

## CHAPTER 8

# SOCIETY AND CONSERVATION

### SOCIAL AND INDIVIDUAL RETURNS

#### *Social Time Preference and Conservation*

If we assume that individual freedom and initiative are desirable, then social action which limits individual action, either by removing part of his income by taxation or affecting his actions as a producer or consumer, should be justified by rational arguments which clearly reveal the necessity of social action and the basic causes of the condition to be remedied. Regarding conservation Pigou has stated:

“There is wide agreement that the State should protect the interests of the future *in some degree* against the effects of our irrational discounting, and of our preference for ourselves over our descendents. The whole movement for ‘conservation’ in the United States is based upon this conviction. It is the clear duty of Government, which is the trustee for unborn generations as well as for its present citizens, to watch over, and if need be, by legislative enactment, to defend the exhaustible natural resources of the country from rash and reckless spoilation.”<sup>1</sup>

With such a general statement few will disagree except to point out that under democracy the “State,” in considering the future generations, reflects the value judgments of the individuals comprising it. Hence it is not in opposition to the individual but reflects those values, which the individual alone can not attain, but which are desired by the majority. The individual often thinks in terms of the “good society”

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<sup>1</sup> *The Economics of Welfare*, *op. cit.*, p. 29.

but lives under institutional arrangements that make his own voluntary actions to achieve the desired end inadequate. Most citizens believe in national defense, but few individuals send small personal cheques to the treasury to buy munitions because of the futility of such actions. They know from experience that not many will act that way, and they prefer to support legislation that will be effective by taxing everyone. Society's reflection of individual value judgments which conflict with their actions as individuals has been interpreted by many conservationists to reflect a difference between social and individual time preference, and this has been used as a blanket rationalization of why society needs to act to conserve our resources. In a previous publication the author has pointed out that this concept obscures rather than clarifies the issues, and outlined some of the conditions under which social action to achieve conservation is justified.<sup>2</sup>

The major objections to using a difference in time preference between society and the individual as a justification for social action may be summarized as follows:

(1) It establishes a universal cause of exploitation, and this obscures rather than reveals the real causes which may be very specific and far removed from a philosophic and moral generalization. If, for example, we say that individual exploitation of southern cotton soils is more rapid than is desirable for society because the individual's time preference (his preference for goods now rather than in the future) is greater than social time preference, we may fail to ask whether there are other reasons why individual exploitation is too rapid and neglect to analyze the basic causes of the divergence between social and private interests. The real causes may be insecurity of tenure, lack of capital, custom, or a population density

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<sup>2</sup>Arthur C. Bunce, "Time Preference and Conservation," *Jour. Farm Econ.*, Vol. XXII, No. 3, August, 1940.

that is too great to maintain the level of living without disinvestment.

(2) Because the real causes of exploitation are obscured, public expenditures to control it may be unrelated to them and result in wasteful and unnecessary controls that may conflict with other social ends. Again referring to the exploitation of southern cotton lands, social action to induce conservation may be unrelated to the basic causes if it is undertaken on the assumption that it is necessary because of a difference in time preference between society and the individual. Instead of tenure reforms or supervised migration, subsidies or coercion might be used; subsidies might entrench a policy of permanently subsidizing a maladjusted area, while coercion might still further lower the social status of a depressed population and retard the development of new managerial skills and initiative. Before studying causes we must also analyze the effect of conservation on family income and relate this to the social benefits that will result in order to determine whether there is a real conflict between individual and social interests.

(3) Under most formulations of social time preference, no limits to public action can be established. All exploitation becomes anti-social, and the possibility of making any rational allocation of resources is destroyed. This is probably the greatest weakness of the social time preference arguments. Only if we use an interest rate can we evaluate expenditures or returns in the present with those expected in the future. Society, as well as the individual, has to choose between alternatives existing in time, and some rate of discount must be used. For most public expenditures the current interest rate on government bonds appears to be the logical one to use in social accounting. This enables us to estimate the present worth of expected future returns or, conversely, the future value of present expenditures. Many social expenditures are for intangible ends that cannot be measured in

monetary terms. This kind of expenditure simply represents social consumption and cannot be classed as economic or uneconomic in terms of a productive norm. The expenditure is made to supply a want, and where the results of two expenditures are separated in time, the use of interest charges simply provides us with a more accurate "price" of the two alternatives so that a more rational choice can be made.

The time preference of an individual will not affect his production plans, providing that he can borrow. If his time preference is higher than the rate of interest he will borrow, and if it is less he will save. When credit is not available he may be forced to liquidate the soil resources in order to supply urgent present needs. The basic cause of uneconomic exploitation under such circumstances is the lack of credit. Similarly, extremely high interest rates resulting from monopoly controls or other causes may cause an individual to exploit his soil resources rather than borrow. Both these conditions result in divergence between individual and social net returns and are discussed in more detail later.

Where the concept of a difference between social and individual time preference is used only to denote a difference in the interest rates at which the individual and society can borrow, the term differential interest rates is preferable; interest rates then can be included in the more general category of differences in prices available to the individual and society. Where social time preference is used in an intangible sense or to represent a zero rate of interest, it simply obscures the issues and makes social accounting impossible.

#### *The Conditions Under Which Private and Social Net Returns Coincide*

Rejection of the social time preference concept does not mean that social and private net returns coincide. They seldom do, and in previous chapters we have seen the com-

plexity of the problems of adjustment as well as the difficulties the individual faces in knowing when conservation becomes economic. If we contrast the conditions necessary for individual and social net returns to coincide with the conditions that actually prevail, the diversity of the causes of difference may be readily perceived. The essential conditions of harmony may be summarized under four headings:

(1) There must be equality of knowledge between the individual and the specialized groups providing information for the organization representing society as a whole, particularly with reference to future trends. This must also include knowledge of social costs and benefits.

(2) This knowledge must be adequately reflected in present prices determined under pure competition, the individual must be price responsive in his economic activities, and all significant costs and benefits must impinge on the individual.

(3) The intangible ends desired by the individual must be the same as those of society as a whole, and the ends must be attainable by individual action.

(4) There must be fluidity in the possibilities of altering the combination of factors of production so that adjustments in the proportions used may easily be attained in response to changes in prices, costs, and expectations.

In our present economic and social order, however, these basic requirements for an identity of social and individual interests are seldom, if ever, met. In the case of soil deterioration, for example, farmers are often not aware of the fact that erosion is destroying the soil assets, particularly if it is confined to sheet erosion. They treat net income as if it were net returns and make no allowance for the loss in the value of the land. Even if they realize the importance of erosion, they may not know the best methods of control nor the best available alternatives. Similarly, society may have information regarding other social costs resulting from erosion, such

as flood damage, silting of rivers and reservoirs, and costs of relief or resettlement of stranded populations in areas where the land can no longer maintain its present population. In this case the individual cannot calculate any of these costs because they do not bear directly upon him, and where he does not pay them, he would not adjust to them even though he might be aware of them. Apart from information on present conditions, society may be able to make better estimates of probable trends in the future because of its greater technical knowledge available through specialists.

For example, population specialists can estimate fairly accurately the probable population growth over the next decade, given the census data and immigration regulations, and can anticipate the expansion in domestic demand for food products. This and similar information may be available to individuals, but it will affect their behavior as producers only when it is adequately reflected in present and expected prices which form the framework within which production plans are made, usually on expectations confined to a relatively short period of time.

Society, through its legislative actions, also affects the conditions or institutional framework within which the individual formulates plans, and can, therefore, increase or decrease the element of uncertainty attached to individual actions. A law giving security of occupancy, compensation for unexhausted improvements, and compensation for disturbance would change the expectations and attitudes of tenants so that the risks of long-time plans involving liming, legumes, and livestock would be greatly reduced. Similarly, policies affecting trade conditions and prices, particularly in the international field, may increase or decrease individual risks and change the relationship between individual and social interests. Partly because of its control over the institutional conditions, society may also carry risks that would not

be borne by any private individual or corporation when the expectations of profits are small. This is particularly true of very large capital expenditures for such things as canals, large power dams, irrigation projects, and bridges. Private owners of capital cannot be permitted to pass these risks on to each individual in the society through taxation or the control of prices while the government can use these means of sharing or reducing risks.

An obvious deficiency of the necessity of competitive prices mentioned above is the fact that prices are market prices and not long-run "normal" prices. They tend to reflect more immediate factors and may move a long way from the normal level. This has been particularly true of land values. In many cases prices, including interest rates, are not fully competitive and do not accurately reflect future expectations even where these are known. Furthermore, much of the behavior of individuals is not price responsive.<sup>3</sup>

When we analyze the problem of intangible values, an even more difficult task faces us. Value judgments vary widely between individuals, and to assume harmony between all individuals and the abstract entity of the state seems impossible. At the same time, under democracy, the intangible values desired by the majority of the people tend to coincide with those of their representative government. In regard to natural resources the majority may consider that some reserves for future eventualities should be maintained even when there is no apparent long-time economic justification (such as an expected fall in the rate of interest due to capital accretions or an expected increase in population) for such conservation. Conservation in this case may be looked upon as a form

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<sup>3</sup>See the discussion of periods of production by J. R. Hicks in *Value and Capital*, Oxford University Press, 1938, Chap. XVII, p. 226. He states, "In a state of grave mistrust, people will 'live from hand to mouth'; if they do so, changes in the rate of interest (the moderate changes we are talking about) can have little influence on their conduct."

of insurance against technological changes which may or may not take place. For example, society might decide that selective logging on a permanent yield basis must be adopted in order to maintain lumber resources for future generations. If we assume that at the time the decision was made, prices and interest rates were such that rapid exploitation was the most economic practice, then conservation would mean a lower level of living for the present due to higher costs of lumber (or a lower rate of capital accumulation) and a possibly higher standard of living for the future generations than would otherwise obtain. If, however, technological changes should make it possible to grow slash pine in the southern states and produce moulded pulpwood more cheaply than ordinary board lumber from mature trees, the result of this attempt to protect the resources for future use would be a lower standard of living in the present with the maintenance of forest resources that declined in value as a result of technological changes.<sup>4</sup>

Where an intangible end is desired by the majority in a democratic society, there may be a direct conflict of interests between the government and any minority opposed to the policies. Where the minority is large, opposition and mass evasion of control measures may be so great that the law is either repealed or not put into effective action. For this reason the actions of society through its government cannot deviate very widely from the rather generally accepted values of the people as a whole. Where the opposition is confined to a small number, coercion may be successful, or where the opposition is caused by a minority bearing economic losses, compensation may be used. In formulating public policy for conservation, these conflicts must be considered in order to devise the best means of attaining the desired end.

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<sup>4</sup>At the same time society as a whole may reap great benefits from the forests for recreational or flood control purposes. These might not accrue to the individual owner but would be important considerations affecting public policy.



With regard to flexibility in the combination of the factors of production, we have seen that many institutional factors prevent adjustments from taking place easily, particularly at the extensive margins of arable farming; farm size is not easily adjusted, and farm population is relatively immobile; similarly, tax systems and conditions of tenure may seriously obstruct adjustment. All these conditions are important to a realistic analysis of the causes of divergence between individual and social interest.

*Conditions Under Which Social Action to Achieve  
Conservation Is Desirable*

The very complexity of the situation makes any examination of the reasons why social action to achieve conservation is necessary and desirable extremely difficult, but only as we understand these reasons can we determine the most appropriate means of achieving the desired end. In broad terms social action to achieve conservation is desirable:

(1) When it would be economic for the individual entrepreneur to conserve but he does not;

(2) When conservation is not economic for the individual but is economic for society; and

(3) When intangible ends desired by the majority of individuals in a democracy can be attained only by collective action. A complete analysis of these conditions and relationships involves the entire contents of this publication, and many of the points presented in the following sections draw upon previous discussions.

CRITERIA OF SOCIAL ACTION WHEN CONSERVATION  
IS ECONOMIC TO THE INDIVIDUAL

Social action to achieve conservation, when it is economic for the individual to do so, is obviously justified on the basis that it will increase both individual and social net returns.

The major problem is to determine how much should be expended, what methods should be used, and what criteria are available to determine whether conservation is economic or not.

The distinction between deterioration and depletion is important in determining the quantity of funds that should be expended by society to eliminate what is essentially waste. In the case of fertility depletion, society might well expend funds so long as they were effective in increasing the social net income. In an emergency such expenditures may be essential in order to best utilize our resources, but in more normal times the difficulties of measuring the effectiveness of expenditures in achieving their objective would limit the scope of social action to education and possibly subsidies for specific improvements. The use of coercion could hardly be justified unless a serious crisis arose. To develop an effective program, the causes of uneconomic depletion should be fully diagnosed in order that the most appropriate action may be taken. But even if society takes no action, any resulting depletion losses will not permanently impair future returns.

In the case of uneconomic exploitation which results in soil deterioration, not only present net returns but future net returns are reduced and an irreplaceable destruction of capital assets occurs. Society is justified in making expenditures to prevent such permanent capital losses as well as the loss in current net income. In actual practice it is impossible to distinguish between depletion and deterioration when both occur together, but the distinction is analytically useful in determining the areas in which social action is most urgent. Where soil deterioration is occurring public action to eliminate it may have to be more drastic than that which would be justified to deal only with fertility depletion. Coercion of minorities through land use regulations, zoning ordinances, subsidies, and even government-directed migration may be

necessary in order to eliminate the social losses resulting from individual actions.

Public policy and action can be formulated, however, only as we understand the basic reasons why individuals continue an exploitive system *when it is not economic* for them to do so and results in lower net returns than could be obtained from a conservation system. Some of the more obvious causes are outlined below, but more information is needed to determine the relative importance of each of these causes of exploitation in various regions of the United States.

### *Custom and Individual Adjustments*

Custom is one of the important factors determining human actions particularly in relationship to consumption. In industrial production its importance has rapidly declined with the introduction of machinery and rapid technological change. To some extent the same change has occurred in agriculture with the advent of farm machinery, and farm operators are more price responsive in an agriculture which is largely commercial in nature. The development of more price responsive action in farming has not, however, been equally rapid in all areas, and customary methods which are uneconomic and destructive may persist over long periods of time. It is extremely difficult to distinguish the relationship between the dominance of custom and inertia or resistance to change. Even though the operator may realize that his present farm operations are damaging his soil and that a change might make it possible to conserve his soil and increase or maintain his income, he may continue his present system because the benefits seem insignificant compared to the "effort" involved. In many cases yields could be improved and erosion decreased by simply adopting a better rotation and working the land on the contour. Once established the new system may require less labor and permit the same crops to be grown; but the

fact that fences have to be changed and new methods adopted seems to act as a barrier that prevents these adjustments from taking place. In some areas exploitive methods of farming developed when the land was rich in virgin fertility, and a system which was originally economic became uneconomic as the fertility declined; but exploitation has continued because the system which first developed, and the institutional patterns associated with it, act as resistances to change.

### *Lack of Knowledge and Individual Adjustments*

Lack of knowledge is also an important factor associated with uneconomic exploitation and takes many forms. Farmers have not been aware that the productivity of their farms has been decreasing. Improvements in varieties and techniques of management have obscured declines in yields, and many studies indicate that if fertility had been maintained present yields would be much higher than they are. Sheet erosion has been particularly insidious and, as has been reported in a previous study,<sup>5</sup> many farmers were not aware that erosion was taking place until gullies developed and interfered with farming operations. A further factor obscuring the decrease in soil productivity has been the upward trend of land values from 1900 to 1920 during which period, for the United States as a whole, they doubled each decade. These increases in value tended to offset any decline in value which should have taken place as the fertility was removed; at the same time the higher land values tended to make the capital loss from exploitation larger and, therefore, should have made it more economic to conserve the soil.

Although some farmers recognized that their soil was deteriorating, they did not know the steps that should be taken to prevent or reduce it. One of the great advantages of the

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<sup>5</sup>Arthur C. Bunce, *The Farmer Looks at Soil Conservation in Southern Iowa*, Ia. Agr. Exp. Sta., Bul. 381, 1939.

Soil Conservation Demonstration Areas has been that they have not only "demonstrated" but also "tested" many conservation practices, and their usefulness in this direction may be even more important as time passes. Even today we are not fully informed as to the best possible methods of conserving all our various soil types.

A still more intricate problem of knowledge develops when we consider the information necessary to decide whether conservation is economic or not. The operator would have to know the size of the annual capital loss and the net income from the conserving system as well as the exploiting system. This involves a complete farm budget analysis, and in reality, few farmers have the necessary facts to make these estimates. Exploitation, therefore, may continue although a careful analysis might reveal that a conservation system would be much more economic.

### *Insecurity of Tenure and Individual Adjustments*

Insecurity of tenure may encourage uneconomic exploitation by creating conditions which prevent the establishment of a system of farming which would conserve the soil. The change to a conserving system, for example, might involve an increase in pasture and meadow and an increase in the roughage-consuming animals; these, in many cases, need a production period of several years, and uncertainty of tenure creates an added risk which must be borne by the operator. Where the investment of capital is involved, uncertainty is a major factor affecting individual actions. Similarly, lack of any provisions for compensation for unexhausted improvements reacts against a long-time plan of land use involving liming, fertilization, and legume production.<sup>6</sup>

<sup>6</sup> For some empirical studies dealing with this problem, see *Economic Phases of Erosion Control in Southern Iowa and Northern Missouri*, by Schickele, Himmel, and Hurd, Ia. Agr. Exp. Sta., Bul. 333, 1935; and also *Socio-Economic Phases of Soil Conservation in the Tarkio Creek Area*, by Schickele and Himmel, Ia. Agr. Exp. Sta., Res. Bul. 241, 1938.

*Rationing of Credit and Individual Adjustments*

Rationing of credit by various credit agencies may cause uneconomic exploitation to continue by withholding credit for either urgent personal needs (such as education of children, etc.) or for productive livestock capable of using more roughage. This may occur either by maintaining a high rate of interest or by outright limitation of loans. In the case of the loans for urgent personal expenditures, an uneconomic disinvestment may result because of the inability of the individual to relate his time preference to the interest rate by borrowing. In the case of production loans a high rate of interest or rationing may prevent the individual from adjusting his farming to a more profitable and more conservational system.

The four factors outlined above do not exhaust the causes of uneconomic exploitation. There are many others: fluctuations in prices may introduce a further element of uncertainty in investments, and farm size may be an important factor in some areas because the unit of operation may be too small to provide the necessary level of living without disinvestment.

*Conclusions*

Where exploitation that is uneconomic to the individual occurs, society is justified in initiating action to eliminate it, but the action taken should relate directly to the basic causes operating in any given area. If tenure is uncertain or credit not available, then tenancy legislation or credit expansion may be the soundest method of attacking the problem. If lack of knowledge is a major cause then demonstration and education are most appropriate. If inertia and custom are major factors then either subsidies or coercion might be necessary. It is obvious that there are wide differences between regions in the United States, and any comprehensive

attempt to establish conservation should be based upon information regarding the causes of uneconomic exploitation in the various regions, and areas with regions.

Where exploitation is uneconomic to the individual and also results in other social losses, the case for social action is strengthened. The next section deals only with the case where there is a conflict between individual and social interests because exploitation is economic for the individual but not for society. All of the causes of this divergence in interest also apply to the case where exploitation is uneconomic to the individual, but they are discussed separately in the next section in order to avoid duplication. Where exploitation is uneconomic to the individual, its elimination is advantageous both to the individual and to society; where exploitation remains economic to the individual there is a direct conflict of interests, and the problems of social control are intensified.

#### CRITERIA OF SOCIAL ACTION WHEN EXPLOITATION IS ECONOMIC TO THE INDIVIDUAL BUT NOT TO SOCIETY

Even when exploitation is economic for the individual because it maximizes net returns, it may not be economic for society because social net returns may be less than private net returns. Similarly, conservation or improvement not economic to the individual may be economic to society. The causes of divergence between private and social net returns may be classified into three groups: (1) when exploitation involves damages (or conservation and improvement involve benefits) apart from the destruction of the resource involved, which do not impinge upon the individual; (2) when the capital losses or gains do not impinge upon the individual, and (3) when the prices that are available to society differ from those available to the individual. These groups are not mutually exclusive, but they are useful for the purpose of simplifying our analysis and are taken up in the order listed above.

*Social Costs and Damages*

Since the benefits of conservation or improvement (such as flood control) largely correspond to the elimination of certain damages (such as flood damages), only the damages are outlined here.

Damages caused by floods, due to the increase in flood peaks resulting from an increase in the rapidity and quantity of runoff of surface water, are a serious menace to both rural and urban areas. Silt deposits in rivers, reservoirs, and on lowlands occur at an accelerated rate as erosion develops and may cause large social losses. Roads and drainage ways may be affected both by gullies and sedimentation, and maintenance costs are increased. An increase in the rapidity of runoff may affect the infiltration of water so that the water table and levels of lakes and sloughs may be lowered. All these factors are related to plant growth and wildlife, and in many cases, the water supply for towns and industries is impaired. The difficulty of evaluation lies not only in estimating the total damages but in allocating the damages to specific causes or areas. Whenever such social costs or losses can be related to specific areas, society is justified in attempting to eliminate or reduce them by the most suitable methods of inducing soil and water conservation. Estimates of damages borne by society, or by groups in society, must be made and also of the costs of conservation borne by the individuals who are affected by the controls. Since our basic assumption is that exploitation is economic to the individual, conservation will involve a loss in present income, and this should be balanced against the gain resulting to other members of society.

A less direct cost to society which may result from continued exploitation is the cost of relief or resettlement when the productivity of the land is so reduced that it will no longer sup-



port the present population. This involves not only the farmers but also the town and village populations which have developed as service and educational centers. This problem only arises when there is a serious maladjustment in farm size so that disinvestment takes place to provide the necessary annual income which could not be obtained under conservation measures. Sooner or later, however, the income from exploitation declines, and the population is then forced to adjust. In this case conservation implies more than introducing a new farming system; either farms must be made larger, or a permanent subsidy must be paid to the operators who practice conservation. Preventative measures affecting future settlement must be taken by society through zoning ordinances, and where this condition exists today, a long-time population and land use plan should be developed. Such a plan should embrace not only land use as such, but the possibilities of expanding secondary production enterprises must also be considered. Any expenditure of money to establish conservation when this means a lower income to the present operators may be purely a waste of funds unless steps are also taken to see that the farm unit will provide an acceptable standard of living to the people involved.

### *The Transfer of Capital Losses*

In many cases exploitation appears to be economic to the individual because he is able to transfer the capital loss to society as a whole or to other individuals in society. The simplest case is that of the tenant farmer on a one-year lease, whose objective is to maximize his net income this year and who does not consider the loss in capital assets which is borne entirely by the landowner. The landlord may permit such losses to occur simply because of ignorance or inability to supervise the farm operations and establish a land use program

which will maintain his investment. Under these conditions education of landlords and the development of institutional arrangements encouraging longer periods of tenure and security of occupancy are important means of achieving conservation.

Similar conditions exist in the case of a heavily or over mortgaged farm where the operator is attempting to pay interest and principle payments over too short a period. In this case the operator disinvests his capital in order to pay for it, and if the disinvestment does not reduce net income too rapidly, he may succeed in meeting his obligations and build up the soil after the debt is paid. This may or may not be an extremely wasteful method, depending upon the cost of rebuilding the productivity of the soil. In the case of deterioration, such restoration may be impossible. An increase in the mortgage period to twenty, forty, or more years, might permit the operator to maintain his capital and enjoy a higher income over the whole period. Where the net income of the operator is rapidly reduced, or when the mortgage is too high, foreclosure is inevitable. The longer it is postponed the greater the capital loss will be, and this loss will be borne by the lender.

In the case of wildlife and fisheries, there is no way by which the pricing system can allocate a capital value to what is essentially a "free" good and appears to have no cost of production. The failure to allocate capital values is due to the difficulty of developing private ownership of these resources, and the only alternative is rigid government control of the quantity taken and positive action in re-stocking and propagation. In the case of game a widespread use of suitable shrubs to provide food and cover by individual farmers would increase the numbers greatly. However, if there is no means by which the farmer can sell his interest in this game, there is little chance of his being willing to do much to increase it. Since the public is interested in this phase of conservation,

it is justified in using license fees to pay farmers to cooperate in game production, or permitting them to sell "trespass" permits to hunters on their land. In most of the cases of transference of capital loss to others, specific measures must be developed for each problem involved, and this can be done only as we develop better techniques of social accounting.

### *Society and Investments*

Because society represents the majority of people, it can and does make investments which will not be made by individuals. This may be due to the length of the period of investment, the magnitude of the capital expenditure involved, or the uncertainty of future returns. Society spreads this risk, through its ability to tax, over all persons in the group, and at the same time, society benefits from any intangible services which may result from the investment. The government, representing society, may also affect costs and prices through tariffs, taxes, fiscal policies, franchises, monopoly legislation, etc. For example: The government may borrow money at 3 per cent on the credit of the state and its ability to tax, and invest in any enterprise which is desired by the people; a private firm might have to pay 10 per cent on money it borrowed because of the risk involved. Such action by society is justified when intangible values are involved; when the social costs of such investments are lower than individual costs; or when the social returns are higher than individual returns would be.<sup>7</sup> Interest rates also play an important role in determining the value of resources and have an important bearing upon the divergence between social and individual net returns. This problem is discussed in the next section.

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<sup>7</sup>A divergence between social and individual costs and returns may be due to many factors such as society's ability to reduce unemployment relief by providing employment or any of the factors mentioned in the two previous sections. See Eric Englund, "What Price Conservation," *Land Policy Review*, Vol. 3, No. 2, March-April, 1940. Also see Gunnar Lange, "A Neglected Point in the Economics of the Soil," *Jour. Farm Econ.*, Vol. XXIII, No. 2, May, 1941.

*Differential Interest Rates*

If the interest rate available to individuals for the purchase of land or other productive investments is 6 per cent from local credit agencies, and the government can borrow money and make loans for 3 per cent, a conservation problem immediately arises. Land yielding a rent of \$6 an acre is worth only \$100 an acre to the individual, but would be worth \$200 an acre to the government, assuming equality of the conditions affecting both parties. Actually, the difference between these rates is partly due to differing risks arising from the fact that loans to the individual are inseparably tied up with his managerial ability and fluctuations in prices. The government, on the other hand, can transfer all these risks to society as a whole through its power to tax, and the creditor is reasonably sure that not only will his loan be repaid but the interest will be met as well. This implies that the interest earned on the current value of government bonds is as close an approximation to the marginal productivity of capital that we can obtain. Investors, therefore, would tend to bid the value of land, having a rent of \$6 an acre, up to \$200. The difficulty that immediately arises is whether actual land values are more closely related to the rate of interest available to the borrower or to the theoretical rate reflecting the marginal productivity of capital. There are other important factors to be considered relating to the family living, such as independence, "job security" of the owner operator, and social prestige, all of which will enhance the value of ownership. In the case of tenant farmers contractual rent may vary widely from theoretical rent as we have defined it here, and may reflect housing conditions, nearness to good roads and schools, and other similar factors. These are essentially consumption expenditures for family conveniences and may not be related to the productivity of the land. Where contract rents are on a crop share basis they fluctuate with yields and prices, and

these risks are shared by both tenant and owner. Where cash rents are paid they are more stable over time, and the tenant assumes all the climatic and price risks. At the same time, the relationship of the number of tenants seeking farms to the number of farms available affects the relative bargaining power of the tenant and landlord which tends to be reflected in both the level of family living and the rent paid. If we add to these factors differences in managerial ability, the simplifications involved in using a concept of economic rent are revealed. In spite of the simplifications, a useful analysis of the bearing of interest rates upon the divergence between private and social interests can be made on the assumption that rent is a residual and reflects the marginal productivity of land.

If we introduce into this simplified pattern two interest rates, one representing the marginal productivity of capital and one representing the rate at which farmers can borrow, the divergence between private and social net returns can be seen. Let us assume that the interest rate representing the marginal productivity of capital is 3 per cent and that this determines the value of the land because of the mobility of investments; let us also assume that the local rate at which loans are available is 6 per cent because of custom, rigidity, or inefficiency in the banking system. Under these circumstances a farm will earn 3 per cent on its capital value, but a farmer buying the farm will pay 6 per cent on his loan. This is only possible by one of three means: He may either disinvest, he may lower his current consumption of goods, or he may earn a rate of profit on his working capital substantially higher than the interest rate on loans. Which he will do will be determined largely by his level of living. The poorer the level of living, the less is the possibility of saving and the greater the probability that uneconomic exploitation will occur.<sup>8</sup>

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<sup>8</sup> The managerial ability to make profits on working capital is, of course, reflected in the level of living and income of the farm family.

One example will indicate these relationships. If the rent from an acre of land is \$6 and the marginal productivity of capital is 3 per cent, then the land will be valued at \$200. To buy a 100-acre farm would require \$20,000, and the local interest charges alone at 6 per cent would be \$1,200 a year. The land would yield \$600 as its net returns, and the remaining \$600 would have to be paid out of the returns to management and family labor. If the earnings for the grade of management necessary to run this 100-acre farm "appropriately" are \$2,000, then the saving of \$600 a year might be possible. If, however, the managerial ability were such that it could handle only 50 acres effectively, the interest payment would be \$600 and the returns from the land \$300; this leaves \$300 to be made up. Assuming management and family labor returns to be \$1,000, it might be extremely difficult for the operator to save the \$300 needed to pay the local interest charges. If to the interest is added an amortization charge to liquidate the debt over a 5 to 10 year period, the impossibility of the poorer manager becoming an owner without exploiting his capital assets, is seen.

One solution of the problem would be tenancy with security of occupancy which would avoid the necessity of the farmer reducing his level of living in order to purchase a farm; this has been advocated and adopted extensively in England. Whether such a solution is acceptable in this country depends upon the value the operator places upon ownership because of the security and prestige which may be associated with it. Since we postulated interest differentials, or loan limitations, due to custom, rigidity, or inefficiency, the most direct solution is to make loans on land available at as low a rate as is possible consistent with the marginal productivity of capital and the particular risks involved.

If we assume that the Federal Land Bank has made loans available to farmers at the lowest rate justified, an almost

identical problem arises when different mortgage periods are considered. Instead of contrasting a 3 and a 6 per cent interest rate, we could contrast the effect of ten-year and thirty-year mortgage payments in relationship to the possibility of repaying the loan without exploiting the land. From 1932 to 1935 the average term of farm mortgages for the United States was 7.2 years for insurance companies, 2.9 years for individuals, 1.9 years for banks, and 4.3 years for others.<sup>9</sup> This is one indication of the shortness of the repayment period for an investment which might well be spread over much longer periods of time and related to the farmers' ability to pay.

A further effect of excessive interest rates, or capital rationing, is the reduction of investments in land improvements or livestock which may be necessary in order to change from an exploitive to a conservation system. This would cause the exploitive system to continue long after it had become economic for the individual to adopt a conservation program. In both cases the pressure to exploit the soil is caused by the difference between the rate of interest available to the individual and the rate reflecting the marginal productivity of capital, and this exploitation may be economic and necessary for the individual but not for society.

Action designed to prevent exploitation must be directed at the cause. For operators with high managerial capacity, longer mortgage periods, or lower interest rates on mortgages and conservation investments, may be justified, provided that their managerial and labor returns are large enough to permit the saving of sufficient funds to cover interest and amortization charges. Where managerial and labor returns are so low that such savings cannot be made, tenancy associated with reforms

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<sup>9</sup> Donald C. Horton, Harold C. Larson, and Norman J. Wall, *Farm-Mortgage Credit Facilities in the United States*, U.S.D.A., Misc. Pub. No. 478, 1942, Table 62, p. 168. Table 63 indicates wide regional differences, and the authors point out that the low figure for banks is partly due to the classification of production loans (usually short-term) as mortgages. pp. 165-68.

giving security of occupancy and compensation for improvements may be the soundest long-time program.

Impinging upon this purely theoretical picture we find a host of institutional factors. Farm population is relatively immobile, farm size and population patterns are rather stable and based upon historical developments, and rent, as we have seen, may have little relationship to the marginal productivity of the land. Partly due to these complexities abnormally high local interest rates exist in many areas, and the basic problem lies in determining the proper charge for risks due to fluctuations in prices and managerial errors. Government programs aimed at stabilizing farm income by an ever-normal granary or by subsidies to low income groups have important implications to conservation. Crop insurance may eliminate some of the risks, and this would justify an interest rate to farmers more closely approaching that at which the government can borrow. Subsidies may not eliminate risks, but they reduce the pressure to exploit the soil resulting from a lack of income adequate to maintain an acceptable level of living.

### *Differential Labor Costs*

Differential prices available to the government and to the individual also occur when the government but not the individual has control of unemployed resources in a period of depression. A typical example of this occurs in the case of labor. If, in one area, terraces and dams involving a large use of labor are necessary to control erosion, the cost might be so high that it would be uneconomic for the individual to make the expenditure at current wage rates. If society, however, has accepted the responsibility for assuring a minimum standard of living for the unemployed, the actual costs to society of using this labor for constructive purposes, is the difference between the wages paid and the amount allowed for relief. This might make the social cost of erosion control structures



much less than that which would be paid by the individual. To determine whether a proposed program is economic or not, we would have to know whether the value of the resource saved would be greater than the *additional* social expenditure involved. If it is, then society and the individuals using the labor benefit. If net income under the conservation system is affected, this also would have to be taken into account.

The major problem of the use, by society, of unemployed resources lies not in determining whether they should be used in constructive enterprise, but in determining the most economic use. Unemployed labor, for example, might be used for the building of terraces on farms or for building a high school in the town, and the only way an economic decision can be made is by comparing the value of the high school with the value of the terraces (built at an equivalent cost) in preventing soil impairment. Such decisions are being made continually, and social returns can be maximized only as we learn to make and use estimates more accurately. One indirect method that society can and does use to measure this importance is to ask the individuals who benefit to contribute in some measure to the government expenditures. Where these contributions to the total cost of a project are made by various groups on a competitive basis, an indication of the value of alternatives is obtained. For this to be useful in conservation work, the individuals would have to have some knowledge of the magnitude of the capital losses, the effect of the control measures in reducing them, and any change in annual net farm income that might result.

### *Conclusions*

Regardless of the causes of exploitation that is uneconomic to society, social action to eliminate it is justified, but the corrective measures should apply to the basic causes associated with any given area or problem. These measures may be

direct or indirect, depending upon whether conservation is a specific objective or whether the actions are directed to other major ends and resource utilization is affected only indirectly. It is obvious that there are wide differences between regions, areas, and even farms in the causes of exploitation, as well as differences between the kinds of resources being exploited. Only as we understand the causes more fully can we adopt the most effective methods of attacking the problems.

#### CRITERIA OF SOCIAL ACTION WHEN INTANGIBLE ENDS ARE DESIRED BY SOCIETY

In the previous sections we have dealt with problems which involved financial gains or losses and which, theoretically at least, essentially represent problems of measurement in terms of money. We must now attempt to analyze the problems involved when intangible ends become social objectives supported by a majority through political agencies. In essence group action is necessary only in those cases where individual action is incapable of attaining the desired end.

A typical problem of this nature is that of billboard advertising which destroys natural beauty. Where a billboard creates a driving hazard it can be removed under the police powers of the state, but if it simply destroys a beautiful vista it is more difficult to do anything about it. Apart from the interested business men, it is difficult to find anyone who desires advertising along highways, and it seems reasonable to claim that the vast majority of citizens prefer scenery to advertisements for soap, gasoline, or cigarettes. The only reason that this kind of advertising persists and grows is that the advertisers believe it increases sales, and they, therefore, are willing to pay the landowner for the use of his land for this purpose. The value of the scenery to the public has no way of expressing itself through the pricing system and is an intangible end. In this case the solution appears simple; legisla-

tion could limit the property rights of individuals to sell or lease advertising sites outside of specified areas or restrain the advertisers from erecting the billboards. This would mean a loss in income to a few landowners, and a case might be made for some form of compensation. Since the loss in income from advertising would be very small compared to the total income from farm land, and because competitive advertising is often waste, the arguments favoring compensation seem weak.

There are many other social values of a similar nature; picnic areas, virgin forest strips on highways, recreational values of hunting and fishing, and forest camping areas, etc. Apart from these rather specific values there are broad general concepts such as individual freedom, security in both an economic and military sense, and equality. Conservation itself may fit into this group of broad intangible ends, and when it does, it simply reflects the desire of the people to think more broadly than in economic terms alone.

Many of our difficulties in dealing with these intangible values lies in the fact that our economics have been cast in terms of a productive norm. In our individual life we are both producers and consumers. As producers we are concerned with equating marginal costs with marginal returns to maximize income. As consumers we purchase the things we desire and have no objective means of measuring the expected satisfactions, so that we look at the prices of alternative purchases and buy that which we *think* will yield the greatest satisfaction. There are, however, many things which we as individuals cannot buy, and these range all the way from scenery and recreational areas to traffic controls to eliminate danger. Essentially, expenditures by the government to attain intangible ends represent social consumption expenditures desired by the majority of the people. They may reflect national pride or a desire to have open air recreational facilities available to all in order to counteract the influence of urbanization

in separating man from his natural environment of earth and sky and living things. Where the services from social expenditures are not sold, the only criterion of which expenditure is best lies in the decision of the people, through their representatives, as to which they want most. The problem of social accounting, therefore, is simply the correct pricing of alternatives in order that more informed choices may be made. Where expenditures or returns vary in time the use of the interest rate at which the government can borrow simply represents a means of estimating alternative prices and has nothing to do with the question of whether an expenditure will "pay" or not. If the objective is desired urgently enough it will be obtained regardless of the price, but it is essential that the cost be known so that comparisons may be made.

### *The Criteria of Rational Evaluation*

In order to make any rational evaluation of the appropriate means society should use, and how far society should go, a certain minimum of information regarding both the ends sought and the means to be used must be available. These requirements may be briefly stated as follows:

- (1) The end sought must be stated in such specific terms that progress towards its attainment may be evaluated.
- (2) The relationship of the stated end to other desired ends must be known in order to analyze conflicts.
- (3) The means that may be used must be evaluable in terms of their ability to achieve the specified end.
- (4) The relationship of the means as they affect other ends must also be known.

Unless these requirements are met any rational analysis of social action appears impossible, and the broader the end the smaller the chance of intelligent action. Broad non-specific ends, such as "equality," have to be broken down into more specific concepts (e.g., equality as a political person at a given

age, equality of opportunity to receive education, equality in law, or equality of income distribution defined in terms of ranges of differences desirable and acceptable to the majority).

### *The Definition of Objectives*

The idea that all conservation is good seems to have little value for the formulation of rational social action. As we have seen, conservation means different things, depending upon whether it is a fund, flow, or biological resource we are dealing with. Under a given set of conditions either exploitation, conservation, or improvement may be economic in the case of land, and conservation is simply a point that separates exploitation from improvement. Because exploitation and improvement may be rapid or slow, an infinite number of points could be picked between the two extremes, and conservation occurs at the point where exploitation ceases and improvement has not yet begun. In some areas and under some conditions either exploitation or improvement may be the better policy for the nation to adopt. If we ask, "When should this country have started to conserve its soil?", we are forced to admit that, while much of the early exploitation was wasteful, much of it was economic both for the individual and society. The broad objectives of soil conservation can be analyzed more rationally if we establish detailed statements of the objectives. These might be classified as follows:

- (1) To achieve conservation or improvement in those farming areas where it is economic for the individual to do so.
- (2) To achieve conservation or improvement on those farms or areas where it is not economic for the individual but it is economic for society.
- (3) To achieve conservation or improvement on those farms or areas where it is not economic for the individual but is desired by society to attain intangible ends.
- (4) To use the means best suited to achieve these ends when

complementary or conflicting relationships with other ends are considered.

Social policy directed toward achieving the first two of these objectives should seek to attack the most urgent problems (in terms of social losses) first. The third objective creates analytical difficulties of a special kind because there is no way of evaluating the importance of intangible ends in relation to each other through the pricing system, and our only available guide is the precedence that is given in the allocation of funds by the decision-making group. However, once the funds are allocated the most suitable means must be selected, if the funds are to be used wisely, and the means selected must take into consideration other ends.

### *Conflicts of Ends and Means*

In all cases the question of whether or not conservation is economic for the individual is of paramount importance. If it is not economic, then coercion or a permanent subsidy may be necessary. If coercion, by limiting property rights, is adopted without compensation, this conflicts with the freedom of the individual to maximize his personal income. If a subsidy is used, funds so spent cannot be allocated to educational purposes to establish conservation in those areas where it is economic to the individual and where no permanent subsidy is needed. Only as we estimate the effectiveness of alternative expenditures to induce conservation can the most efficient conservation policies be formulated.

Budget allocations for conservation are made in competition with other objectives of the government. Conservation must compete with relief, education, and military expenditures. The final allocation of funds should reflect the urgency of the various problems to society as a whole. The total conservation budget must then be broken down and allocated to achieve more specific ends which may be either economic or

intangible in nature. To some extent these ends are bound to overlap in practice and can be separated only on a theoretical level. In reality the specific ends will range all the way from purely intangible ends, such as beauty, to the economic end of eliminating the annual damage of \$5,000 to a reservoir from silt deposits. To achieve these specific ends are many means which may be used separately or in conjunction with each other. The ends sought mainly impinge upon the individual through the means used, and his reaction will depend upon the relationship of the means used to attain conservation to his other personal ends such as the maximization of his net returns and desire for individual freedom.

At the legislative level, conservation as an end competes with other social ends for funds. When detailed conservation policies are formulated, the needs of various areas, specific objectives, and alternative means must all be evaluated in order to make the most efficient use of the limited funds. At the same time the relationship of the means to be used to attain conservation to other objectives and means must be analyzed to prevent duplication or conflict. Education to achieve conservation on those farms where it is economic may be associated with our general educational system at very little cost. On the other hand, any policy which attempts to achieve conservation by education where individual loss is involved may be futile. Similarly, actions which tended to raise the price of intertilled crops relative to conserving crops, might completely negate a conservation policy which included a reduction of intertilled crops as a desirable means of reducing erosion.

Conservation ends and means, therefore, are closely related to many other social policies and actions because they all impinge upon the individual. Conservation policy, therefore, must be formulated with reference to all other actions that are being developed to assist agriculture, and the policies

of action agencies not specifically authorized to attain conservation objectives should consider the relationship of their programs to conservation.

These problems of policy formulation are discussed further in Chapters 11 and 12 after the character and limitations of various means of social control over land use have been reviewed and the problems of measurement have been outlined.