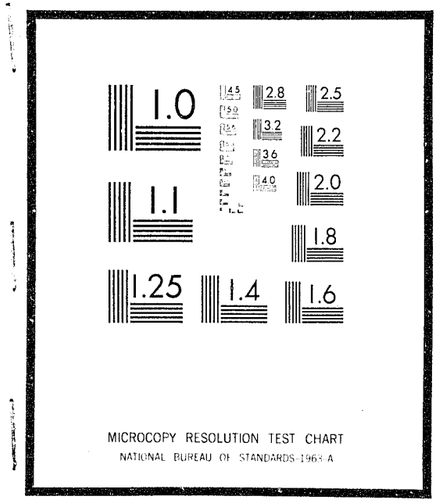




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# THE CHALLENGE OF PRODUCTIVITY DIVERSITY PART I. OVERALL SUMMARY AND RECOMMENDATIONS

Harry P. Hatry, et al

June 1972

# THE CHALLENGE OF PRODUCTIVITY DIVERSITY

## Improving Local Government Productivity Measurement and Evaluation

Part I.

Overall Summary and Recommendations

June 1972



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## ABSTRACT

This is Part I of a four-part study. The other parts are:

II. Measuring Solid Waste Collection Productivity

III. Measuring Police Crime Control Productivity

IV. Procedures for Identifying and Evaluating Innovations--Six Case Studies

This study took place from October, 1971 through May, 1972, and consumed one and one-half years of man effort. This part of the report presents the overall findings and recommendations. In addition, it includes the findings and recommendations presented in Parts II, III, and IV.





Part I

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ACKNOWLEDGMENTS

The principal authors of this report are: Part II - Donald M. Fisk and Louis H. Blair; Part III - Philip S. Schaenman, James Kalish, Pasqual A. DonVito, and Peter Bloch; Part IV - George P. Barbour, Jr. of the International City Management Association. Overall direction was undertaken by Harry P. Hatry and Donald M. Fisk.

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# THE CHALLENGE OF PRODUCTIVITY DIVERSITY: OVERALL SUMMARY AND RECOMMENDATIONS

## Reasons for Productivity Measurement

To study the operations of one city alone at one point in time provides little basis for saying whether citizens are getting their money's worth. But when, as this study suggests, some cities outperform others of comparable size by as much as 1,000 percent, a clearer picture emerges. Such comparisons indicate the potential of looking more closely at local government productivity. If the performance of all localities could be raised closer to the level of the top performers, the implications for service improvements and cost savings nationwide would be staggering. Given sufficient attention to improved productivity, it may even be shown that the present high performers are achieving far less than what can reasonably be attained with modern management methods.

Varying productivity patterns within single jurisdictions may also provide vital clues. As data are assembled over time, indications of falling productivity may serve as a warning that a particular local government service is slipping and in need of attention. Analysis of data by neighborhoods or clientele groups can be undertaken to detect whether certain citizens are experiencing serious inadequacies or inequities in service.

At the outset, it should be established what is meant by local government productivity. A Bureau of the Budget study provides this general definition: "Productivity estimates compare the amount of resources used

with the volume of products or services produced."[1] One further refinement is important, namely, that the "volume of products or services produced" is interpreted in the broad sense to include the ideas of effectiveness and quality, not merely efficiency and quantity. In other words, the biggest effort at the least cost is not necessarily best if it leaves citizen "customers" less well off or dissatisfied.

The major reason for attempting to measure productivity has already been implied: to encourage the kinds of comparisons and public scrutiny that lead to better value for citizens from their local governments. Productivity measurements also have additional uses:

-- To provide an index of progress--or lack of progress--to individual local governments.

-- To develop performance targets based on aggregate data for similar communities.

-- To dramatize diversity and thus generate effort to determine the reasons for success and whether these reasons can be applied more widely to treat the causes of poor showing.

-- To serve as a basis for performance incentives that can be used by government management and labor in wage and working condition establishment.

-- To guide the federal government in allocating resources to raise the level of performance throughout the nation.

[1] U.S. Bureau of the Budget, Measuring Productivity of Federal Government Organizations, 1964.



Nature of Study

This exploratory study, undertaken from October 1971 through May 1972 and involving approximately one and a half man-years of effort, barely skims the surface of a complex subject. But it suggests the kinds of improvements in productivity and productivity measurement that can be anticipated through further work in the short and long run.

The basic goals of this study were: (1) ways to improve the measurement of productivity in solid waste collection, (2) ways to improve the measurement of productivity in police crime control, and (3) the development of procedures for identifying and evaluating innovative approaches to improved productivity (using solid waste collection and policing as test areas).

This report has four parts: Part I, summarizing the findings and recommendations, and Parts II, III, and IV describing each of the basic tasks in more detail. Parts II (solid waste collection productivity measurement) and III (police crime control productivity measurement) are technical in nature. They will be of principal interest to those concerned with implementing productivity measurement procedures for these two services. Part IV discusses procedures for searching for and evaluating innovative approaches so that other governments can benefit from these experiences. It illustrates these procedures by describing six brief evaluations of specific innovations.

It was decided to focus on two local services, with somewhat less depth of analysis than might have been achieved by concentrating on a single field, in order to arrive at more generalized conclusions about local public service productivity.

Encouragingly, many cities and counties throughout the United States are breaking away from traditional approaches in the attempt to improve

productivity. Three innovations in solid waste collection and three in policing are examined here (Part IV) in enough detail to suggest that further analysis should yield still more valuable results. The emphasis in the exploratory work is not so much on the case studies themselves as on the procedures for locating and evaluating innovations.

The focus here is on productivity measurement and analysis from a national viewpoint, i.e., on comparisons among governments. However, suggestions are also made for individual local government productivity analysis.

Measurement Difficulties

Among the many problems in measuring local government productivity, three of the most serious need to be emphasized. One is the difficulty of determining what is to be measured, especially quality aspects. Another is that a measurement itself can have perverse effects. And a third is the tug-of-war between simplicity of measurements (to achieve understandability and reduce measurement costs) and complexity (to place the proper perspective on usually very complex issues).[1]

Knowing what is to be measured is relatively simple if the end result (as in much of the private sector) is a physical product. Local governments, however, chiefly offer services. Even when a physical product is involved--e.g., as in a swimming pool or water supply system--the quality aspects tend to loom large. Little progress in measuring productivity can be expected unless one first attempts to deal with quality aspects, troublesome as these may be.

[1] These concepts along with our findings of the current status of productivity measurement over the full spectrum of local government services are presented in an earlier report to the Commission, "Improving Productivity and Productivity Measurement in Local Governments" by Harry P. Hatry and Donald M. Fisk, The National Commission on Productivity, June 1971.



The possible perverse impact of measurement instruments can be explained by illustration. If policemen are rated solely according to the number of arrests per employee, this may lead to excessive pressures to make arrests, even in instances where justice and order are better served by avoiding arrests. Or if housing programs are evaluated largely by the number of new units constructed, this may encourage the neglect of older units.

A too simple measurement system that locks on to a sole indicator of productivity may provide a distorted and possibly unfair picture. A measurement system that attempts to cover all facets of a service may become so complex that it cannot be comprehended by officials or others. The aim should be to seek a middle ground between these extremes.

Whose Productivity Should Be Measured?

A major question in the establishment of a productivity measurement system is that of whose productivity should be measured. For local government services, productivity might be measured at the following levels:

a. All resources, both public and private, expended in producing the service, e.g., in police crime control, efforts such as household protective devices could be included as well as government activities.

b. Public resources that are expended by the governmental body, such as the city or county.

c. A single agency in the government, such as the police, fire, or solid waste collection department.

d. Some subunit of an agency, such as the uniformed field personnel of a police department or the commercial collection unit of a solid waste collection agency.

e. Some smaller group of individuals, such as a solid waste collection crew, the personnel of a fire company, or those of a police precinct.

f. Productivity of specific individuals, such as the individual solid waste collector, the individual policeman or fireman.

Depending on the specific issue any one of these levels of measurement might be appropriate. Each has its use. However, the focus of this report is on the second and third levels (b and c) indicated above. The productivity of individuals or small groups of individuals as distinct from other individuals or other small groups is an important city management issue, but is not directly addressed in this report. Nevertheless, many of the concepts identified will also be useful for these other levels.

The city government, its legislative officials and the public will be concerned first with the service as a whole, and secondarily with the performance of individual agencies. These are the focus of this report.

The user of the productivity measurements should be careful to avoid attributing blame to any group of employees (whether management or non-management) because of poor compared performance--at least not before a closer examination of such performance to identify the likely causes. Many factors will exist that are outside the control of any individual employee or group of employees. Nevertheless, productivity measurements are important for identifying the need for corrective action as well as indicating the progress made after corrective actions are taken.

Remaining Sections of Part I

The following sections present, first, a series of general recommendations that emerge from the study. Then the findings and recommendations



from the three specific study tasks (as described in Parts II, III and IV) are presented.

While this study focuses on productivity measurement, it is urgent that national productivity data collection be accompanied by analysis of the resulting data to provide insights that can be used by governments throughout the nation to improve their own productivity. Some suggestions for analysis are contained in Parts II-IV.

## GENERAL RECOMMENDATIONS

1. The federal government and the local government associations[1] should jointly sponsor a two to three year trial of a national productivity measurement and analysis system for annually examining selected local government services. Approximately $250,000-$500,000 per year for each service would be the cost for a minimum system. Possible funding sources include federal agencies that are concerned with the functional areas of local government being examined.

   Initially this effort might be on solid waste collection and police crime control to take full advantage of the work described in this study (see Parts II and III). For solid waste, a new national data collection effort would be required. A lesser amount of added data would be needed in the police crime control area because of the substantial data system already in existence. To achieve comparable data, however, federal aid or other incentives probably will be needed.

2. Measurement analysis teams should be established for each service or function covered.

   The teams would design the data collection systems, monitor and analyze incoming data, provide national aggregate information and intergovernmental comparisons,

[1] International City Management Association, National League of Cities, U.S. Conference of Mayors, National Association of Counties, and probably also the state government associations--the Council of State Governments and the National Governors' Conference.



and attempt to identify reasons for high productivity--particularly those transferable to other governments. These teams should be comprised of local government and possibly private sector as well as federal personnel.

3. The federal government and local government associations should support efforts to pinpoint and evaluate new approaches to the provision of local government services that may be potentially useful to other communities.

   In-depth analyses of existing innovative methods should be made to determine their effects on productivity, special implementation problems, and likelihood of transferability. The teams called for in Recommendation 2 might be given responsibility for these evaluations. Consistent evaluation and dissemination procedures are recommended to assure maximum economy, quality and comparability of the work. Adequate, comprehensive evaluations are likely to require a minimum of one to two man-months each and often considerably more effort (as compared to the one to two man-weeks for the evaluations in Part IV of this study); experience will lead to better estimates of the degree of effort needed.

4. The federal government should encourage the development of a mechanism, perhaps operated by the local government associations, for rapid dissemination of findings about local government productivity to cities and counties throughout the country.

Such efforts should include findings of the national studies described in Recommendations 1 and 2 and of the special evaluations described in Recommendation 3.

5. The federal government should support further development of local government productivity methodology.

   This would be a proper function for the measurement-analysis-evaluation teams proposed in Recommendation 2. The measurement and analysis procedures described in Parts II, III, and IV of this study are only a beginning. An important refinement, to use one example, would be an investigation of how various municipal characteristics (size, population mix, and so forth) might affect productivity. Parts II and III include many specific development proposals.

6. Individual city and county governments should undertake annual assessments of their own productivity, compare their performance with other communities to the extent permitted by available information, and analyze the reasons for findings of low productivity.

   Some examples of procedures for such assessments are described in Parts II (Chapter 4) and III (Chapter 4). The national system proposed in Recommendations 1 and 2, the evaluations of innovations in Recommendation 3, and the dissemination program urged in Recommendation 4 would, if carried out, provide a setting to make these local assessments more feasible and meaningful.



7. Local governments should improve substantially their data gathering on service outputs and inputs and make explicit provision for analysis of the data. The federal government should, if possible, provide financial support for this development of local capability for productivity analysis.

8. State governments should sponsor efforts to provide productivity measurements for their local governments and undertake follow-up analyses--particularly if the federal government is slow to do so.

   This could be based on the concepts and procedures described for a national effort. A combined state-county-city effort could probably be undertaken without great expense.

9. Productivity measurement should explicitly consider quality considerations as well as workload. Multiple measurements are needed to provide an adequate perspective. When making inter-city comparisons, relevant city characteristics should be used, at least to group similar cities so that fairer comparisons are possible. Resource inputs should be measured in total dollars as well as total manpower expended.

   Measuring quality has been avoided in the past as being nearly impossible. However, recently developed procedures permit at least some important quality aspects of service to be measured and at least arrayed along with workload measures to provide a truer picture of total productivity. Some examples are contained in Parts II and III. Traditionally, productivity measurement has focused on the amount of manpower used. In local government measurement, it is also important to consider total dollars expended so that all resources consumed in producing a service are taken into account.

## MEASURING SOLID WASTE COLLECTION PRODUCTIVITY
## PRINCIPAL FINDINGS AND RECOMMENDATIONS

### Findings

Part II identifies improved procedures for estimating how the productivity of solid waste collection might be assessed nationally and makes suggestions as to how productivity might be analyzed at the local level. The principal findings of this investigation are as follows:

1. Numerous solid waste collection statistics are currently collected by local governments that operate collection systems. Using these statistics, some jurisdictions prepare workload measures such as cost per ton, cost per residence, and cost per curb mile cleaned. These measurements usually provide some idea of the level of productivity and how it is changing.

2. Local statistics generally fail to take into account the level and quality of service provided to the citizens. These factors can dramatically affect the cost and true productivity of local government operations. Productivity measurement should take these factors into consideration. Location of pickup (e.g., curb or backdoor) and frequency of collection are level of service variables that seem to affect productivity significantly.

   For example, by simply changing from a backyard to curbside residential pickup location a jurisdiction can often increase its workload "productivity" by one-third.



   But by such action it has also decreased the level of service to its residents.

3. To permit "fair" comparisons of workload productivity among local governments workload data from different cities can be categorized or adjusted to at least partially reflect differences among these level of service characteristics.

4. Procedures are becoming available for the systematic measurement of other quality factors, but no fully satisfactory procedure yet exists for translating them into productivity computations.

   Systematic inspection procedures recently have been developed for evaluating various levels of street cleanliness. Other measurable quality factors include missed collections, damage to private property, and citizen perceptions of service adequacy (using citizen survey techniques).

5. No ongoing survey currently collects national data annually on solid waste collection.

   Attempts to fill this void have included three, one-time, surveys over the past decade, some producing data of questionable validity. One survey sought to amass statistics for approximately 6,600 jurisdictions. Such data may be used to demonstrate variations in interjurisdictional productivity but is neither sufficiently current nor comprehensive enough for meaningful comparisons.

6. Data definitions and collection procedures differ among municipalities, with widest variations occurring among smaller jurisdictions.

   APWA (American Public Works Association) and OSWMP (The Environmental Protection Agency's Office of Solid Waste Management Programs) have made initial efforts to develop standardized data collection procedures. When adopted by municipalities such standards will provide more uniform data collection procedures on some of the major data items needed for comprehensive productivity measurement.

7. Present knowledge of how community differences affect solid waste collection productivity is skimpy.

   Topography, climate, income and density are examples of factors possibly affecting productivity. However, existing research gives conflicting or ambiguous evidence on their importance.

8. Productivity varies by type of solid waste collection activity, particularly street cleaning, residential collection, commercial collection, and brush-leaf pickup.

   Residential crews collect many times more tons per man than street cleaning crews, and street crews seem to collect more tonnage per man than leaf crews.

9. City-to-city differences in solid waste collection productivity of 300 to 500 percent have been uncovered (even after controlling for



certain service variables and community factors).

Example 1: For twice-a-week residential curbside or alley pickup, the tons collected per man in 1971 varied (in the small sample examined in our study) from a low of 334 tons in one city to a high of 1,645 tons in another. Even a city of approximately the same size and only 30 miles from the low city collected 908 tons per man. For these same two cities, the tons collected per $1,000 of expenditure were 35 and 88 respectively. Collection in the high productivity city, moreover, is handicapped by narrower alleys and streets. The low productivity city, however, appears plagued by poor management and high absenteeism.

Example 2: For once-a-week curbside or alley pickup the tons collected per man varied from 941 to 1,905; tons collected per $1,000 expended varied from 41 to 90.

Example 3: Disparities also are great in street cleaning operations. The figures for sample cities varied from 55 to 434 tons per man per year. Tons per $1,000 expended varied from 6 to 47.

However, it cannot be assumed that these differences are due solely to any one factor. Differences may be due to such factors as: procedures or equipment used, quality of management and non-management personnel, data errors, differences in data definitions, and quality and community factors not controlled for in the productivity comparisons.

Recommendations

1. The federal government should undertake the development of a national system to measure the productivity of local government (cities and counties) solid waste collection activities. The Office of Solid Waste Management Programs of the Environmental Protection Agency seems the most logical organization to direct the effort.

   The system should be directed at providing local governments (particularly those with low productivity) encouragement for, and guidance on possible means of, improving their own productivity.

2. Local governments to be included in this national system should report both workload statistics and important level of service and quality variables such as suggested in Chapter 2 (Part II). Local governments surveyed might include those over 50,000 population or possibly over 25,000.

   Many statistics required are readily available in most, if not all, local governments with populations of above 50,000. It should be possible to collect much of the needed data by mail survey. Some on-site visits, however, will be needed. The survey form should be no longer than, perhaps, three pages and should require on an average no more than an hour for the municipalities to complete. A sampling of jurisdictions, rather than a complete enumeration, may be desirable to keep costs down. Once established the survey should cost about $100,000 a year. These



   funds would support all data collection efforts, including field trips, and the annual publication of survey results (see Recommendation #5). Despite the temptation to collect more and more data, there is much to be said for keeping it simple. It is not obvious that a system costing a million dollars would produce significantly better answers.

3. Solid waste collection productivity measurement-analysis teams should be created to design the data collection procedures, analyze the data and to examine localities with apparent high productivity in order to determine the reasons for successful performance, especially those that may be transferable to other jurisdictions.

   Teams might be drawn from government and private personnel experienced in such fields as solid waste engineering, budget analysis, economics, operations research, and systems analysis. For the examination of apparently highly productivity jurisdictions, a visiting team might include two persons. On-site observation and data collection might require one to three weeks, with a total time including analysis and reporting of three man-months. Four such investigations per year would cost approximately $50,000, or less if only government employees were utilized. Team findings should be disseminated rapidly and effectively to communities throughout the country. (Because of the speculative nature of

the team proposal, the concept should be re-evaluated after several visits and a year of operation.)

4. The data derived from the national survey should be used to identify and analyze crucial factors affecting productivity.

   Other data that is likely to affect solid waste collection productivity such as data on climate, topography, socioeconomic characteristics and so forth, should be examined along with workload, quality, cost, and manpower data. Solid waste collection activities, such as residential collection and street cleaning, should be analyzed separately. As data accumulates over the years, providing time series data, these analyses will be strengthened. Continuing analysis would require an estimated annual budget of $100,000 including salaries and computer time. Results of such studies should be valuable to local solid waste managers, manufacturers of collection equipment, city program planners, and the Environmental Protection Agency, particularly in its development of demonstration projects.

5. An annual report should be prepared with summary findings for the use of national and local decision makers.

   One year after the national system is established and staffed is not too early to provide useful, if less than perfect, results. The report should include overall national averages and ranges, as well as for



different types and levels of service (particularly pickup location and frequency of collection), by region, and by city size. The annual report should also provide the findings of the analyses proposed in Recommendations #3 and #4. (The FBI's annual crime reporting system and the Bureau of the Census' annual survey of governmental finances are examples of part of what is envisaged but these currently stop far short of providing comparative productivity analysis.) Indices can be prepared to indicate time trends. The report should indicate limitations and interpretation problems associated with the assembled data. The cost of preparing this report is included under Recommendation #2.

6. Standardization and validation of data should be high priorities of the national system.

   The current APWA and OSWMP efforts to achieve standardized measurements are an excellent starting point for arriving at meaningful interjurisdictional comparisons. However, to assure accurate and reliable data collection, survey personnel should make periodic on-site examinations or audits of sample localities. Special incentives may be required to encourage localities to upgrade their data gathering techniques.

7. Individual local governments should for their own internal use collect, calculate, array, and analyze productivity measurements.

This is important so local officials and citizens can examine productivity trends and respond properly to observed levels and changes in the levels.

8. Use of local government productivity measurement procedures, such as described in this report, should be explored to assist in the development of solid waste collection performance incentives agreeable to local government management and labor.

This project was unable to explore directly this particular application of productivity measurements. The importance of this problem clearly indicates the need for such an effort.



## MEASURING POLICE CRIME CONTROL PRODUCTIVITY PRINCIPAL FINDINGS AND RECOMMENDATIONS

Part III of the study discusses improved procedures for estimating local government productivity in police crime control and presents some illustrative analyses of police productivity based on readily available data.

### Findings on Measurement Procedures

1. Measuring police productivity is a complex task involving many conceptual difficulties. A number of measurements of effectiveness and productivity are needed.

Partial, if not distorted, perspectives of police crime control productivity would result from reliance on single indicators.

2. Weaknesses in the basic data on crime statistics and police outputs have led some to reject any analysis of the data as futile. This position appears overly pessimistic.

Major trends that appear in the data seem more likely to be useful than misleading, even for most individual governments, especially if the known data limitations are kept in mind. Various improvements in accuracy and consistency of data collection are needed, however.

3. The major (perhaps unsolvable) problem is to measure the effect of police activity on deterrence of crime.

The major difficulty is the inability to estimate the number of crimes that do not occur because of police activity. At best, what currently is done is to measure non-deterrence, i.e., events that occur. Even here current data is subject to misinterpretation because of extensive non-reporting by victims on many types of crime.

4. Measuring only the number of arrests or clearances per man-year does not attest to their ultimate disposition or quality. This could lead to perverse incentives. A "quality of arrest" indicator is therefore needed.

   Apprehension productivity (as compared to deterrence productivity) is the more readily measurable aspect of crime control. Data on arrests or clearances per man-year or per dollar expended can be readily derived from existing data. Data on the disposition of arrests, such as the percent of felony arrests that "survive" a preliminary court hearing, can be used as indicators of the quality of the arrests.

5. Some new directions in measuring police performance that make use of citizen surveys are coming into use.

   Measurements of the citizen feeling of security and citizen perception of quality of treatment by police have been attempted in some instances through citizen surveys. Victimization surveys to identify the amount of non-reported crimes are a further example.



6. For crime control productivity measurement, police manpower and expenditure figures can be misleading where they include activities other than crime control, particularly traffic control.

   Non-crime control expenditures and man-hours should be subtracted out when estimating crime control productivity where these activities actually increase expenditures over that needed for crime control.

Quantitative Findings

7. Local governments display striking variations in performance on a number of effectiveness and productivity indicators.

   For example, police expenditures vary by over a factor of four for cities of similar crime rate and size. One city with 3,700 index crimes per 100,000 population spent less than $10 per capita for police in fiscal 1970, while another with a similar crime rate spent $42.

8. Some correlation was found between some socioeconomic characteristics and police effectiveness and productivity measurements, but not as much as one might expect. The correlations that were found explained very little of the total variation in the measurements. The non-explained part of the variations may be due to data problems, factors external to the police that were not considered, the existence of more complex relationships than those examined or productivity differences.

   Only the percent non-white population and the total population size correlated significantly with the crime rate, and they only "explained" a small part of

the total variations among cities. Surprisingly, cities with higher percentages of youths (age 15-24) and poor (families with income below $5,000) did not seem to have higher crime rates than others. This could, of course, be due to errors or reporting differences in the data or to the limitations of the particular youth and poverty indices used. But it is, nonetheless, surprising.

9. An apparently significant relation was found between clearances per police employee and reported crimes per police employee. The greater the number of reported crimes per police employee, the larger the number of clearances per employee. This suggests that for fair comparisons among cities or among police units within a city, the workload in terms of cases per man should also be considered when evaluating clearances per police employee.

   This also suggests that productivity analysts should look for other such relationships to place productivity comparisons in better perspective.

10. The analysis supports the hypothesis that real, significant variations in productivity occur from city to city. This implies that further research in identifying apparent high performers and in-depth analyses of the reasons for their success is warranted.

    Because so much of the variation in effectiveness and productivity remains unexplained after socioeconomic and workload factors are considered, the possibility that an in-depth analysis would reveal major differences



in productivity seems high. Data inaccuracies are also likely to be found, but since there are so many cities at the extremes, one has to suspect that more than just data problems are responsible for the variations.

Recommendations

1. A national police crime control productivity measurement effort should be undertaken on a trial basis. Approximately $250,000-$500,000 per year would be needed for a minimum measurement and analysis system.

   Initially, existing data collection from police departments across the country would be utilized. New data series such as "arrests per police employee" can be prepared from these data. A start should be made towards procuring additional data for the type of measurements suggested in Chapter 2, Exhibit 1 (Part III). These include measurements of quality aspects of police services such as: disposition of arrests and clearances, citizen feelings of security, and citizen perception of treatment by police.

2. A major component of this effort should be analysis of the information collected. The analysis effort should begin to seek reasons for high or low productivity and to identify ways to improve it.

   Local governments that appear to be relatively highly productive (based on the data collected) should be identified and examined (including on-site visits) by the productivity analysis team to identify the reasons and to identify programs that may be transferable to other governments.

3. For the purposes of (1) and (2), a police productivity measurement-analysis team should be formed. It would develop procedures for obtaining additional data, undertake analyses of the data, and examine apparently highly productive jurisdictions to identify successful methods that might be transferable to other jurisdictions. Provision should be made for the team to receive continuing guidance from police, local government officials, and criminologists. Missions of the team and of the national effort would include the following:

   a. Provide information on specific jurisdictions, national and regional averages and ranges so local governments can compare themselves with others.

   b. Provide improved perspectives on crime control progress in the nation as a whole including possible ways to increase productivity.

   c. Identify communities that are doing particularly well in police productivity, with explanations of the probable factors leading to success.

   d. Spell out data limitations to avoid misrepresentation of crime data, especially on national trends and comparisons of localities.

   e. Improve the data base by standardizing definitions and recommending compatible data collection procedures.

   f. Develop better understanding of the relationship between crime and police activities (to the extent the research in item "g" permits).



   g. Undertake research to increase knowledge about the relation between productivity and various demographic, socioeconomic, and police program characteristics.

4. To obtain a reasonable perspective on police crime control productivity, a number of productivity indicators should be considered simultaneously. These should include quality indicators.

   An initial set of productivity indicators is suggested in Chapter 2 (Part III). Note that for apprehension productivity, the use of indicators on the disposition of arrests to reflect, at least partially, the quality of arrests is recommended.

5. Productivity comparisons should be made among cities grouped by population size and socioeconomic characteristics (such as racial composition and family income). This will permit fairer comparisons, and ones more likely to reflect police-related factors.

   Although the correlations we observed between police productivity and population and certain socioeconomic variables were small but statistically significant, they would still distort comparisons if not considered. Such groupings also seem intuitively desirable.

6. Because of the inevitable problems with comparability of data among local governments, periodic audits of local data collection procedures should be undertaken. For practical reasons these probably would have to be limited to a sample of governments each year. As with the data collection itself, this audit would be on a voluntary basis.

The productivity measurement-analysis team will need to pay particular attention to the problem of achieving reasonable commonality of data among governments. However, the primary responsibility for obtaining accurate data rests with local officials.

7. Local governments and other criminal justice agencies should undertake their own productivity studies.

In the long run, local governments will be the greatest beneficiaries of productivity analysis. The focus on national data can provide useful benchmarks for comparison purposes and help dramatize the importance of the local work. In addition, local governments should examine their own trends, compare productivity of various geographical units such as precincts or beats, and perhaps compare different types of units within the police department. Some examples of the types of productivity analyses local governments might undertake are presented in Chapter 4 (Part III).

8. Because of the existing inability to measure the causal connection between police performance (whether of individuals, teams, or all police department employees) and crime deterrence, we cannot recommend usage of police employee performance incentives based on such causality. However, it may be acceptable to consider incentives based on changes in productivity indicators, such as identified in this study, without requiring that improvements in crime rates be definitely attributed to police performance. It was beyond the scope of this study to identify



possible incentive procedures based on productivity measurements, but we recommend that work in this area be undertaken in the future.

9. Productivity analysis should be applied to the entire criminal justice system, not to police alone.

It is difficult to extract the roles of the police from those of other parts of the criminal justice system such as the courts, correction institutions, and other elements (e.g., drug treatment and street lighting programs) of the system.

10. Future research to continue the analysis started here might include:

-- Attempting to correct for some of the data problems by (a) collecting data that excludes resources spent on non-crime control activities, (b) auditing data collection procedures in a sample of cities.

-- Study of such relationships as: (a) the number of arrests to the number of police employees, (b) the number of crimes to the clearance rate, the number of police and other factors--with "lags" in these variables also considered. Such models, if proven valid, would be useful in determining the effectiveness of police in influencing crime rates and in estimating the number of police needed to increase the clearance rate by a certain amount.

-- Considering logarithmic and other non-linear regressions between productivity and socioeconomic variables, in addition to the simple linear regressions

evaluated here.

-- Considering the relation between police productivity and other community characteristics than those studied here, such as the number of unemployed youth.



## PROCEDURES FOR IDENTIFYING AND EVALUATING INNOVATIONS--SIX CASE STUDIES PRINCIPAL FINDINGS AND RECOMMENDATIONS

This part of the study was aimed at developing and testing procedures for identifying and then evaluating potential innovations that are currently being tried out in at least one local government.

### Findings on Search and Evaluation Procedures

1. There does not currently exist an adequate mechanism in the United States for any of the following three tasks:

   --identification of existing local government innovations,

   --their thorough evaluation as to productivity potential, and

   --the rapid dissemination of such findings to other local governments throughout the country.

2. Professional urban administrators rely on a rather vast but ill-defined and incomplete network to bring to their attention new approaches and new ideas.

   This private network consists of people whom the administrator is comfortable with and through experience has learned that he can rely upon. These personal networks are valuable in discovering and assessing technical innovations. While there is no doubt that this system will continue

to operate, the inherent lack of scope and depth certainly has prompted administrators to look elsewhere for information and innovations.

3. Some formal dissemination mechanisms for innovation do exist. Among these are certain federal government programs, state and local government, public interest groups, functional professional associations, national, municipal and professional journals, and the newly formed Public Technology, Inc.

4. The typical published material in professional journals and national municipal magazines is lacking in adequate evaluation data including full cost, favorable and unfavorable effects, and social and institutional implications.

5. There is a considerable lack of readily available evaluative information on the innovations examined during the course of this project.

   Data on both total cost and effectiveness impacts were inadequate to evaluate the innovations properly without extensive effort--more than available to this project.

6. In none of the cases examined had attempts been made either by the local government or some other organizations, such as the federal government, to provide for evaluation before the innovation went into effect. The lack of such pre-planning precluded extensive before versus after comparisons of innovative programs. However, in a few cases, federal agencies supported evaluations after the introduction of the innovation.



Yet even in these instances, much was left to be desired in the way of adequate cost and effectiveness information, especially that which would be relevant to other governments.

7. While the lack of control groups and pre-planned evaluation precludes isolating all of the variables in a case study, after-the-fact evaluation still seems useful.

8. There is little uniformity in the type of measurement data presently collected by municipal jurisdictions.

9. Because citizens are the recipients of municipal services, citizen feedback should be included in productivity measurement. Local governments have few systematic mechanisms to obtain and sustain citizen feedback.

Findings Relevant to the Specific Innovations Evaluated

Twelve solid waste collection and thirteen police function potential innovations were identified in the initial phase of this work. From these, six were selected that seemed to lend themselves more readily to a one-to-two week evaluation and that appeared to be of most interest to other local governments. Their inclusion in this study does not necessarily mean that the innovations had resulted in increased productivity in the subject cities. Following are our findings based on the abbreviated evaluations.

1. Non-mechanized, one-man refuse collection in Inglewood, California has resulted in a 33 percent reduction in manpower while the city has experienced a 55 percent increase in the annual tonnage of refuse over

a ten year period. Productivity in tons per man has increased 100 percent. This increase in productivity has compensated for part of the rising cost of labor.

2. The Bellaire, Texas and Scottsdale, Arizona one-man mechanized, containerized collection systems have reduced the collection manpower force and have resulted in a potential lowering of the cost of collection service in each of those communities.

3. The two computer assisted solid waste collection systems evaluated in Wichita Falls, Texas and Baton Rouge, Louisiana both claimed savings--one in cost, the other in manpower. However, the data presented was not sufficient to fully substantiate either savings. The equalization of employee task assignments in both communities, however, has had a beneficial impact on employee morale.

4. The use of non-professionals in the Dallas, Texas police department is closely modeled after the recommendation of the President's Crime Commission. There is no clear indication that the program has actually resulted in a cost reduction for the department. However, the program has increased the number of minority personnel in the department.

5. The evaluation of use of helicopters in Lakewood, California and in Los Angeles points up the requirement for additional research in order to estimate the full cost and effects of such programs. Apparent substantial crime reduction was reported for both these tests--but at a substantial cost.



6. The Kansas City, Missouri police department used a computer-based manpower resource allocation model to predict peaks in calls for service and design differentially manned beats. With an increase in police manpower, the department shifted to even manning and appears to be using the prediction capability of the system for tactical employment only. A serious drawback in evaluating this program has been the lack of response time data. A closer analysis of the arrest rates before as compared to after the implementation is also required.

## Recommendations

These are presented in two groups: "Approach" and "Specific Procedures".

### Approach

1. It is recommended that the federal government and the State and Local Government Public Interest Groups encourage and sponsor the development of a 3-phase process: (a) identify possible local government innovations, (b) evaluate each for its potential effect on productivity, and (c) disseminate rapidly and effectively the evaluation findings to other local governments in the United States. The procedures outlined in this report can be utilized in this process.

   Not all new ideas or new technology will increase productivity. Thus, dissemination of purely descriptive information on new ideas without thorough evaluative information would have the danger of encouraging further waste. Potential innovations to be examined should include not only hardware and technological advances but any type of program that may contribute significantly to productivity--including management

systems, procedural changes, motivational programs, variations of existing programs, etc.

2. The evaluation of potential innovations should emphasize: (a) all relevant costs; (b) impacts, both intended and unintended, both beneficial and negative; (c) impact on productivity based on the information obtained in (a) and (b); and (d) implementation problems likely to arise in other governments including legal, political, personnel, labor-management relations, etc.

   These evaluations should attempt to translate the cost, effects on productivity,and problems in the innovating jurisdiction into the likely costs, effects and problems for other potential implementing jurisdictions.

3. Special approaches such as the use of technology transfer teams, regional workshops, and mixed media, should be tested as means to rapidly and effectively disseminate the findings of the evaluation. This would provide an added spur to innovation in local governments.

4. Local governments should be encouraged to collect relevant data on costs and effects to evaluate their own programs.

   An important component of such evaluations that is usually lacking is a formal method, such as citizen surveys, for obtaining citizen feedback.

Specific Procedures

5. It is recommended that some version of the evaluation forms for case study selection and innovation shown in Exhibits I and II (Part IV) be utilized in future studies on innovation selection and evaluation.



6. It is recommended that the evaluation criteria in Exhibit III (Part IV) be utilized in the evaluations.

7. It is recommended that a minimum of two man-months be allocated to the evaluation of each innovation.

   In some cases six to twelve man-months or more would be more appropriate especially in those projects that are more complex, that involve multiple cities, that treat important national or local issues, and that require extensive data collection. However, fully exhaustive evaluations will seldom be possible because of basic data limitations currently existing in local governments.