GOVERNMENT CAPACITY SHARING PROGRAM

Department of Housing and Urban Development

Office of Policy Development and Research

HUMAN FACTORS IN PRODUCTIVITY IMPROVEMENT PROJECT: ASSESSMENT REPORT

by SRI International

FOREWORD

In recent years, the Office of Policy Development and Research of the U.S. Department of Housing and Urban Development, in partnership with state and local governments, has been concerned with improving the delivery of public services. Four related programs have been sponsored since early 1974:

- *Capacity-Building Demonstration Program* — Strengthening the capabilities of local officials to fulfill their overall policy development, resource allocation, and management responsibilities. (1974-1976)
- *Capacity-Building Energy Conservation Program* — Promoting the practical application of technology and management to conserve energy. (1975-1977)
- *Capacity-Sharing Productivity Improvement Program* — Promoting the transfer and implementation of practical approaches to improve state and local government productivity. (1976-1979)
- *Financial Management Capacity-Sharing Program* — Collaboratively responding to the increasing problems facing local governments in their financial management practices. (1978-1980)

The products and practical tools from the first two programs have been available since early 1978. We are now making available the products from the capacity sharing productivity improvement program. Eighteen projects involving over 200 local governments have produced more than 85 training manuals, case studies, handbooks and computer programs.

Developed, tested and implemented by state and local governments, these products, in most cases, have also been carefully assessed by an independent contractor, SRI International, and a statement of its assessment is included with each product. In those cases where the results were inconclusive, the reader is so advised. For many of the projects, we are also publishing a complete assessment report. In other words, we have done our best to assure you that the products are sound and useable.

Five summary booklets that highlight the results from all eighteen projects and provide ordering information for their publications are available from HUD. Descriptions of the booklets and ordering information are given at the end of this volume.

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ASSESSMENT STATEMENT

IMPACT ON SERVICE DELIVERY

The principle objective of this project was to ascertain what impact will organizational development efforts have on morale, worker productivity, and customer satisfaction. The Communications and Electrical (C&E) Division of San Diego was the test site. The project used control groups in the Long Beach, the San Diego Building Division and a group from District Eleven of CALTRANS. The employee survey data as a whole indicate substantial gains in morale. This is matched by an equally impressive improvement in job satisfaction as measured by absenteeism, turnover, utilization of training opportunities and, and grievances. Customer satisfaction surveys indicate high ratings both before and after the intervention. Finally, the productivity of the two work units measured jumped 29% after the intervention began and steadily continued to climb during th project. Similar improvements were not attained by the control groups.

IMPACT ON COST/COST OF IMPLEMENTATION

The project has analyzed cost and estimates that it would take $40,000 to repeat this effort for a target group of 100. A complete budget is provided in the Case Study. Cost savings attributable to the project were computed to be approximately $129,000. These savings are a result of improvements initiated during the project. It is anticipated that many of these savings will have long term cumulative impact.

SPECIAL REQUIREMENTS FOR IMPLEMENTATION

Qualified organizational development specialists are essential to the replication of these techniques elsewhere. Outside consultants may be required if such specialists are not part of the jurisdiction's staff. Local universities may have specialists on their teaching staffs willing to participate in such a project.

TRANSFERABILITY

The organizational development processes employed in this project are transferable. The problems addressed by the project are common to other local governments. The extensive evaluation certainly need not be replicated elsewhere although some monitoring of impact is essential. What is generalizable from the San Diego experience is:

- Organizational development did have a positive impact
- Management commitment is essential
- Qualified specialists must be used
- Organizational development interventions take time (at least a year).

SIMILAR PROJECTS ELSEWHERE

While organizational development has been used in other state and local government agencies, this project is the first known comparative evaluation of the use of organizational development in a local government setting. Control groups were identified and monitored for comparative performance measurement.

Prepared by SRI International, Menlo Park, CA 94025 February 1979

HUMAN FACTORS IN PRODUCTIVITY IMPROVEMENT PROJECT: ASSESSMENT REPORT

San Diego, California

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The research and studies forming the basis of this report were conducted pursuant to a contract with the Office of Policy Development and Research of the U.S. Department of Housing and Urban Development (HUD). The statements and conclusions contained herein are those of the contractor and do not necessarily reflect the view of the U.S. government in general or HUD in particular. Neither the United States nor HUD makes any warrantee, express or implied, or assumes responsibility for the accuracy or completeness of the information herein.

EXECUTIVE SUMMARY

The City of San Diego's organization development project, called Human Factors in Productivity Improvement Project (HFIPIP), was successful in improving labor-management relations, in increasing productivity, and in saving money. An extensive evaluation of the project was carried out by the city, and SRI International confirmed the appropriateness and thoroughness of the evaluation procedures, including the factors taken into account in the evaluation. Therefore, SRI concurs in the finding that HFIPIP was successful in meeting the stated objectives of the project.

The specific procedures used in San Diego, however, are not demonstrably transferable to any unit except one exactly like that for which they were developed. Thus, HFIPIP cannot be used as an "off-the-shelf" productivity improvement innovation.

Specific technical skills are needed to implement the organizational development ideas that made HFIPIP successful. The City of San Diego has considerable experience with organizational development, and has supported an Organizational Development and Training Group for some time. Not all local governments would have such skills available or would have such a high acceptance of organizational development techniques. In addition, any organization considering organizational development as a method of raising productivity must be able to plan over a long enough period to absorb the costs of considerable nonproductive time at all levels of the organization during the start-up period.

Given the presence of the specific skills, sufficient management commitment, and financial resources to fund the necessary planning and start-up time, it seems reasonable to conclude that any jurisdiction could implement an HFIPIP of its own--and at much lower cost than the cost to San Diego, since there is no need to repeat the extensive formal evaluation carried out by San Diego. The remainder of this report describes the

system in enough detail to permit a local government manager to decide whether or not it is worthwhile to purchase the full case study; only the full case study will permit a local government executive to determine whether or not HFIPIP is likely to succeed in a particular jurisdiction or government organizations.

CONTENTS

I INTRODUCTION

Between June 1977 and July 1978, the City of San Diego conducted an experiment in organization development (OD) called the Human Factors in Productivity Improvement Project (HFIPIP). The experiment consisted of two complementary components, designed and executed in parallel by the City's Organizational Development and Training (OD&T) section. One component was a comprehensive set of OD interventions aimed at increasing both productivity and morale in the City's Communications and Electrical (C&E) Division. The other component was a sophisticated evaluation plan to assure that the results of the OD program could be measured against the investment it required.

The HFIPIP was one of 18 different productivity-oriented projects partially supported by Innovative Projects Program grants from the U.S. Department of Housing and Urban Development (HUD). In connection with this program, HUD also contracted with SRI International to assess and package the products that resulted from the most viable projects. In the case of San Diego's HFIPIP, most of the necessary assessment activities were more than adequately handled by the project staff itself. The SRI assessment team consulted with the San Diego project team to formulate an assessment plan and schedule at the outset, and our respective staffs remained in contact throughout the project. Together with the obvious professionalism of their evaluation plan, these contracts encouraged us to adopt and maintain the relatively passive (for an assessment team) role of "looking over their shoulders" while the project was in progress.

Although some evaluation and follow-up activities will continue until February 1979, the HFIPIP staff has already produced two impressive volumes of documentation. One of these is a 45-page booklet called Team-building Workshop Modules. The booklet begins with a section devoted to aiding the reader in distinguishing between OD and management training, with which OD is sometimes confused. After the general structure of the

training program is described, the booklet presents exercises and check lists covering a wide variety of topics, including, as examples, self-awareness, organizational communication, conflict management, role identification and clarification, and creative problem solving. These modules are sufficiently detailed and practical to guide trained OD specialists in other jurisdictions in the design of their own teambuilding interventions.

The other volume of documentation from the HFIPIP is appropriately called a Case Study. It consists of a detailed description of the background and context of the project, the approach, activities, and ongoing experience of the OD program staff, the process by which the program was evaluated, the exemplary data produced by this evaluation, and, finally, a set of conclusions and recommendations. The level of detail is suggested by the inclusion of 24 tables and figures, as well as 20 different appendices. Nevertheless, the style of the Case Study is readable and highly informative, particularly in the wealth of specific facts and interesting sidelights it contains.

The three basic questions we seek to answer in our assessment of the HFIPIP are:

- Did it work?
- What did it cost and save?
- Can it be transferred to other jurisdictions?

As the preceding paragraphs have implied, the project's Case Study goes a long way toward answering these questions for us. In particular, the first two assessment questions are answered in subsequent sections essentially by excerpting relevant passages from the Case Study. To set the scene, the next section provides some basic descriptive information about the project and its institutional context. Finally, the concluding section offers our assessment of the key issues concerning transferability.

II OVERVIEW OF THE PROJECT

BACKGROUND

Here is how the Case Study describes the background of the HFIPIP:

The City of San Diego is the commercial, industrial and cultural heart of the San Diego metropolitan area. It is the area's largest city, inhabited by 805,000 of the 1.6 million local citizens. It is the second largest city in the state. It employs over 7,000 people and expends an annual budget in excess of 250 million dollars. San Diego began using its present Council-manager form of government in 1931.

Under the council-manager form of government, the voters elect a mayor and city council which acts as the City's legislative and policy-making body. The council then selects a professionally trained city manager who carries out the programs and policies adopted by the council. The City is organized into 26 departments which provide needed services to its citizens. Public works, public safety, water, building inspection, and housing are the principal services. Much of the City's leadership style is determined by the personal characteristics of the city manager in office at any one time.

Since 1974, the City has conducted a traditional Productivity Improvement Program (PIP) using engineered work standards. To date, 37% of all City positions have been studied, resulting in significant cost savings. The goal of this program is to reduce costs and/or to improve service levels with existing resources.

The Financial Management Department, which conducts PIP, estimates cumulated savings resulting from this program at $7,520,374. Although PIP's administrators point out that cuts in staffing via PIP are to be made through attrition, many City employees have expressed hostility toward the process. Survey and interview results suggest that employees generally regard City management as insensitive and unresponsive to the human needs of personnel. The Productivity Improvement Program is specifically feared and resented. Numerous employees have singled it out as a contributor to low morale. This is particularly unfortunate since the program's goals are to increase the productivity of the City work force.

Ironically, attitude-survey results in general suggest that employees endorse the increased productivity goals of PIP. While the research literature has not unequivocally established that increasing employee morale will lead to increased productivity,

observations in the City of San Diego generally support the contention that more productive units tend to have higher morale than the less productive units.

It is possible to audit savings caused by surgical interventions in the organization. However, some managers fear that the $7 million saved by deleting jobs may be more than offset by lowered levels of service and the interference with productivity caused by low morale. On the other hand, responsible managers in the City agree that PIP-style measurements are useful and that selective cutbacks could increase efficiency. The PIP program is controversial. City of San Diego managers are confronted by the problem of implementing work standards and productivity measures in such a way as to not adversely affect morale.

Organizational Development was suggested as a solution to the problem. OD was seen as a way to mobilize employees' natural desire to be productive and work efficiently. The goal of the OD approach, in the City of San Diego, is to increase productivity at the same time as improving morale. The concern with morale is based partially on an unproven contention that high morale has a positive effect on productivity and partially on an assumption that morale improvement is both humane and worthwhile for its own sake.

Still, the City's goal was not to have a "happiness" or "do-good" program. OD as practiced in San Diego City government is a "hard" versus a "soft" approach to management, and as such its goals of increased efficiency are perfectly compatible with those of the Productivity Improvement Program. An important aspect of the "hard management" approach that the City adopted is that OD treats interventions in an organization's procedures as an experimental process in which changes are implemented and then the effects are rigorously measured. Future efforts are predicated upon the results of the previous experimentation. Rather than commit resources to a full-blown attempt to affect all 7000 employees, the City decided to experiment intensively in one division of less than 100 employees.

The City's OD&T Section applied for a grant from HUD to get the ball rolling. The grant was awarded in July 1976, but the San Diego City Council did not accept it until December 1976. As described in the Case Study,

Getting the Federal money was the key element that encouraged the City to proceed with the project. The City desired an alternative to its Productivity Improvement Project, but receiving the HUD grant was the catalyst for the project. The City's in-kind contribution (Budget for OD&T for FY77) to the project was five times larger than the 32,000 HUD grant, but the Federal money was crucial seed. Receiving the grant legitimized the OD approach to increasing productivity through attention to human factors.

To conduct the project, it was necessary to hire additional OD specialists to supplement the existing OD&T staff. Two half-time and one full-time positions were filled by May 25, 1977.

The actual interventions at the program site began June 22, 1977, with the commencement of the attitude surveying and interviewing phase. Direct project interventions and post-testing in both the project and control groups were completed by July 1978. Evaluation and follow-up (maintenance) activities are expected to continue until February 1979.

The project site, chosen purposefully, was the Communications and Electrical (C&E) Division of the City's Department of Transportation.

> The C&E Division is responsible for the maintenance, installation and repair of all the City's vehicle radios. C&E maintains all of the City's street lights and traffic signals. The Division repairs the City's parking meters and makes daily collections of parking meter revenue. C&E operates microwave transmission stations and Station 38, a broadcast facility for non-Police-and-Fire communication....Several factors influenced the choice of the C&E Division as the site for the research. C&E is a large line (as opposed to staff) department and is in many ways typical of the City's operating departments. Most of the C&E employees are engaged in a blue-collar skilled trade. The division directly serves the public and supports other City work groups. Before the project was initiated, [a person] who later was chosen as consultant to the project, conducted two problem-identification workshops in C&E and found its superintendent...eager to try an innovative approach to management. The majority of C&E's facilities are physically located at the same City operating station as the Organizational Development and Training Section. Thus, contact between the two groups could be facilitated.

PROJECT APPROACH

There are many different ways to define OD. In the Case Study, the approach taken in San Diego is described in very abstract terms, intentionally, to avoid any arbitrary pigeonholing. One way OD was defined was as follows:

> We helped the personnel of C&E look at their system "as it was" and then helped them find means to change it into what they would "like it to be."

Their basic approach is known as "action research." As defined in the Case Study,

> ...the action research model progresses through stages of gathering data, feeding information back to the organization's personnel, planning, and implementing change and evaluating the results of the entire intervention with a view toward repetition of the process in order to deal with new and unresolved issues.

Some of the implications of this approach can be spelled out as a set of attitudes or assumptions underlying the project:

- A systematic application of OD techniques to the public sector can increase productivity.
- The specific choice of OD techniques should be made only after an initial survey assessment of the perceptions of members of the work unit.
- In general, "action research" is a collaborative effort in which the persons responsible for implementing change must be involved in the process throughout the cycle from reconnaissance to evaluation and back again.
- In particular, there must be employee participation in the design of workshops.
- In particular, the "product" of this project is the process of organizational training and development in itself, rather than any particular exemplar. Different jurisdictions, applying the same processes, will develop different specific packages to accommodate idiosyncratic needs.

There are other assumptions behind the project that characterize some of the conditions necessary for OD programs to succeed:

- OD is a "top-down" process. That is, there must be management involvement and support for it to succeed, as well as cooperation from the group.
- OD takes time. Without enough time for the interventions to proceed at a natural pace, there is no point in getting started.
- OD requires trained personnel. It takes more than following a list of instructions to make OD work. Much of the skill involved requires unusual judgment and sensitivity as well as knowledge of a range of possible techniques.

Another excerpt from the Case Study describes the kinds of interventions employed in the HFIPIP:

> In OD jargon, any time an outside agent (usually an OD consultant or specialist) does something to facilitate the process whereby

people inside an organization attempt to solve problems or plan for change, the activity is called an "intervention."

...Our OD project used survey feedback, teambuilding workshops, role clarification, creative problem solving, counseling, process consultancy, and cognitive training interventions. Survey data, collected for evaluation and action research purposes, was fed back at the teambuilding workshops. At the teambuilding workshops, organization roles of all C&E personnel were clarified. The teambuilding workshops included a problem identification/action planning phase. The action planning phase led to extensive activity in which C&E's managers monitored the status of problem solutions. OD specialists from OD&T acted as personal management consultants for managers of C&E. Late in the project, C&E management requested a series of 2-hour cognitive training sessions in which supervisors learned specific management skills and City procedures.

To quote once more from the Case Study,

The general goals of HFIPIP were to improve morale and to increase productivity without allowing either goal to interfere with achievement of the other. To reach those goals the C&E Division established the following specific objectives:

- To improve organizational communication, by opening up new communication channels, providing avenues for the resolution of interpersonal issues, and clearing up confusion about work procedures.
- To identify and resolve organizational problems.
- To build the division's capacity to clearly identify and resolve future problems.
- To establish a system for candid discussion of problems and planning of action to resolve them. To provide avenues of communication that inform people at all levels of the organization of the measures being taken to resolve problems.
- To establish an organizational norm of confronting issues honestly rather than avoiding them. To make direct feedback between individuals more common.
- Improve supervisory skills of the division's entire managerial staff.
- To increase the spirit of cooperation within workgroups through teambuilding efforts.
- To increase efficiency through greater coordination. Organizations which change structurally in order to optimally use employee skills can achieve greater coordination.

- To increase the recognition that outside sources give the division for its many duties and accomplishments.

The actual details of what was done to achieve these specific objectives are spelled out in both the Modules and the Case Study. The Case Study also provides a lot of information about how each of the steps led to the next. Because OD interventions are necessarily site-specific, we do not go into these details here.

III PROJECT RESULTS

There are so many "results" and evaluation data reported in the Case Study that only a cursory summary is possible in this report. One section of the Case Study describes qualitative changes in organizational structure and interactions that occurred throughout the intervention phase of the project. These qualitative changes are meaningful only in light of their relevance to the specific goals set by the C&E division at the outset of the project. Suffice it to note that,

> Project activities identified 245 issues which hampered productivity or decreased satisfaction. During the course of the project, the division resolved 194 of those issues.

In addition, mid-project interviews indicated improvements in both productivity and morale directly attributable to the OD interventions. These qualitative results are described in detail in the Case Study.

Of potentially more interest are the data from the quantitative evaluation component of the project. A table in the Case Study summarizes the findings on ten different variables. One of these, "morale," was assessed by three different surveys given both before and after the interventions to three different groups: the C&E division, another comparable division (the Buildings division) in San Diego, and an exactly comparable group of employees in Long Beach. The Case Study describes statistical tests among the three groups on a variety of demographic variables to demonstrate the similarity of the two comparison groups to the C&E group. Job satisfaction was also measured unobtrusively by collecting data from Division records concerning absenteeism, turnover, utilization of training opportunities, and grievances.

What is most interesting about all these measures of employee attitudes is the pattern that they form. The survey data as a whole indicate substantial gains on such dimensions as organizational climate, leadership, goal integration, and satisfaction. But the unobtrusive measures--

traditionally given more weight than paper-and-pencil measures because they are less susceptible to various artifacts of measurement--present an even stronger picture of improvement. The pattern is that the measures most likely to be valid indicators of genuine improvement show the strongest effects.

Other surveys were taken of customer satisfaction, including both public and institutional customers. Each survey indicated high ratings both before and after the interventions. The C&E Division did so well "before" that there was virtually no room for improvement "after."

By far the most impressive data, however, are the data on productivity. These data are so impressive, and the way they are treated in the Case Study is so difficult to convey by way of summary, that the relevant section of the Case Study is presented here in its entirety:

> Indices of productivity were obtained for the Street Lamps and Traffic Signal Sections of the C&E Division and a functionally similar work crew in District Eleven of the California Department of Transportation (CALTRANS). The CALTRANS data were collected to provide a comparison group. The two sets of data were plotted as time series before and during the OD intervention period. Both sets of data were analyzed in an effort to determine if the OD intervention affected C&E Division productivity.
>
> DESCRIPTION OF C&E PRODUCTIVITY INDEX. Time-and-motion studies of tasks involved in street lamping and in maintenance of traffic signals had been completed by the Financial Management (F/M) Department of the City of San Diego just prior to the onset of the OD project. A total count of specific tasks completed by individuals in the Traffic Signals Section and in the Street Lamps Section was taken in biweekly periods coinciding with pay periods. This information was available on individuals' daily work cards and so was a relatively unobtrusive measure of productivity. That is, it was obtained from archives rather than from observation of employees. The data base consisted of the daily work cards submitted by the nine employees of the Traffic Signals Section and the four employees of the Street Lamps Section.
>
> For each task, the total volume of work done by all employees in the section multiplied by the task's "time guideline," a fair work-time standard in minutes generated by the F/M time-and-motion studies. For example, wiring a traffic signal takes 76.8 minutes. If the Traffic Signals section repaired the wiring on four signals in one pay period, the total productive time for that task during that period would be 307.2 minutes. The productive times for all tasks were totaled to

arrive at the grand total productive time achieved during the pay period. This total was adjusted for unavoidable process losses (e.g., cleanup time, transportation time) and converted to total hours earned. When divided by total work hours available, this figure yielded the Productivity Index, totaled for two sections.

Productivity index data were obtained for each of the 37 pay periods from December 31, 1976 through June 1, 1978. It was of interest to determine whether any change occurred in productivity which might be attributable to the interventions. Therefore, for the two work sections, we plotted productivity as a function of time. This graph appears as [Figure 1]. These data were submitted to the following analyses: (1) Simple linear regression of productivity for both the pre-intervention period (i.e., December 31, 1976 through June 30, 1977) and the intervention period (i.e., July 1, 1977 through June 1, 1978), and (2) analysis of variance applied to the means of pre-intervention productivity versus intervention productivity.

COMMUNICATIONS AND ELECTRICAL DIVISION PRODUCTIVITY. A cursory examination of [Figure 1] suggests that productivity in the C&E Division was slowly declining prior to the intervention (slope = -.003) but improved during intervention (slope = .002). However, 95% confidence intervals computed for these slopes ($-.016 < \underline{b} < .009$, preinterventions; and $-.005 < \underline{b} < .009$, intervention) show that the gradients do not significantly differ from zero or from each other. What this means is that the apparent upward and downward trends in [Figure 1] are too slight to be reliable in a statistical sense.

Nevertheless, average producitivity increased dramatically during the intervention period. Whereas mean pre-intervention productivity was only .73, the comparable figure during the intervention was .94, an increase by 29% of the original. This increase is highly significant ($\underline{F}$ (1,35) = 36.35, $\underline{p} < .001$). In other words, productivity took a quantum leap after the intervention began and steadily continued at the higher level during the intervention.

CALTRANS PRODUCTIVITY INDEX. The California State Department of Transportation compiles records of work output for crews performing the same tasks as the two sections in the C&E Division. CALTRANS District Eleven encompasses San Diego and Imperial counties. Because District Eleven includes the City of San Diego, that district's lighting crew often works under conditions identical to those encountered by the C&E Division's Street Lamps and Traffic Signals Sections. For that reason, we have also compiled productivity indices for the District Eleven lighting crew to use for purposes of comparison.

Differences in the two reporting systems necessitated computing the CALTRANS productivity index in a manner slightly different from that of the C&E computation. Mileage records

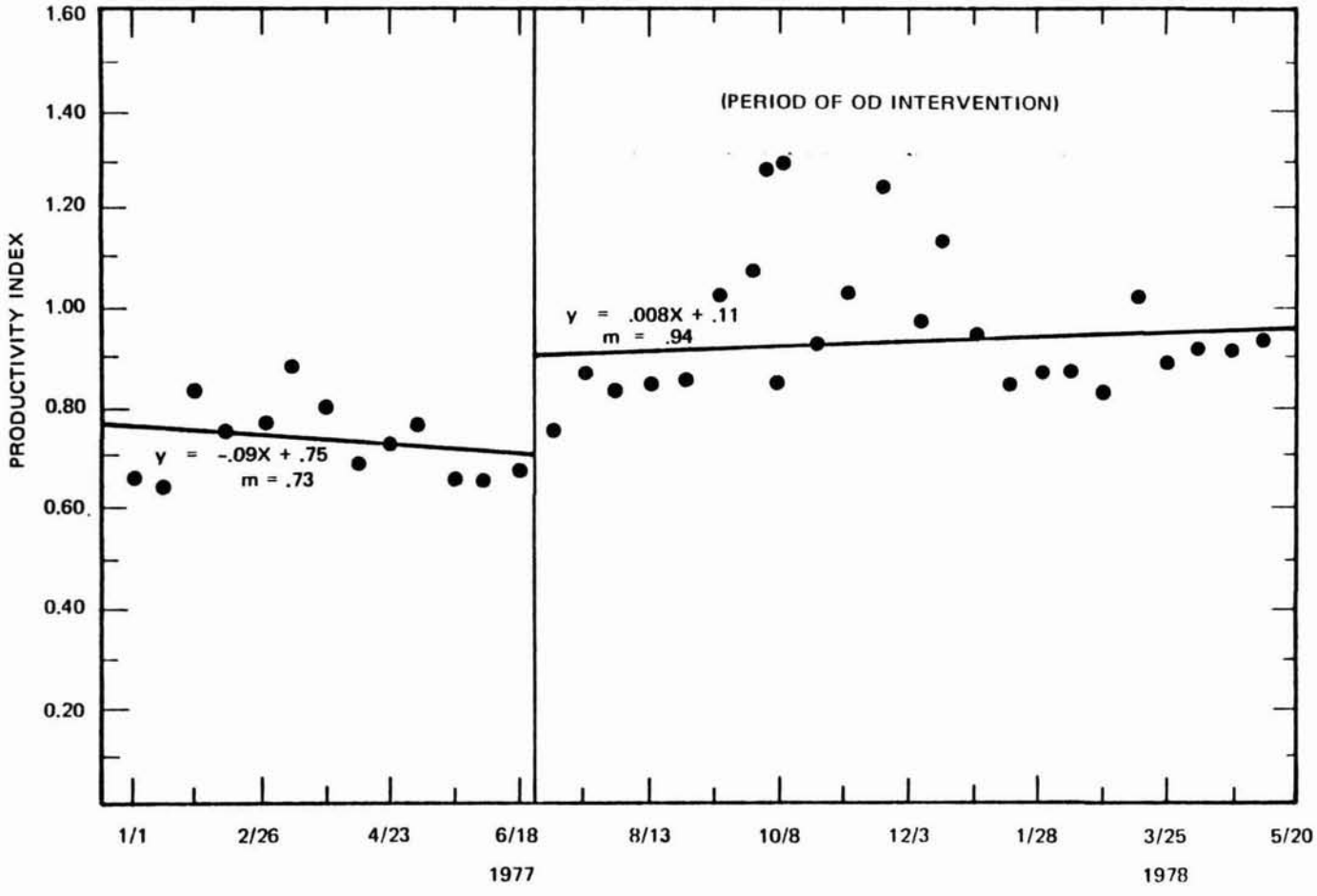

FIGURE 1 COMMUNICATIONS AND ELECTRICAL DIVISION PRODUCTIVITY — STREET LAMPS AND TRAFFIC SIGNALS SECTIONS

and correction factors for unavoidable delays differed between the two groups, but otherwise the computations were identical. Therefore, while it is legitimate to compare trends in productivity between C&E and CALTRANS, it would be misleading to directly compare actual productivity values.

The mileage-reporting difference resulted from two factors. (1) the eastern portions of District Eleven are rural, so its service area includes a higher proportion of undeveloped territory than does the C&E service area. Consequently, the number of miles traveled by an electrician or traffic-signal technician on a District Eleven service call is often higher than mileage for C&E service calls. (2) CALTRANS' computerized management-information system reports person-miles traveled each month, while in the C&E Division the only comparable archive is vehicle-miles. Depending on the number of passengers carried, a vehicle-mile in C&E may actually be equal to two, three, or more CALTRANS passenger-miles. So these factors increase the District Eleven mileage totals, which in turn tend to inflate measured productivity.

One single CALTRANS section maintains both street lamps and traffic signals, while two autonomous sections perform those functions in the C&E Division. We used two different correction factors (supplied by the F/M time-and-motion studies) in order to adjust the C&E data for unavoidable delays. There was no way to separate CALTRANS task frequencies into street-lamping and traffic-signal categories, since in CALTRANS the two functions are performed by a single crew. Therefore, with the CALTRANS data we had to use a single correction factor for unavoidable delays. The CALTRANS correction factor was a split of the difference between the two C&E delay factors in proportion to the size of the respective C&E crews.

Thus, the record-keeping systems forced us to give the CALTRANS comparison productive-time credit for its transportation and other dalays according to a slightly different scheme than was used for C&E. Despite these computational differences, the CALTRANS and C&E mean productivity indices for the pre-intervention period were highly similar (C&E = .7276, CALTRANS = .7292). Still, these are two different dependent measures obtained by very similar but not identical methods, and so we must resist the temptation to directly compare them.

CALTRANS productivity data were compiled for the 24 monthly pay periods between July 1976 and June 1978. Figure [2] is a graph of CALTRANS productivity plotted as a function of time. These data were submitted to the same statistical analyses as the Communications and Electrical Division data.

CALTRANS DISTRICT ELEVEN PRODUCTIVITY. Figure [2] might suggest that the CALTRANS lighing crews' productivity was on the increase ($\underline{b}$ = .006) prior to the time the intervention period. However, 95% confidence intervals computed for the two regression slopes ($-.046 < \underline{b} < .059$, before July 1977; $-.051 < \underline{b} <$

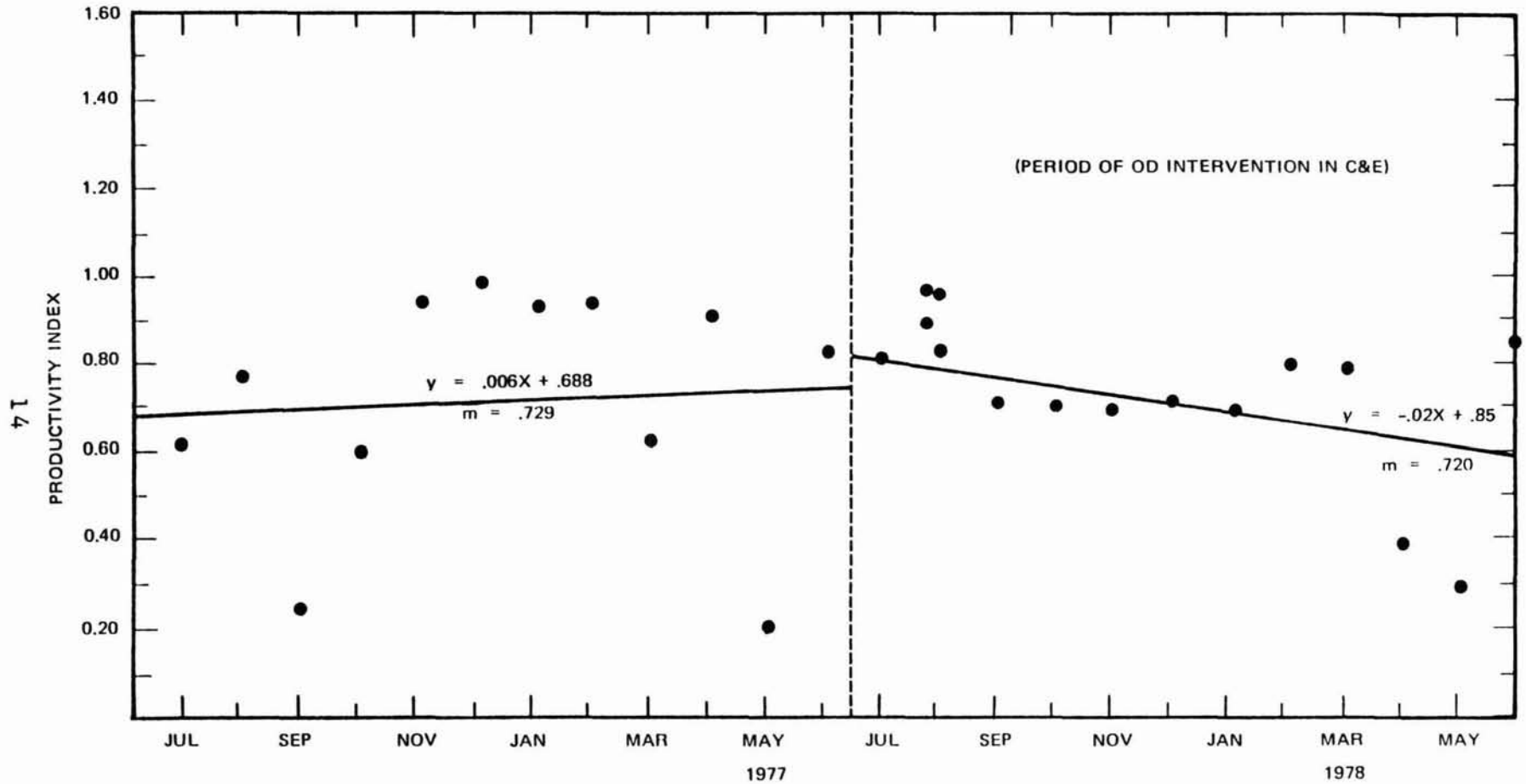

FIGURE 2 CALTRANS COMPARISON GROUP — DISTRICT ELEVEN STREETS LAMPS AND TRAFFIC SIGNALS PRODUCTIVITY

.011, after July 1977) indicate that the slopes were neither different from zero nor different from each other.

CALTRANS' mean productivity from July 1976 to June 1977 was .73. For the period that coincides with the C&E intervention, i.e., July 1977 to June 1978, CALTRANS' mean productivity was .72. Analysis of variance shows that these two means are not significantly different from each other ($F(1,22) < 1$). It seems clear, then, that the productivity of the CALTRANS lighting crews did not change during either period.

INTERPRETATION. Taken together, the productivity data strongly suggest that the OD intervention program contributed to substantial increases in productivity in the C&E Division. As Figures [1] and [2] make clear, productivity in C&E jumped to a new, higher level and remained there throughout the intervention period, whereas there was absolutely no change in CALTRANS' productivity over the same period of time. The CALTRANS District Eleven lighting crew makes an ideal comparison group, since it performs the same function in the same locale as the C&E Division. Nevertheless, it was not possible to randomly assign the OD treatment to groups, so the CALTRANS crew is not a true control group. Therefore we recommend caution in interpreting these results.

A 29% increase in productivity from OD interventions is a remarkable finding. What is even more remarkable is that one cannot fault the finding on the usual grounds of questionable measures, misuse of statistical techniques, or lack of an appropriate control group. As far as we can tell, within the limits imposed by our "hands off" role in the evaluation, the HFIPIP did in fact increase both morale and productivity to a degree worthy of notice by other jurisdictions.

IV COST OF THE PROJECT AND ASSOCIATED SAVINGS

The project staff did an excellent job of describing budgeting issues in the Case Study. Once again we are reproducing an entire section verbatim.

PROJECT COSTS

In this section, the project's budget is summarized. This section also presents a recommended budget that San Diego or another municipality could use to reproduce the Human Factors in Productivity Improvement Program without grant support.

UNUSUAL COMPLEXITIES. During its lifetime, the project's initially simple cost plan became very complex. The following factors account for the budget's complexity:

- Eight months elapsed between the time the City first estimated costs in its grant application and the time the City finally signed a formal contract with HUD. Two factors caused the delay:
  1) HUD's legal processing took from July to October 1976, and
  2) the City Council took from October to December 1976 to vote on fund acceptance.
- After its position classification study, the City Personnel Department increased the salaries of the OD Specialist job envisioned by the grant application.
- San Diego's Personnel Department took from July 1976 to May 1977 to actually fill the positions for the project, during which time City employees received a 7.5% cost of living raise.
- Numerous staff changes occurred during the project. The turnover was caused by promotions, retirements and layoffs due to Proposition 13's limitation on California property tax revenues.
- During the project, the OD&T Section's responsibility was enlarged from department-wide to City-wide training and organizational development. The original application envisioned the project staff working the majority of its time on the project. However, the staff was assigned numerous other duties during the life of the project.

Each of these factors interacted with the others to further inflate the cost plan. For example, the City couldn't budget or hire new staff until HUD officially awarded the grant. HUD

could not provide funds until the City Council approved the project. Civil Service could not recruit until the Council approved the program and a position classification study had been completed. Then Civil Service took a two month break in its operations for internal analysis, further delaying recruitment.

Since the grant did not require matching funds, HUD approved the inclusion of CETA funds in measuring the City's contribution to the project. CETA staff performed support roles as apprentice organizational development practitioners. Although these personnel costs are actual costs for this project, other projects would not need these expenditures. The primary benefit of using CETA staff was to training them for future programs under actual conditions.

The unanticipated complexities, unplanned or unbudgeted startup costs, unnecessary CETA expenses and higher salaries than planned, all inflated this project's budget. OD practitioners, preparing their own cost plan for a similar project, should remember that this budget is somewhat higher than necessary.

PROJECT BUDGET. The budget proposed in 1976 for this project was $172,438. $32,025 of the budget derived from a HUD grant and $140,413 came from City of San Diego matching funds. Although HUD's request for proposals did not require such funds. For purposes of this cost analysis, the project was broken down into three periods: start-up, demonstration and follow-up. Table [1] is the project budget.

EVALUATION COSTS. The HFIPIP was rigorously evaluated. Certainly any budget for an OD project should include an evaluation component. However, the experimental nature of this project and HUD's need to assess transferability made the evaluation more intricate and expensive than it would have been under other circumstances. The City of San Diego or some other municipality could reproduce this OD project with a much smaller evaluation budget. For that reason, we present Table [2], a rough estimate of the evaluation portion of the total HFIPIP budget.

REPLICATION BUDGET. Table [3] provides an estimate of the costs necessary for another agency, or for the City of San Diego, to implement a comparable project for a target group of 100 participants, if we assume the following:

1. Qualified OD Specialists would be available.
2. This project would not require the full-time work of the specialists.
3. Project would last approximately one year.
4. Use of an outside consultant would be minimized.
5. Indirect charges would be reduced by using a minimum of outside support. Grant administration overhead costs would of course be non-existent.

Table [1]

HUMAN FACTORS IN PRODUCTIVITY IMPROVEMENT PROJECT BUDGET

START-UP PERIOD July 76 - June 77	City	HUD	Total
Direct Charges			
Personnel	$ 32,772	--	$ 32,772
Non-Personnel	933	--	933
Contractual	5,471	--	5,471
Indirect Costs			
*Personnel	10,924		10,924
Non-Personnel	889		889
TOTAL	$ 50,989		$ 50,989
DEMONSTRATION PERIOD July 77 - July 78			
Direct Charges			
Personnel	$ 70,201	$23,383	$ 93,584
Non-Personnel	1,764	1,098	2,862
Contractual	5,218	3,090	8,308
Indirect Charges			
*Personnel	23,400	--	23,400
Non-Personnel	1,376	1,225	2,601
TOTAL	$101,959	$28,796	$130,755
**FOLLOW-UP PERIOD			
Direct Charges			
Personnel	$ 4,052	--	$ 4,052
Non-Personnel	500	500	1,000
Indirect Charges			
*Personnel	810	--	810
TOTAL	$ 5,362	$ 500	$ 5,862
TOTAL OF 3 PROJECTS	$158,310	$29,296	$187,606

*Indirect personnel charges are 33% of direct charges. This percentage is the overhead rate for administration support expenses incurred outside OD&T for management, purchasing, auditing, personnel administration, etc.

**The follow-up period costs are an estimate based on staffing by one OD Specialist II, one-third time for the six month period. Non-personnel costs include reproduction costs and other miscellaneous expenses.

Source: Table 4, HFIPIP Case Study, City of San Diego.

Table [2]

ROUGH ESTIMATE OF HFIPIP EVALUATION BUDGET

Personnel	
OD&T:	
1/3 OD Specialist	$ 8,000
1/4 Intermediate Typist	3,600
C&E and Buildings Division:	
180 work-hours (answering questionnaires)	1,620*
Non-Personnel	
Printing	1,000
Data Analysis by Institute for Social Research	540
Contract assistance with statistical analysis	700
Estimated City in-kind contribution of data processing	2,000
Estimated City in-kind contribution of administrative/ managerial support	500
Travel (7 trips to Long Beach @ $50)	350
TOTAL	$17,710

*Note: This estimate was computed at an average personnel cost of $9 per hour. This budget excludes the expenses for the Long Beach comparison group's questionnaire completion, because neither the City nor HUD was directly charged for that cost.

Source: Table 5, HFIPIP Case Study, City of San Diego

6. Salaries would be comparable to those in San Diego.

7. Evaluation would be less intricate and expensive than it was in the HFIPIP.

Table [3]

REPLICATION BUDGET

Personnel	
1/8 Senior OD Specialist	$ 3,500
1/8 Admin. Analyst	3,100
1/4 Clerical	2,600
2 (1/2 time) OD Specialists	25,000
	$34,200
Non-Personnel	
Survey Data	$ 500
Office Supplies	600
Transportation	200
Misc. i.e., copy telephone, electricity, etc., supplies	600
	$ 1,900
Consultant Support	$ 1,200
TOTAL	$37,300

Source: Table 6, HFIPIP, City of San Diego

The City of San Diego could replicate the program with the above minimum, one-year funding. This would allow for:

1 month - Entry and data collection

4 months - Workshops and shopfloor meetings

1 month - Action planning and implementation

6 months - Follow-up and evaluation

During the last six months, personnel expenses could vary greatly as a function of the project's progress level. More than likely, as much as half the OD Specialist's time would be available for other projects. However, progress at mid-project would control the decision to use the specialist for other enterprises.

COST SAVINGS

As a result of the Human Factors in Productivity project, the C&E Division improved organizational functioning and realized some major cost savings. Based on a financial analysis of approximately one-third of the organization's work units, some specific economies have been attributed to the OD project. The cost savings totaled approximately $127,960. It is anticipated that many of the savings will have long term cumulative effects. We also expect the division to realize future costs savings by using OD methods. Therefore, project cost will be far outweighed by ultimate savings.

We should note at this point that the Case Study includes a detailed description of each item that contributed to the estimated cost savings attributed to the OD project.

V WHAT IS NEEDED TO TRANSFER HFIPIP

By way of summary, it is our assessment that the HFIPIP was a notable success. The project demonstrated that a carefully planned and well-supported OD program can produce significant improvements in both productivity and morale in the public sector. Furthermore, the project represents, to our knowledge, the first and only instance in which such improvements have been documented in a manner sufficiently compelling to justify the attention of jurisdictions throughout the country. The evaluation component of this project was exemplary. There can be little room for doubt that the improvements really occurred.*

But there may well be questions about whether the San Diego success can be duplicated elsewhere. Before offering our comments on this matter, we allow the Case Study to speak for itself one last time.

> In general, we feel that the OD processes employed in the HFIPIP are highly transferable. The problems addressed by the project are universally encountered by municipalities. Virtually any jurisdiction, which wishes to plan for the future, to raise productivity, lower costs or improve employee morale, can profit from application of OD.
>
> OD is a flexible process rather than a universally applicable nostrum, so the procedures of this project can never be pretested, for all situations. Any jurisdiction which attempts OD will have to choose appropriate interventions in accordance with its unique needs. However, the San Diego project can be considered a pretest of the general approach. As we have previously noted, we employed a wide variety of OD techniques in the HFIPIP. This case study and the Teambuilding Workshop document the project's methods. Jurisdictions wishing to use OD can save many development costs by replicating HFIPIP methods.

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*One "loose end" concerns the fact that the follow-up evaluation remains to be done. A certain measure of caution would seem to be appropriate in this regard. On the other hand, there is no particular reason to be either optimistic or pessimistic about what the follow-up will show. Necessarily, then, our assessment of transferability is based on the facts at our disposal at the present time.

> Since the HFIPIP was so thoroughly evaluated, we recommend that other jurisdictions avoid most of our evaluation expenses. Effective managers evaluate their programs, but they don't need to conduct the detailed research which was necessary for the experimental HFIPIP. The experimentation has already been accomplished.

It is SRI's opinion that the HFIPIP must be regarded as unusual in several respects. Most obviously, the evaluation component of the project is unique: it has never been done before and may never be done again. It must be emphasized, however, that it need never be done again. As Al Gross (the principal author of the Case Study) put it, "Now that we've shown that the wheel is round, we don't have to keep proving it over and over. Let's roll 'em!"

But how unusual were the skills and resources available in San Diego that kept the wheel rolling so smoothly? The City had a history of support for its OD&T group, indicated by the fact that its functions had been allocated to a large line department (General Services), rather than a central staff department. There was a cooperative working relationship already established among the OD&T staff, the City management, and the employees who participated. Several members of the project team happened to have benefited from a particular local resource, a Navy OD training program, which, of course, does not exist in every jurisdiction that might want to attempt its own OD program. The list could go on, as a careful reading of the Case Study would confirm.

From a perspective, it is impossible to guess whether any particular condition or event is critical to the success or failure of any particular program. Obviously, there were a lot of facilitating factors in the San Diego situation. Any other jurisdiction attempting to judge the appropriateness of the OD approach to its own circumstances will necessarily want to study the Case Study very carefully. But we do feel confident in making a few general comments to highlight the most important conclusions to be drawn from the HFIPIP regarding transferability.

In simplest terms, OD should not be taken lightly. As with any other potentially powerful technology, it should be regarded as a major investment of resources, to be made only after a careful assessment of

its appropriateness to particular circumstances. There would seem to be three basic conditions that must be met, at a minimum, before one should expect to achieve success with OD interventions:

- There must be management commitment to the program, both from the top and from the leader of the work unit.
- There must be a trained staff available to make the concepts operational.
- There must be enough time to plan carefully, implement at a reasonable pace, and allow for the processes to take effect.

If these basic conditions exist, we conclude from our assessment of the HFIPIP that OD programs deserve serious consideration as means to increase both productivity and morale in work units in the public sector at a potentially very favorable cost/savings ratio.

Government Capacity Sharing Program

There are five overview booklets available from HUD that tell about this and other ideas developed and tested in the eighteen HUD-funded projects aimed at improving productivity in state and local government:

- **Practical Ideas for Small Governments Facing Big Problems** tells how local governments have designed energy conservation programs, personnel management and purchasing systems, have introduced performance menasurement and cost accounting, have improved permit application and licensing, and have devised a way to plan for large street and road projects.
- **Practical Ideas for the Government That Has Everything—Including Productivity Problems** describes ideas for solving problems affecting service efficiency or effectiveness, or employee morale. Street repairs, park maintenance, street and alley cleaning, and permits and licenses are some of the subjects.
- **Practical Ideas on Ways for Governments to Work Together** describes four intergovernmental projects and one public-private project. Subjects include joint provision of services, a successful environmental review team, energy conservation, personnel management, purchasing, developing cost accounting and performance measures, and drawing on the management experience available in the private sector.
- **Practical Ideas for Governments Facing Planning and Scheduling Problems** describes ways of coordinating public services and citizen responsibilities to improve services to a neighborhood, a method for planning large public works projects, a way of instituting quality control in parks maintenance, an information system designed for parks, methods for scheduling shift work equitably, and ways of locating emergency and leisure service facilities.
- **Summary of Productivity Improvement Projects** describes each of the eighteen projects carried out and lists over eighty of the documents produced on the projects.

A free copy of each can be obtained by writing to Division of Product Dissemination and Transfer, Assistant Secretary for Policy Development and Research, Department of Housing and Urban Development, Room 8124, 451 7th Street, S.W., Washington, D.C. 20410.