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Social Well-Being and Waste Water Management

Martin H. Krieger

This paper was originally written for the U.S. Army Corps of Engineers, San Francisco District, in consultation with Drs. William Alonso, Leonard Duhl, and Michael Teitz of the Department of City and Regional Planning at the University of California, Berkeley. I take responsibility for its current form. I want to thank my liaison at the Corps, First Lieutenant J. Michael Cobb, for assisting us in this work.

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In the next few years it seems likely that the U.S. Army Corps of Engineers will become deeply involved with urban waste-water management problems. This reflects changing national sentiments concerning its previous duties with respect to rivers and harbors and a developing "crisis" in urban waste water management. The Corps is currently proposing to develop regional waste water management facilities. The Environmental Policy Act of 1969 and the Environmental Improvement Act of 1970 require that such activities be responsive to social well-being impacts.¹

The Corps has a long tradition of being concerned about economic impacts. Cost-benefit analysis originated with Corps work. However, no generally agreed way of including social well-being effects are currently in use. In doing a feasibility study on urban waste water management in the San Francisco Bay Area, the Corps had to develop its own procedures for doing so. We were asked to review their efforts. The following is an edited extract from that review.

The Corps' interest in explicitly including the social well-being impacts of its efforts is part of a larger national movement. This has most recently come under the rubric of "social indicators." These are statistics that relate social action to the state of the society. Currently, a great deal of research effort, in and out of government, is being devoted

¹See, John Lear, "Environmental Repair: The U.S. Army Engineers' New Assignment," Saturday Review, 54, May 1, 1971, p. 47.

to developing such indicators. Much of the research is concerned with factors describing positive, rather than ameliorative, aspects of society -- indicators of the quality of life.

The urgency for including these factors will be especially great in the case of waste water management. Most residents of urbanized areas view waste water processing as a utility, that is something for which they pay but about which they need not worry. Of late, many utilities, notably electric power, have come to the attention of the population as the supply systems have broken down. These breakdowns are the result of complex sequences, often originating in conflicts over land use. Rather than using systemic failure as a way of raising the issues of waste water management in the public's eye, more plan-ful action involving the affected publics is called for.

The Set of Alternatives

How the "waste water management problem" comes to be defined has major implications for its social well-being impact. Four alternative means of sludge disposal have been proposed. These are: disposal in the oceans, disposal in the estuary (in the San Francisco Bay Area), disposal on the land, and a mixture of these. Appropriate means of recycling purified waters are provided.

The set of four alternatives may be too limited. By assuming "all things being equal," especially waste production per person and population growth, we may be ignoring other management options.

Taxes and effluent charges are likely to have some effect on waste production. It seems fair and equitable to charge clean-up costs to those who produce wastes. As a result of market processes, this will encourage many waste producers to reduce the amount of wastes they discharge. The magnitude and resulting form of waste water management procedures may be altered dramatically.

WHAT IS "SOCIAL WELL-BEING?"

The concept of "social well-being" has no precise definition or one that is embodied within a single profession's practice. In that sense, it is very different from "economic efficiency" or "ecological survival." Yet it is obviously a genuinely significant value to which certain professions are committed -- medicine, law, planning and design, among others. Politicians have always tried to address themselves to it. Still, efforts to systematically include social well-being in decisional processes seem to require an explicit definition of it.

The issue is mainly with the quality of group, family and individual life. Dimensions that seem most significant include material equity (and implicitly the quality of jobs and schools), psychological well-being, physical health, democratic participation in governmental processes, and aesthetic factors.

When a concept is not well defined, certain procedures can insure that the latent aspects of the definition are included and that public action is at least partially responsive to the values

associated with the concept. A fairly straightforward element of social well-being, likely to find wide acceptance, is distributive equity. In order that the other aspects of the definition be included in the process of decision making, a broad representative group, outside of the engineering and design professions, needs to be included. These will comprise local residents, public officials, and specialists from fields concerned with social well-being.

The Social and Psychological Character of the Problem

The lack of an "objective" definition of social well-being is not peculiar to this concept alone.

"Pollution" is also a cultural artifact.² Of course, it is known from physical and medical sciences that the ingestion of certain substances will have toxic effects. Calling such substances "pollutants" is the result of a social evaluation of the significance of such toxic effects compared to the (presumably existent) beneficial effects. The levels of risk we accept are socially, and not scientifically, determined. A pollutant in one society will be considered either neutral or beneficial in another, yet the physical effects in both may be roughly the same.

This is especially clear with respect to waste water management. Currently, the idea of drinking purified waste waters may seem abhorrent to some people (even though this is the biological process that we now use), independent of physical health hazards. Similarly, the spraying of partially purified

²Mary Douglas, Purity and Danger, Baltimore: Penguin, 1970.

waters onto the land, and perhaps growing crops on the same land, (part of the land disposal scheme) is likely to suffer social suspicions associated with pollutants. Yet people can be convinced of the purity of mechanically recycled water, as many examples in effect today show.

MAJOR OBJECTIVES FOR SOCIAL WELL-BEING

Social well-being objectives consist of both normatively oriented impacts and processes by which the decision among alternatives is made. The latter are especially important. The social well-being of certain groups crucially depends on the manner in which problems come to be defined and subsequently worked on. The chosen solution to the problem is important, but the method by which it is chosen may be of equal importance.

Distributive Equity

The one objective that characterizes all of the concerns we shall articulate below is that of distributive equity -- of material goods, of regional quality, and of decisional power.

A number of versions of the objective are in use. Conventionally, the results of an activity are equitable if those who are made worse off as a result are compensated in some form for their losses. Distributive equity, on the other hand, as understood in much of current Federal and local policy, is a criterion which suggests that as a result of an action greater weight be given to benefits for those in the greatest need and who have the smallest resources. The kinds of goods people desire as benefits also need to be taken into account. At the least, the projects should not make the lot of the poor any worse.

We will now discuss the various criteria in greater detail.

A. Material Equity

Different waste water management alternatives will affect the material well-being of sectors of the population in different ways. We believe that the differential effects of projects on real family income should be a primary evaluative criterion in choosing among projects.

Differential Effects of Projects

Alternative projects affect income by changing the mix of jobs, the costs and character of access to work, the kinds of (non-priced but valuable) recreation available, and the tax structure of a community. These effects are manifested through the project as an investment in the area (mainly during construction) and as a result of the operations of the facility. For example, one of the investment effects of the recent downtown building boom in San Francisco and the construction of the Bay Area Rapid Transit System has been a strong demand for construction workers. Even here the ~~problem~~ is not straightforward. Worker migration from outside the region may be substantial. Similar effects will attend the development of large waste water management projects.

The Differences in the Preferences of Different Publics

It is quite clear that the environmental preferences of the rich and the poor are substantially different.³ The rich view environmental quality in terms of amenity, while the poor are concerned with escaping from dirt and deprivation. The attention

³This argument is extracted from my, "Six Propositions on the Poor and Pollution," Policy Sciences, 1, 1970, p. 311.

of the rich may be on the beauty of the wilderness, while the urban poor may be most concerned with the security and cleanliness of their apartments. Thus the impacts of different projects will be valued differently by the different income groups.

Also, it seems likely that the distribution of environmental pollutants and disamenity is inequitable and that people who are income and wealth poor suffer disproportionately from a poverty of environment. They often live near the sources of greatest disamenity (powerhouses and sanitation plants) and cannot escape from them.

What is perhaps most disturbing is that very deliberate effort is needed to make sure that environmental improvements aimed at helping the poor do not end up benefitting the well-to-do at the expense of the poor. An example will make this clear. Say that poor people live near a sanitation plant. We propose to develop a regional system which will enable us to eliminate this plant and thereby improve the local neighborhood. We suspect that we have improved the lot of the poor. But this may not be the case. The sanitation plant, which kept rents low in a neighborhood, is no longer present. What is to prevent the neighborhood from becoming attractive to the non-poor, have rents bid up, forcing the renting poor to move and thereby taking away their better environment. This effect characterizes much of urban redevelopment work of the past decades.

In order to understand how these unintended effects occur, detailed tracing of the flows of incidence ought to be done. Not every impact need or can be traced, but some, especially those related to displacement in the work or residence of poorer people, have high priority.

B. Regional Quality

Even though a regional waste water management system would be a very large investment, such a project in any of its various proposed forms is unlikely to influence the rate of development of the region significantly. If it were not built, then there might be a substantial effect, but we must consider that a good part of that would be offset by ad hoc investment by localities.

The limited effects on aggregate growth have two main sources. Regional growth is highly dependent on outside forces related to migration and the national demand for the region's products. Secondly, these latter effects are only partially dependent on the quality and cost of waste water management alternatives. On the other hand, the differential effects (probably canceled out in the aggregate) may be substantial for specific industries.

Inter-Regional Distribution

Rather than affect the overall levels of population growth or economic development of the area, the main consequence of the system would be socially distributive: who gains and who loses, and geographically distributive: directing urban or agricultural growth in some directions or discouraging or pre-empting it in others. Consequently the time stream of development in sub-areas will be affected.

Such distributional effects can be substantial. A land disposal system could: a. Impact large amounts of rural land for the spraying and purification process; b. provide contracts for high technology contractors likely to be based in San Francisco;

and, c. provide opportunities for growth in the suburbs of San Francisco without local costs of waste water disposal systems. Other systems would have disaggregated effects of similar magnitude.

Effects on Differential Growth

The way in which the project is administered will have strong regional distributive effects. If waste water treatment services are available to any community in the region at no direct cost, then constraints that may exist on the development of large scale areas will be loosened. Depending on the alternative system used, different amounts of local treatment will result in different constraints. This availability of waste water systems will have very definite effects on regional development. It is not policy neutral. A reduction in constraints to development is an implicit development policy, the consequences of which need to be spelled out and evaluated.

Another differential effect of different alternatives will be their intrusion on poor people's homes and on public recreation areas. The low- or non-priced aspects of these must underestimate their values to the people involved. The costs of replacement may be much higher than the prices of the property.

Finally a word about the effects of scale of a region-wide system. While there may be economies of scale, it is likely that the physical aspects of region-wide systems will be much more grand than those of local systems. At the same time, the physical apparatus will be localized in some single area. So a region's waste water management machinery will exist in a locality. Local

aesthetic, health, and economic effects, as well as social well-being effects, will be magnified and need special attention.

C. Equity in Governance

There is a long tradition of local participation in the development and advocacy of Corps projects. As the Corps becomes more deeply involved with waste water management, and thereby the problems of urban populations, this experience will serve it in good stead. What is needed is an enlargement of the arena of legitimate actors in the process of designing and choosing projects. In this manner the Corps' professional expertise will be supplemented by intimate contact with those affected by its efforts. The result should be the choice and design of projects that will have substantial and wide support within the region.

Consumer Participation

The preferences and interests of the poor and the rich, the consumers and the farmers and manufacturers, and the blacks and the whites are different. Yet each will be affected by a large waste water management system. Each is legitimately desirous of influencing the kinds of projects that are constructed.

We might try to develop a technique for recording the values of various interested groups and develop relative weights for them. This process has deep theoretical as well as practical difficulties. It seems much better, from recent experience, that the conflicting groups come together to consider alternatives as live representatives of their interests.

Social well-being is fostered in two ways by such an effort. The acts of participation themselves help in building community and individual competence. The process of participation brings certain social well-being values, not easily explicitly measured (even qualitatively), to the attention of the community and the Corps.

Considerations of equity suggest that groups that have traditionally been left out of the design and choice process be actively included, kept well informed, and be given substantial power. These will include groups representative of the poor, the end point consumer, and the racial minorities.

Local participation is no cure-all. It is likely that cries of cooptation and feelings of ~~resentment~~ and disaffection will set in. These are not to be avoided but are natural concomitants. The value of incorporating the perspectives of those who tend to be left-out, and of developing an informed community, are too great to let these difficulties become hindrances.

It is essential that the various groups be involved early in the process, that the difficulties of their maintaining interest over the many years between conception and construction be recognized, and that participants are actually a part of the process. It is incumbent on the Corps to adequately explain the character of the alternative projects with good visual and descriptive aids. The complexity of these projects requires this for intelligent formation of opinions.

Other Governmental Units

The concern for social well-being is distributed throughout government. The problems associated with waste water management are legislatively distributed to several of the Departments, notably Housing and Urban Development and Health, Education, and Welfare, as well as the Corps among others. (The Environmental Protection Agency is already involved.)

Each governmental unit represents certain concerns as its primary ones. It would be impossible for any one unit to incorporate all such concerns as primary ones at any one time. In order that the social well-being objective be met, active participation in the choice and design process by these various Departments will be needed. There is no lack of commitment to deal with waste water problems, so that it is likely that the various units (including those of the State) should be anxious to participate.

Since we are concerned with regional waste water management systems, which sometimes may even cut across state lines, we will constantly face questions of centralization vs. decentralization. Should the development of the system take place in local governments, in national units (such as the Corps), or in communities? Clearly the answer is "yes" to all three. Each level of government will be able to do some jobs best. This does not mean that it has total control over the area in which it is most competent. Local efforts will have to be responsive to regional system wide effects and, similarly, regional plans and designs must take cognizance of important local values. If some piece of land is locally significant for parks, formal or informal, then the system plans cannot just readily sacrifice such land.

Regional Government

Finally, we wish to say something about the effects of a regional system on regional government. Different alternatives will have profoundly different effects with respect to the viability of regional government. There is much to be said for such governments when the region seems genuine to most people and certain problems (such as transport and waste waters) are regional in effect. If the Corps were to set up a system without involving local governments, then a prime opportunity around which regional government can be encouraged would be lost.

Besides the efforts at local participation, one vehicle for encouraging regional governments would be the arrogation of the operation of the regional system to such a government. The operations involved would be substantial and would provide a base for further development.

CONCLUSION

The seemingly tenuous character of social well-being does not preclude its being systematically included in project evaluation. Rather, a multiplicity of methods, some of which use analytic schemes and others which involve affected public in the choice process, can get at these issues. Social well-being may be viewed in terms of amenity, but it is much more crucially seen in terms of the needs of the poor and excluded.

APPENDIX
PROCEDURES FOR EVALUATION

In many cases current practices provide a basis for evaluating potential equity effects.

Existing economic and ecological impact analyses provide a starting point for articulating the social well-being aspects of each alternative project.

The economic analysis focuses on issues of project efficiency while the ecological analysis evaluates various impacts with respect to an objective which might be called survival. They seem to consider many of the events or impacts that would result from the alternatives. These same impacts should be evaluated, as well, according to the social well-being objective and sub-objectives within it. The general concept is shown diagrammatically in Table 1. (This is reminiscent of conventional tables; its purpose here is schematic) On the vertical scale are listed the various impacts identified by the economic and the ecological analysis. There will be a certain number of other impacts, such as psychological or aesthetic ones, not considered in these two analyses, and therefore this listing would be somewhat longer.

Across the Table are the various relevant objectives. While the impacts identified in the economic section are those assessed from the point of view of economic efficiency, or their contribution to national product, each of these should also be evaluated with

TABLE 1

Objectives Impacts	Efficiency for "X"	Survival for "X"	Income Equity	Social Well-Being of Public "X"*		
				Regional Amenity	Psychological Effects	Governance
Economic Impacts _____ _____ • • •	CA	P	P	P	P	P
Ecologic Impacts _____ _____ • • •	P	CA	P	P	P	P
Impacts Particular to Social Well-Being	P	P	P	P	P	P

CA: Currently Assessed P: Proposed

*A separate accounting is needed for each public.

respect to the other objectives, recognizing that for some impacts and some objectives the consequences will be nil. Thus, a given economic impact, which in the efficiency criterion is evaluated in terms of its aggregate national effects, would be considered within the material equity column in terms of its impacts for each of several groups. For instance, a total benefit of 1000 might represent a benefit of 500 for each of two groups and nil effect for other groups. Or a benefit of 1000 might represent a benefit of 2000 for one group and a cost of 1000 to another. Separate accounts are needed for each public.

Each of the various impacts should be evaluated by each of the criteria, and each of these effects should be disaggregated or unfolded for each of the groups affected. Thus a particular impact might be economically efficient, ecologically nil, negative from the point of view of equity, positive but inequitable from an aesthetic point of view and so forth.

The particular objectives listed under Social Well-Being are illustrative. They include a consensual but tentative listing of material or income equity, mental health or psychological criteria, aesthetic criteria, regional patterns from the perspective of efficiency and amenity, and governance.