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IT IS becoming increasingly evident that, in most regions of the country, the demand for water is fast outstripping its supply at existing prices. This is particularly true in the Western states, where population growth, urbanization, Indian claims, energy development, and concern for the protection of wildlife and natural environments threaten to upset established patterns of water use, which traditionally have been heavily weighted in favor of irrigation.¹

In the face of these problems, many analysts and decision-makers have concluded that what is required is expanded federal and state involvement in the planning and management of entire river systems. Public policies should be designed to conserve water and allocate it fairly and efficiently among competing uses so as to maximize social value. Federal and state plans must establish "trade-offs" among alternative water uses that reflect the costs and benefits of each alternative to society. On the basis of these calculations, water would be allocated in pre-determined proportions to economic sectors according to some vision of the "public interest." Regulations, taxes, prohibitions, zoning, cost-sharing incentives, and related public policies would be used to secure compliance with the plans.²

Typical of this approach is an article by Ackermann et al., "Scientific and Technological Considerations in Water Resource Policy."³ This article is a condensed version of a report made by the Office of Science and Technology Policy (OSTP) to the President's Policy Committee for the Water Resources Policy Study. The aims of the report are to "bring into focus the technical and scientific considerations in water policy, including some technical aspects of organizational management for problem solving" and "to identify the research directions that address particularly important gaps in our current knowledge."⁴ The following statements indicate how the authors conceptualize water problems and how they propose these problems should be dealt with institutionally:⁵

Most important domestic problems faced in the United States today are affected by policies for the management of our water resources. . . . Often there is too much or too little management, or it occurs in the wrong place, at the wrong time, or in the wrong way to serve the many demands. The combination of all these inadequacies constitutes what is generally referred to as "the water problem."

NOTE: The first draft of this paper was prepared for presentation before a seminar on "Scientific and Institutional Considerations in Water Resource Policy Decisions," jointly sponsored by the National Science Foundation and the American Academy for the Advancement of Science, Austin, Texas, February 26-27, 1979. The Director of the seminar was Yacov Y. Haimen, Professor of Systems Engineering and Civil Engineering at Case Western Reserve University. I wish to acknowledge the graciousness with which Professor Haimen took the criticisms which this paper makes of his ideas on water resources planning. I also wish to thank Mrs. Janet Garcia of the Government Department at New Mexico State University for typing the manuscript on very short notice.

¹ On water issues in the West, see Dean E. Mann, "Water Planning in the Colorado River Basin States: Challenges and Prospects," paper delivered before the annual meeting of the Western Political Science Association, Los Angeles, California, March 16-18, 1978.

² On state planning efforts, see *ibid.*, pp. 15-35.

³ William C. Ackermann et al., "Scientific and Technological Considerations in Water Resources Policy," *EOS Transactions of the American Geophysical Union* 59 (June 1978): 516-27.

⁴ *Ibid.*, p. 517.

⁵ The quotations are taken from *ibid.*, pp. 516, 517, 518, 519, 520, 522, 524, and 526.

The nation can expect to experience from time to time local severe water shortages.

Greater efforts are required in floodplain planning to integrate land use management with the design of storage structures.

As a matter of policy, federal water agencies should . . . expand experimentation that . . . will encourage the appropriate use of high-risk floodplain lands.

Drought planning should be a continuing priority at appropriate national, state and local levels.

Plans for allocating or reallocating the available supply with due regard for adjustments in water property rights involved should be prepared, and effective conservation practices, to be employed when drought reserves are inadequate, should be developed.

Where surface and groundwater supplies are interrelated and where it is hydrologically indicated, maximum beneficial use of the combined resource should be accomplished. Laws and regulations authorizing or requiring users to substitute one source of supply for the other should be provided.

Pollution control regulations and criteria for riverine systems should be developed. . . .

New attention should be given through regional planning to balancing energy-related water demand with the demands on water supply by agriculture and other uses. Planners should consider economic, environmental, social, local, regional, and national goals in the short, intermediate, and long term.

Studies should be conducted to improve and make more effective the river basin planning process.

Conservation should be encouraged in both the water and the energy program.

Basin planning has had some modest success in technical analysis and at the inter-agency levels. . . . The challenge is to design regional management institutions that overcome the barriers that have existed in the past.

This paper takes issue with the institutional recommendations made by Ackermann et al. It argues that their proposals for increased public planning and management of water resources are unsound because they are grounded in faulty planning theory. This theory ignores the individualist nature of social relationships and neglects the role which markets play in allocating resources to competing uses according to a single measure of value: the market price. Planning is defined and its roles in business and government are contrasted. It is shown that in the business world, planning is micro-oriented while in government it is concerned with macro characteristics of collective entities. The impossibility of allocating resources efficiently without market exchange is demonstrated. The paper concludes with a plea for *less*, not more public involvement in water planning.

I

Planning is a continuous adjustment of resources to competing intra- and inter-temporal social and economic opportunities. It reflects a rational process of calculation by which individuals seek to maximize the expected value from a given set of resources. Planning presupposes knowledge about the relative values which resources yield in different uses. Only those who earn income from resources, such as their owners and users, have the incentives to obtain this knowledge.

Owners or users of resources, however, are not necessarily experts at planning. While they alone know how much they value the resources under their control, they usually find it helpful to contract the services of planners who can advise them how to allocate the resources among economic alternatives. This is made possible when

resource owners or users adopt a convenient measure, such as the rate of interest, to evaluate the various uses to which the resources can be put.

This is exactly what takes place in the market economy. Owners and users of resources hire business planners or financial consultants to help them manage their resources. Thus, business planners are employed by corporation managers, banks, investors, businessmen, entrepreneurs and others who own or lease property rights to private resources. The success of this type of planning is a function of how much additional utility (usually measured in money) the planner can generate for his client. Planners who succeed will be in high demand and those who do not have no choice but to exit the profession or find some other means of employment, such as working for a government planning agency or department. It should be clear that this type of planning, which I will label financial consulting, is strictly micro-oriented, i.e., it is concerned only with the welfare of individual firms and clients.

II

There is, however, another type of planning whose aims are not the welfare of the individual firm, but of a collective entity, such as "society," the "public interest," the "common good," etc. Such entities, of course, are invisible and there appears to be no way of determining their physical existence or even monitoring how well they are doing. Some heretical social scientists — usually economists — deny that they exist at all. These non-believers argue that terms like "society" are simply labels for complex networks of interactions among individuals and have no independent existence over and above the individuals who exist in organized life.⁶

Macro-planners, whom I will call simply planners as opposed to financial consultants, profess to believe that something beyond mere individuals does exist "out there" for whom they must plan. Their client is "society" or the "public interest," not an individual or a firm. Thus, the interests of the latter must be ignored if not sacrificed for the benefit of the former. But whether collective entities exist or not, and however indeterminate are the effects of the planner's efforts on their welfare, planning policies do have clear, observable impacts on the lives and property of identifiable, discrete individual persons. These are the living entities who occupy physical space and exercise authority in the systems with which the planner is concerned. They are the ones who win or lose from the allocations and reallocations of resources the planner incorporates in his plans; consequently, they are the ones who support or oppose his schemes. In contrast, the "social welfare" is never heard from.

Because he deliberately tries to plan for an entity over and beyond mere individuals, the planner fails to conceptualize the institutional complexity of the system or area under his jurisdiction. Haimes' water and land resources planning model, for example, assumes that a sub-river basin can be treated as "essentially one large farm."⁷ This is not atypical. Planners usually proceed as if ownership and authority over vast areas were held in common and ruled by a single body of government officials and "public spirited citizens."

However, the institutional system of a river basin is not one large farm but a complex network of social relations which involve private property, common ownership, markets, elections, campaigns, interest group pressures, government commands, crime, and corruption. The Maumee River Basin with which Haimes is

⁶ Murray Rothbard, *Man, Economy and State* (New York: Van Nostrand, 1962), p. 71, and Ludwig von Mises, *Human Action* (New Haven: Yale University Press, 1949) pp. 143-53.

⁷ Yacov Y. Haimes, "Water and Land Resources Planning," forthcoming in Y. Y. Haimes and P. Laconte, eds., *Water Resources and Land Use Planning* (NATO Advanced Study Institute, 1979). The reference is to a mimeo copy of the chapter, p. 16.

concerned, for example, encompasses three state governments, dozens if not hundreds of local governments, the regional offices of several national agencies, many interest groups divided into factions, and millions of property owners.⁸ Thus, it should come as no surprise when plans conceived on the basis of the "single farm" idea meet rejection, sometimes with ridicule and others with fury, and are not implemented as conceived by the planners. Haimes writes about an institutional "gap" between planning and implementation.⁹ Given the radical changes in property rights and the distribution of public authority which most "comprehensive plans" contemplate, the failure of these plans to find political acceptance is understandable. Yet, whereas in the business world the impossibility of implementing a plan would be considered a failure of the planner, in government the opposite is true. The inability of planners to get their schemes approved is viewed as the result of "narrow selfish interests" who conspire with "weak-kneed" politicians to undermine the "public good."

III

The basic problem with macro-planning is that the theories on which it is based are fundamentally flawed. A plan designed to maximize the welfare of a collective entity is not only difficult to implement in practice — it is impossible to construct. This is because the calculation of the relative values of resources which a plan has to incorporate is impossible to undertake by an individual or a group. These values can only be found when the owners or users of resources exchange them in a market. They cannot be determined independently of those transactions.¹⁰

Recall that a business planner or financial consultant succeeds to the extent that he makes money for his clients. This is because resource owners and users find money to be a convenient measure of the utility which *they*, not the planners, derive from the resources. But in government, planners operate under the illusion that the value of resources they plan for is to be determined, not by the private choices of individuals, but by some collective process only they appear to understand. Out of touch with the owners of property, the planner has no idea of the total, let alone the relative value of the resources he arranges and re-arranges in his plans. Nobody could possibly know the former, and the latter can only be revealed by observing the prices at which resources are traded in a market. Complex mathematical "trade-off" formulas are useless unless they accurately reflect the choices and opportunities which individuals confront in the market. No group of "decision-makers" can ever possibly simulate this process. All they can do is determine how they would choose *if* they owned the resources. The point, however, is that they don't. Since they do not own the resources, they lack the incentives to discover their relative values. But without such knowledge, how can the value of these resources to anyone be maximized?

In the market, resources are traded by their owners and users, and such "trade-offs" produce a structure of relative prices. Such prices in turn regulate the quantity demanded of, say, water, regardless of the use to which the water is put. The higher the price, the lower the quantity of water demanded. Also, the higher the price, the higher the marginal value of the uses to which water is put. Whose marginal values? The values of the owners and users of water. Hence, ignoring

⁸ Great Lakes Basin Commission, *Maumee River Basin Study. Environmental Impact Statement* (Ann Arbor, Michigan; 1977).

⁹ Haimes, "Water and Land Resources Planning," pp. 13 and 16.

¹⁰ See the essays by Ludwig von Mises and F. A. Hayek in Hayek, ed., *Collectivist Economic Planning* (London: Routledge, 1935); Paul Craig Roberts, *Alienation and the Soviet Economy* (Albuquerque: University of New Mexico Press), Chapter 5 and pp. 66-69. See also V. O. Key, "The Lack of a Budgetary Theory," *American Political Science Review* 34 (December 1940): 1137-44.

externalities, a market price insures that water resources flow into the production of those goods and services which have the highest value.¹¹ The resulting distribution of water resources maximizes social utility, not a utility perceived by an independent "collective" entity but rather by living human beings who choose the purposes for which water is to be used.

Planners such as Ackermann et al. are aware that the quantity of water demanded is not fixed but varies according to its price:

The potential for meeting future water needs by adjusting our levels of water use seems great, if not well understood. Households seem to use very different amounts, depending upon relative cost and availability; the range of state averages per capita domestic use is from 100 to 300 gal. per day. And there is a wide range of water use per unit of output in almost every industry, particularly among those considered heavy water users. . . . In sum, opportunities for demand management exist. . . .¹²

While Ackermann et al. recognize that price affects the amount of water used by individuals, they studiously avoid using the term "price" and speak only of "cost." One may surmise that this is because price is exclusively a *market signal* which reflects the interaction of demand and supply. The laws of supply and demand are well understood. But admitting that only price can adjust demand to competing water uses would undermine the theoretical validity of collectivist planning. As I have tried to show, such planning is flawed and the relative proportions of water thereby allocated are a reflection either of the arbitrary choices of planners without knowledge about relative values, or of equally arbitrary choices of politicians who respond to the pressures of support and opposition.¹³

As Ackermann et al. indicate, the "water problem" is not one of insufficient physical supply of water; it is a problem of inefficient use of the water that is available. Such inefficiency is, more often than not, the result of public policy itself. Federal irrigation projects have been extremely wasteful of water in precisely those areas where it is least abundant — the arid and semi-arid West. These projects were designed to supply "low-cost" water to farmers and agri-business companies for irrigation purposes. Yet, public policy cannot, by itself, reduce the cost of anything. All it has done is to reduce the amount which a privileged few pay to get a resource taken out of the market by command. By so doing, the water has been allocated to uses of such low marginal value that most of it is wasted:

Of the water stored or diverted for irrigation, less than half reaches the intended crops. The Department of Agriculture estimates that average off-farm loss is about 22% and the on-farm loss, which includes some ditch losses, is about 37% for a total of 59% lost. Some of these losses are ascribed to evaporation and weeds, but in large measure they result from unlined conveyance channels. Of the 14,323 miles of canals operated by the Bureau of Reclamation, 85% are unlined. Of the 34,294 miles of laterals, 68% are unlined.

On the basis of the best present cost estimates, an improvement in farm irrigation efficiency from 50% to 80% can be achieved in many cases at an equivalent annual cost of about 40 dollars/acre of farmland. . . . In

¹¹ If all resources were privately owned and a judicial system functioned efficiently, externalities would not be a problem. Anyone who imposed costs on third parties would be exposed to judicial sanctions, including class-action suits. See Rothbard, *Man, Economy and State*, p. 156, von Mises, *Human Action*, pp. 651–56, and Douglas C. North and Roger LeRoy Miller, *The Economics of Public Issues* (New York: Harper and Row, 1978), Chapters 19, 20 and 21.

¹² Ackermann et al., "Scientific Considerations," p. 525.

¹³ On support and opposition, see Philip Monypenny, "Federal Grants-in-Aid to State Governments: A Political Analysis," *National Tax Journal* 13 (March 1960): 12–16. See also Alfred G. Cuzán, "Political Profit," paper presented before the annual meeting of the Public Choice Society, Charleston, South Carolina, March 17–19, 1979.

most cases, however, conservation efforts by an individual farmer cannot be justified on narrow economic grounds.¹⁴

It is not, however, "narrow economic grounds" which maintain wasteful water practices but federal policy, a policy which commands the allocation of water to politically influential groups whose support elected officials use to secure and stay in office. It must be emphasized that what the federal government has done in relation to irrigation water is to supply it at an artificially low price to a group of privileged users. The cost of such a policy is the value which the water would yield if put to alternative uses. Energy companies, for example, are willing to pay substantially more for the water than irrigation interests.¹⁵ This reflects the higher economic value which the water has in the production of fuel than in growing crops. If public policy had not become involved in the "management" of water resources in the interests of specific agricultural groups, water would have been transferred between these two uses long ago. If markets, rather than politics, had been responsible for allocating water among competing uses in the West, the water would have flowed to its most valued uses and on average we would be better off economically as a result.

Under-pricing of water to low marginal-value users is not the only failure of water management policies. For decades the federal government has been engaged in floodplain "management" designed to minimize the economic losses from floods. It has done this by subsidizing flood insurance and pouring "disaster relief" money into areas ravaged by floods. Such policies have actually encouraged building and development on the floodplain.¹⁶ In fact, in some cases they have probably made it profitable for people to suffer flood losses. Ackermann et al. recognize that other policies have established "improper incentives" which have aggravated erosion and sedimentation.¹⁷ They also acknowledge that "planners for river basins and other geographic units have not always been able to balance the need for water in energy production with other uses of the water resources. Conservation measures have also not been adequately considered."¹⁸ Moreover, river basin planning has not achieved what was hoped for it in the past.¹⁹ Yet, these failures apparently indicate to Ackermann et al. that ever-more comprehensive planning and management is called for. But, in the absence of contrary evidence, would we not be justified in projecting ever-greater policy disasters in water-resource allocation if their proposals are heeded?

IV

What is needed for the efficient allocation of water resources in the U.S. is not greater public planning but better functioning markets. Markets, however, do not operate properly unless property rights are well defined, secure and transferable.²⁰ Unfortunately, water law is defective in this regard:

There are major institutional factors which determine the availability of water for energy production. In the West a set of laws, treaties and compacts control the manner in which water is used. In the East the major

¹⁴ Ackermann et al., "Scientific Considerations," pp. 520-21.

¹⁵ Mann quotes Governor Richard Lamm of Colorado as having said that he wants to make sure "that energy water at \$200 per acre-foot doesn't dry up agriculture water at \$20 per acre-foot." See "Water Planning in the Colorado River States," p. 31.

¹⁶ Charles Schultze, *The Politics and Economics of Public Spending* (Washington, D.C.: The Brookings Institution, 1968) pp. 107-110.

¹⁷ Ackermann et al., "Scientific Considerations," p. 522.

¹⁸ *Ibid.*, pp. 523-24.

¹⁹ *Ibid.*, p. 526.

²⁰ J. W. Milliman, "Water Law and Private Decision-Making: A Critique," *Journal of Law and Economics* 2 (October 1959): 46-57.

problem is with existing riparian laws which do not provide for the allocation of limited supplies among competing users. Under the eastern water law it is difficult to give the legal assurances of water availability that are a prerequisite for investment in an energy plant.

State laws should recognize and take account of the substantial interrelation of surface water and ground water. Rights in both sources of supply should be integrated, and uses should be administered and managed conjunctively. There should not be separate codifications of surface water law and groundwater; the law of waters should be a single integrated body of jurisprudence.²¹

A privatization of water resources, then, should be the first order of business. Water rights should be owned by private individuals and corporations and treated just like any other privately owned resource. Government should get out of the allocation process and simply enforce water rights. Since water is characterized by complex interdependencies, this is itself a formidable task which requires imaginative application of technology, law and politics.²² But once private property over water resources has been established and is secure from political re-allocations, markets will efficiently allocate the available supply to those uses in which they yield the most value. This neither state nor federal "management" could ever accomplish.

²¹ Ackermann et al., "Scientific Considerations," pp. 523 and 520.

²² Jack Hirshleifer, James C. De Haven and Jerome W. Milliman, *Water Supply* (Chicago: University of Chicago Press, 1960), Chapters 1, 3, 9 and 12; Willis H. Ellis, "Water Transfer Problems: Law," in Allen V. Kneese and Stephen C. Smith, *Water Research* (Baltimore: Johns Hopkins Press, 1966), pp. 233-48. For additional applications of property rights and markets to other natural resources see Scott Gordon, "Economics and the Conservation Question," *Journal of Law and Economics* 1 (October 1958): 110-21 and Garret Hardin and John Baden, *Managing the Commons* (San Francisco: Freeman, 1977), especially Part III. For a less enthusiastic view of property rights and markets in water see L. M. Hartman and Don Seastone, *Water Transfers: Economic Efficiency and Alternative Institutions* (Baltimore: Johns Hopkins Press, 1970).