20
Parma (T)	1,764	(2-C)		68,000	7,735	7.6	3.45
Pulaski (T)	1,390	(2-C)		45,271	10,508	23.2	7.52
Rives (T)	2,708	(2-C)		104,212	7.241	6.9	2.67
Sandstone (T)	2,237	(2-C)		101,286	7,735	7.6	3.45

[2/] and [3/] see page 48 for Key

APPENDIX B-2
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

JACKSON COUNTY MUNICIPALITIES (cont.)

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Spring Arbor (T)	5,650	(1-C)		185,725	25,450	13.7	4.50
Springport (T)	1,156	(2-C)	*	23,457	5,350	22.8	4.62
Summit (T)	21,754	(1-A)		813,412	297,857	36.6	13.69
Tompkins (T)	1,832	(2-C)		71,093	7,439	10.4	4.06
Waterloo (T)	2,127	(3)		74,455	15,626	21.0	7.34
Total All Units (26)	144,122			20,668,261	2,949,416	14.2	$20.89
Total Excluding Jackson (C), Blackman, Leoni and Summit Twps.	45,383			2,030,411	302,462	14.9	$ 6.66

[2/] and [3/] see page 48 for Key

APPENDIX B-3
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

LENAWEE COUNTY MUNICIPALITIES

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Adrian (C)	20,364	(1-A)		3,678,639	507,010	13.8	$24.90
Hudson (C)	2,618	(1-C)	*	290,711	19,775	6.8	7.55
Morenci (C)	2,132	(1-C)	*	299,867	2,645	1.0	1.24
Tecumseh (C)	7,120	(1-B)	*	1,500,000	57,498	3.8	8.07
Addison (V)	595	(2-C)		18,393	2,590	14.1	4.35
Blissfield (V)	2,753	(2-C)		371,244	14,659	3.9	5.32
Britton (V)	See Ridgeway Township	(0)		39,947	-0-	-0-	-0-
Cement City (V)	531	(1-C)		46,377	1,753	3.8	3.30
Clayton (V)	505	(2-C)	*	27,340	3,250	11.8	6.75
Clinton (V)	1,677	(2-C)	*	203,745	11,321	5.6	6.75

[2/] and [3/] see page 48 for Key

APPENDIX B-3
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

LENAWEE COUNTY MUNICIPALITIES (cont.)

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Deerfield (V)	See Deerfield Township	(0)		81,202	-0-	-0-	-0-
Onsted (V)	See Cambridge Township	(0)		49,076	-0-	-0-	-0-
Adrian (T)	3,585	(3)		156,238	30,126	19.2	$ 8.40
Blissfield (T)	722	(2-C)		55,709	15,567	27.9	21.56
Cambridge (T)	2,647	(1-C)	*	113,478	25,232	22.2	9.53
Clinton (T)	863	(2-C)	*	117,747	9,262	7.8	10.73
Deerfield (T)	1,589	(1-C)		43,810	15,225	34.7	9.58
Dover (T)	1,325	(2-C)	*	29,500	7,000	23.7	5.28
Fairfield (T)	2,047	(2-C)	*	65,137	7,958	12.2	3.89
Franklin (T)	1,768	(3)		97,226	8,790	9.04	4.97

2/ and 3/ see page 48 for Key

APPENDIX B-3
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

LENAWEE COUNTY MUNICIPALITIES (cont.)

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Hudson (T)	1,180	(2-C)	*	41,825	6,750	16.1	$ 5.72
Macon (T)	1,316	(3)		71,571	5,303	7.4	4.02
Madison (T)	5,473	(1-B)	*	206,558	58,568	28.4	10.70
Medina (T)	1,227	(3)		36,815	7,450	20.6	6.07
Ogden (T)	1,553	(3)		46,103	5,000	10.8	3.32
Palmyra (T)	2,424	(1-C)		105,760	14,600	13.8	6.02
Raisin (T)	4,322	(1-C)		185,788	18,244	9.8	4.22
Ridgeway (T)	1,756	(1-C)	*	46,395	5,402	11.6	3.08
Riga (T)	1,675	(1-C)	*	131,550	12,358	9.4	7.38
Rollin (T)	2,620	(2-C)		142,129	12,995	9.1	4.96
Rome (T)	1,330	(3)		52,491	7,250	13.8	5.45

2/ and 3/ see page 48 for Key

APPENDIX B-3
GENERAL FUND AND FIRE PROTECTION EXPENDITURES[1/]
FISCAL 1976-77

LENAWEE COUNTY MUNICIPALITIES (cont.)

Municipality	Population[2/]	Organization Of Fire Protection Services[3/]	Selling Fire Services	Total General Fund Expenditures	Net Fire Expenditures	Fire Expenditures As A Per Cent of General Fund Expenditures	Per Capita Cost of Fire Protection
Seneca (T)	1,337	(3)		41,904	6,112	14.5	$ 4.57
Tecumseh (T)	1,048	(3)		38,644	6,000	15.5	5.72
Woodstock (T)	1,712	(2-C)		88,204	10,820	12.2	6.32
Total All Units (34)	81,814			8,521,123	916,513	10.7	$11.20
Total Excluding Adrian (C) Tecumseh (C) Madison (T)	48,814			3,135,926	293,437	9.4	$ 6.01

[2/] and [3/] see page 48 for Key

APPENDIX C
FIRE PROTECTION COSTS PER MUNICIPALITY BY ORGANIZATION OF FIRE PROTECTION SERVICES 1/
FISCAL 1976-77

APPENDIX C-1
MUNICIPAL FIRE DEPARTMENTS - ALL PAID AND/OR DEPARTMENTS WITH SOME FULL-TIME PAID PERSONNEL - NOT SELLING FIRE PROTECTION

Municipality	Population	Fire Expenditure	Per Capita Cost
Blackman (T)	14,717	$ 315,095	$21.41
Leoni (T)	13,953	288,340	20.66
Summit (T)	21,754	297,857	13.69
Hillsdale (C)	7,728	131,270	17.56
Adrian (C)	20,364	507,010	24.90
Jackson (C)	45,315	1,745,656	38.52
Totals	123,831	$3,285,228	$26.53

APPENDIX C-2
MUNICIPAL FIRE DEPARTMENTS - ALL PAID AND/OR DEPARTMENT WITH SOME FULL-TIME PAID PERSONNEL - SELLING FIRE PROTECTION

Tecumseh (C)	7,120	$ 57,498	$ 8.07
Madison (T)	5,473	58,568	10.70
Totals	12,593	$116,066	$ 9.22

1/ Fire Protection costs only include operating expenditures, capital purchases are excluded.

APPENDIX C-3
MUNICIPAL FIRE DEPARTMENT - ALL VOLUNTEER
PERSONNEL - NOT SELLING FIRE PROTECTION

Municipality	Population	Fire Expenditure	Per Capita Cost
Allen (T)	1,371	$ 8,191	$5.97
Hanover (T)	2,533	21,774	8.60
Spring Arbor (T)	5,650	25,450	4.50
Deerfield (T)	1,589	15,225	9.58
Palmyra (T)	2,424	14,600	6.02
Raisin (T)	4,322	18,244	4.22
Cement City (V)	531	1,753	3.30
Total	18,420	$105,237	$5.71

APPENDIX C-4
MUNICIPAL FIRE DEPARTMENT - ALL VOLUNTEER
PERSONNEL - SELLING FIRE PROTECTION

Camden (V)	405	$ 3,468	$8.56
Jonesville (V)	2,081	9,493	4.56
Montgomery (V)	404	3,804	9.41
North Adams (V)	574	849	1.47
Moscow (T)	1,093	4,517	4.13
Woodbridge (T)	1,026	3,600	3.50
Columbia (T)	4,481	54,026	12.05
Grass Lake (T)	2,970	21,811	7.34
Henrietta (T)	3,594	29,316	8.15
Liberty (T)	1,840	10,654	5.79
Napoleon (T)	5,500	38,951	7.08
Hudson (C)	2,618	19,775	7.55

APPENDIX C-4
MUNICIPAL FIRE DEPARTMENT - ALL VOLUNTEER
PERSONNEL - SELLING FIRE PROTECTION

Municipality	Population	Fire Expenditure	Per Capita Cost
Morenci (C)	2,132	$ 2,645	$1.24
Cambridge (T)	3,647	25,232	9.53
Fairfield (T)	2,047	7,958	3.89
Ridgeway (T)	1,756	5,402	3.08
Riga (T)	1,675	12,358	7.38
Total	36,843	$253,859	$6.90

APPENDIX C-5
JOINT MUNICIPAL FIRE DEPARTMENT - ALL
VOLUNTEER - SELLING FIRE PROTECTION

Litchfield (C)	1,243	$ 5,688	$4.57
Reading (C)	1,125	6,000	5.33
Waldron (V)	564	1,325	2.34
Litchfield (T)	940	5,967	6.35
Pittsford (T)	1,548	3,746	2.41
Reading (T)	1,194	6,391	5.35
Wright (T)	1,219	7,015	5.79
Jefferson (T)	2,290	4,387	1.92
Springport (V)	723	6,300	8.71
Clayton (V)	505	3,250	6.43
Clinton (V)	1,677	11,321	6.75
Clinton (T)	863	9,262	10.73
Dover (T)	1,325	7,000	5.28

APPENDIX C-5
JOINT MUNICIPAL FIRE DEPARTMENT - ALL VOLUNTEER - SELLING FIRE PROTECTION

Municipality	Population	Fire Expenditure	Per Capita Cost
Hudson (T)	1,180	6,750	5.72
Springport (T)	1,156	5,350	4.62
Totals	18,708	$89,752	$4.80

APPENDIX C-6
JOINT MUNICIPAL FIRE DEPARTMENT -
ALL VOLUNTEER - NOT SELLING FIRE PROTECTION

Municipality	Population	Fire Expenditure	Per Capita Cost
Concord (V)	983	$ 5,283	$5.37
Concord (T)	1,221	10,508	8.60
Rives (T)	2,708	7,241	2.67
Sandstone (T)	2,237	7,735	3.45
Pulaski (T)	1,396	10,508	7.52
Parma (V)	880	3,886	4.42
Tompkins (T)	1,832	7,439	4.06
Addison (V)	595	2,590	4.35
Blissfield (V)	2,753	14,659	5.32
Blissfield (T)	722	15,567	21.56
Rollin (T)	2,620	12,995	4.96
Woodstock (T)	1,712	10,820	6.32
Parma (T)	1,764	7,735	4.38
Totals	21,423	$116,966	$5.46

APPENDIX C-7
CONTRACT OR PURCHASE FIRE PROTECTION

Municipality	Population	Fire Expenditure	Per Capita Cost
Adams (T)	1,275	$ 4,475	$3.51
Amboy (T)	844	5,100	6.04
Cambria (T)	1,871	4,450	2.37
Camden (T)	914	7,700	8.42
Fayette (T)	852	4,950	5.81
Ransom (T)	860	3,800	4.41
Scipio (T)	1,173	3,150	2.68
Norvell (T)	1,788	12,875	7.20
Waterloo (T)	2,127	15,626	7.34
Adrian (T)	3,585	30,126	8.40
Franklin (T)	1,768	8,790	4.97
Macon (T)	1,316	5,303	4.02
Medina (T)	1,227	7,450	6.07
Ogden (T)	1,553	5,000	3.22
Rome (T)	1,330	7,250	5.45
Seneca (T)	1,337	6,112	4.57
Tecumseh (T)	1,048	6,000	5.72
Wheatland (T)	1,074	5,447	5.07
Somerset (T)	2,491	8,750	3.51
Totals	28,433	$152,354	$5.36

APPENDIX D

PRIVATE NON-PROFIT FIRE DEPARTMENTS

The production of fire protection services in the private sector is a rarity in Michigan as well as the United States, but examples do exist. One such example is the Hillsdale Rural Fire Department, a private non-profit volunteer fire department, which provides fire protection to residents in Hillsdale Township, a rural township adjacent to the City of Hillsdale. The department also sells protection to portions of Cambria and Adams Township in Hillsdale County.

HISTORICAL PERSPECTIVE

Prior to 1946, Hillsdale Township residents were without fire protection. Township citizens decided to produce and provide their own fire protection by establishing the Hillsdale Rural Fire Association, a private non-profit corporation, to finance and operate a fire department. Family memberships to the association were sold and annual dues assessed to participating families. Community money-raising projects were initiated to aid in financing the needed fire suppression equipment. Originally the department housed the fire suppression equipment in the Hillsdale City Fire Station until they, HRFD, was able to secure a suitable fire house.

Today the department is as well equipped as any volunteer rural department.

DEPARTMENT OPERATION AND FINANCING

The Hillsdale Rural Fire Department provides both fire suppression service and emergency rescue service. Fire suppression is limited to a

ten mile radius from the association owned station located in the City of Hillsdale. Emergency rescue services are provided at no-charge to county residents, although the department will accept contributions.

The department is manned by a force of 20 volunteers, most reside in the City of Hillsdale and all are certified and have completed the required fire fighting training. Volunteers are paid $4.00 per run.

The Hillsdale Rural Fire Department is operated by a board of directors elected to two-year terms from association members. To become a member of the association, families purchase a $40 lifetime membership and pay annual dues which are set each year by a vote of the membership at their annual meeting. Current dues are $12.50 per association member family. Approximately 300 families hold current association membership.

The Association produces a service which they sell to consumers. The service is sold in the form of fire runs. Consumers of the service are charged $200 for subscribing association members and $300 for non-subscribers.

Hillsdale Township purchases, by contract, nine fire runs from the association to cover the cost of grass fires along roads, accidents, wash downs, etc. The township contract excludes fire runs for personal property. Insurance companies recognize the private non-profit department and will pay for the cost of fire runs incurred by insured members.[1/]

1/ Municipal departments do not charge consumers of fire services for costs incurred in providing fire suppression service, since public revenues are utilized in funding a municipal fire department.

Fire protection is sold by contract to Cambria and Adams Township on a run basis. The department is a participating member in the mutual-aid pact in Hillsdale County.

The Department of Natural Resources assists the department by providing, when available, surplus equipment. The volunteer firemen recondition, build and maintain the department fire suppression and rescue equipment.

REASONS FOR SUCCESS

Problems which arise in the production and provision of a public good such as fire protection in the private sector seem to have been overcome by the Hillsdale Rural Fire Department. The free rider problem, which is often one reason why governments assume responsibility for provision of some services, seems to have been overcome by establishing a strong sense of community among township residents. Township residents have limited alternatives for fire protection and since individuals generally desire to protect their investment, incentive exists to join the association. Hillsdale Township's population is 1543 and current membership in the association exceeds three-hundred families.

The Association membership also can be viewed as providing social benefits to participants, since money raising community projects are undertaken, family activities such as picnics initiated and the department participates in contests between other county fire departments.

Perhaps the most important reason for the success of the Hillsdale Rural Fire Department is the volunteer spirit which exists among the firemen and association members. Mr. Bill Pulley, current President of

the Association spends countless hours designing equipment, securing additional equipment and organizing and managing the department affairs all on a volunteer basis. The twenty volunteer firemen donate much of their free time to rebuilding and maintaining the departments equipment.

Although the department is a private non-profit corporation, the Department does receive transfer of payments from the public sector. Mention was made of the donation of DNR surplus equipment. The City of Hillsdale provides telephone answering service for the H.R.F.D. and trips the alarm which notifies fire department personnel. Municipal fire departments will assist the H.R.F.D. as part of the mutual aid pact in the county.

SUMMARY

The Hillsdale Rural Fire Department represents a unique example of how community residents can collectively organize to provide a service (fire protection) which generally is left for public sector provision.

The volunteer spirit, the sense of belonging to a group and a strong sense of community on behalf of participants all contribute to the success of the department.

Bill Pulley, Association president stated "fire protection production and provision by the Hillsdale Rural Fire Department is a family affair". The statement may accurately describe why the department has been able to survive as a private fire compnay while other areas have looked to government for the provision of fire protection services.

APPENDIX E

ALTERNATIVE PRICING SCHEDULES FOR FIRE PROTECTION

Eight schedules for the selling of fire protection services were identified in the three county area of Hillsdale, Jackson and Lenawee during the course of the research were presented in Section VII of the paper. Additional schedules were identified which were being utilized by municipal departments outside the study area but which would be useful to examine.

A. Cost Sharing Based On Man-Hour Costs

The village of Chelsea self-produces fire protection and markets the protection to surrounding municipalities by contractual arrangement. The price of the protection sold to each community is determined by the department utilizing total costs of production and dividing the costs among the contracting units based on the previous year's usage of the fire services by the contracting unit. Usage is calculated utilizing the total man-hours involved in providing protection to the contracting units. For example, if six municipalities (including the village) are contracting protection, the total number of man-hours expended the previous year are calculated from fire service delivery records and a percent of total assigned to each contracting unit.

The fire chief and the village council develop a budget for the year including a targeted amount for the capital equipment fund. The contracting unit's share for fire protection is obtained by multiplying the percent of total man-hours attributed to the

contracting unit the previous year times the operating budget and the capital equipment amount. The sum of budget share and capital equipment share represents the price of protection charged to the contracting unit. Mid-fiscal year adjustments are made for units which are exceeding the previous year's use or for units who are not utilizing as much of the services as previous records indicated.

Since personnel costs and capital equipment costs are the major costs involved in the production of fire services, the model utilized by the Village of Chelsea represents an attempt to account for both of the major cost items.

Contracting municipalities appear to be satisfied with the division of costs in the Chelsea model since the costs to the contracting unit reflect actual usage of fire services with opportunity provided for mid-year adjustment.

B. Population and State Equalized Value Schedule

Population and the value of property to be protected are factors which are important in determining the fire protection requirements of a community. Several communities who are involved in a joint production arrangement for the provision of fire services, utilize a factor approach in determining the costs attributable to each participating municipality.

The division of costs are determined in the following manner. A service area is established, that is, what is the geographic area to be afforded protection by the fire department. A determination is made of the total population residing in the service area and a

percent of the total population is calculated for each municipality involved in the joint production arrangement. The State Equalized Value (SEV) of the service area is calculated from input from the local assessor. An attempt is made to separate the value attributed to farmland and open space land and the value of property such as houses, farm buildings, factories and other dwellings. The percent of the total SEV attributed to each of the participating units is calculated and a factor is established by the combination of the population percentage and the SEV percentage.

For example, four municipalities are involved in a joint production arrangement for fire protection services. Units A, B, C and D:

	A	B	C	D	Total
Population % of Total	35	25	20	20	100
SEV % of Total	30	30	15	25	100
Total	65	55	35	45	

The sum of the population and SEV is divided by 2 since each factor is assigned an equal weight. The division of the costs involved in joint fire production are determined by multiplying the factor obtained in the division by 2 times the total costs of protection. Therefore, the factor which would be assigned to each unit would be; Unit A - 32.5, Unit B - 27.5, Unit C - 17.5 and Unit D - 22.5. The sum of the factors equal 100.0.

Additional variables or factors could be introduced to be used in determining the factor to be developed for each participating unit. A weighting would need to be developed if equal weights were not given to each variable.

The Addison Fire Department, a joint department involving five units, utilizes a modified version of the population/S.E.V. pricing schedule.

BIBLIOGRAPHY

BIBLIOGRAPHY

Ahlbrandt, Roger, "Efficiency In The Provision Of Fire Services," discussion Paper No. 72-10, Institute of Economic Research, University of Washington, 1972.

Childs, Dan, Gerald Doeksen and Jack Frye, Economics of Rural Fire Protection In The Great Plains, Agriculture Information Bulletin 407, Economic Development Division, Economic Research Service, U.S. Department of Agriculture, Washington, D.C., June, 1977.

Favero, Philip, "Institutional Innovation: The Grand Traverse County Fire Department," County Scrapbook, Center for Rural Manpower and Public Affairs, Michigan State University, East Lansing, January, 1975.

Hitzhusen, Fredrick J., Public-Private Protection Cost Trade-Offs In Texas and New York: A Benefit-Cost Analysis, A. E. Research 73-9, Cornell University, Ithaca, New York, May, 1973.

Hirschman, Albert O., Exit, Voice and Loyalty, Cambridge, Massachusetts, Harvard University Press, 1970.

Jones, T. Morris and M. B. Badenhop, Fire Protection Alternatives for Rural Communities, Bulletin 568, The University of Tennessee, Knoxville, Tennessee, April, 1977.

MacGillivrary, Lois A., "Evaluating the Organization of Service Delivery: Fire", Center for Population and Urban Rural Studies, Research Triangle Institute, Research Triangle Park, North Carolina, September, 1977.

Martin, R. Thomas and Mary S. Patrick, General Revenue Sharing: The Michigan Experience, Report No. 33, Center for Rural Manpower and Public Affairs, Department of Agricultural Economics, Michigan State University, East Lansing, MI, May, 1974.

Olson, Mancur, The Logic of Collective Action, Harvard University Press, Cambridge, Massachusetts, 1974.

Schaenman, Philip and Joseph Swartz, Measuring Fire Protection Productivity In Local Government, International City Management Association and Urban Institute, Washington, D.C., 1974.

Schmid, A. Allan, Property, Power and Public Choice, Praeger, New York, 1978.

Sinclair, William A., Inter-Governmental Contracting For Police Patrol In Michigan: An Economic Analysis, Ph.D. Dissertation, Michigan State University, 1975.

Sinclair, William A., An Economic Analysis of Local Government Contracting For Police Patrols In Michigan, Report No. 40, Center for Rural Manpower and Public Affairs, Department of Agricultural Economics, Michigan State University, East Lansing, MI, August, 1975.

Swersey, Arthur J. and Edward J. Ingall, Fire Protection and Local Government: An Evaluation of Policy Related Research, The New York City Rand Institute, Santa Monica, California, September, 1975.

_____, Municipal Fire Service Workbook, Research Triangle Institute, International City Managers Association and National Fire Protection Association, May, 1977.

_____, The Grading of Municipal Fire Protection Facilities, National League of Cities, 1612 E Street, N.W., Washington, D.C. 20006, July, 1976.

_____, Marshall Evaluation Service Book, Insurance Service Office of Michigan, Southfield, MI, 1976.