



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

3-56
Production Economics Paper No. 6204
Purdue University
April 20, 1962

CRITERIA AND PLANNING FOR OPTIMUM USE

Emery N. Castle

CRITERIA AND PLANNING FOR OPTIMUM USE

Emery N. Castle
Oregon State University, Corvallis*

"Science might almost be defined as the process
of substituting unimportant questions which can
be answered for important questions that cannot"
Kenneth Boulding--The Image, p. 164

Both professional and lay people frequently speak of an "optimum use of natural resources". Upon examination it becomes obvious that the term means different things to different people. It is also obvious that some mischief is done when professional people use the term in a limited technical sense but who are interpreted to mean something quite different. It is not altogether clear that professional people themselves all understand the social significance of the technical concepts they use. This paper is organized as follows:

(1) an examination of the nature of an optimum, (2) a brief discussion of the role of values, (3) an illustration of my main points by giving examples from economics and (4) a discussion of the role of the planner in natural resource use.

The Nature of an Optimum

An optimum may be defined as that state of affairs which results in the most favorable degree, condition or amount of some desirable magnitude, property or attribute. The definition, as such, says nothing about what the desirable "magnitude, property or attribute" might be. Neither does it provide any suggestion as to how these are to be specified or achieved. Recourse must be made to criteria outside the formal definition if one is to specify or proceed toward an "optimum". An obvious step would be to examine those disciplines that are generally recognized as having relevance to natural resource management for criteria that might be used in the management of the natural resources that man has at his disposal. At this point two--ecology and economics will be examined

*Currently visiting Professor, Purdue University.

for the purpose of discovering if they contain concepts which might be helpful in defining optimum resource use. We turn first to the ecological approach to optimum resource use.

The ecological approach envisions an equilibrium among physical and biological phenomenon such that survival of certain climax species are possible. Climax is defined in the words of Odum (13, p. 266) as

"The final or stable community in a successional series is the climax community, it is self-perpetuating and in equilibrium with the physical habitat".

The concept of a climax has been extended to include the notion of disclimax which describes a stabilization of plant and animal associations that provide for prolonged use by man (13, p. 269). In the study of ecology the basic functional unit is the ecosystem which is any area of nature that includes living organisms and nonliving substances interacting to produce an exchange of materials between the living and nonliving parts (13, p. 10). Certainly the knowledge gained from such a field has considerable relevance to the management of natural resources by man. The various specialized fields of ecology will help predict the consequences of man's changing the natural habitat in any way. It also will permit the identification of stable systems both before and after such interference has occurred.

It is, however, the equating of such stable systems with a "social optimum" that leads to difficulty. There is value in defining an optimum within the limits of a particular intellectual discipline and using it to identify tendencies or deviations. It is quite another matter to use it as a normative concept to guide the affairs of man as he manages his natural resources. Let us examine two definitions of conservation by ecologists as examples.

"The aim of good conservation is to insure a continuous yield of useful plants, animals, and materials, by establishing a balanced cycle of harvest and removal." (13, p. 421)

"For the nonrenewable resources, good management is chiefly wise use with the avoidance of waste. It is possible to string out the supply for a long period and to use the resource only for worthwhile purposes, but if it is to be used at all it will eventually disappear. For the renewable resources, management involves, as a minimum, practices which will result in a sustained yield". (14, p. 7)

It would serve little purpose to deliver a lecture on the nonoperational nature of such words as "good", "useful", "wise use" and "waste". The reason these words are necessary to such statements is that to use the biological concept one must relate it to the goals of man. The assumption is made that the definition and identification of man's objectives is a simple matter and that it is possible to establish classifications such as "useful" on the one hand, and "wasteful" on the other, even though the definitions supply no criteria for such judgments. If man is admitted as being of consequence then a concept which assumes his objectives in resource management will not be appropriate as a guide for him to follow however useful it may be to him in specifying information about the resource he is managing.

The same line of argument can be applied to economics as an aid to resource management. From the assumption that individuals in a society wish to enhance some economic magnitude it has been possible to deduce a set of rules that must be followed if certain results are to be obtained. The equation of marginal costs and returns over time can be used to define an "optimum state of conservation". (4, p. 76) Again such an "optimum state of conservation" may be useful in the study of the economics of conservation. But if it is equated with a social optimum the assumption is

that man ought to behave in a particular way. The concept of an economic optimum as a normative concept rests upon an implicit value judgement that cannot be verified by examining the evidence; the evidence indicates that the value judgement is an incomplete one not encompassing all of the relevant values upon which men base the actions. Furthermore, "the economic state of conservation" will depend upon the institutional framework in which an individual is operating. Just as the ecologists found it necessary to specify the role of man and to develop the idea of a disclimax, economists frequently assume institutions as given. If institutions are viewed as definitions of one man's relation to another they represent the means which man has developed to regulate affairs between men while permitting man to satisfy both his individual and collective wants. Consequently, any analysis which assumes them constant is a partial analysis.

Both ecology and economics are relevant and helpful to the natural resource planner if used as positive sciences; i.e., to predict the biological and economic consequences of particular lines of action. They may be misleading if used in a normative manner to specify what "ought to be"--an optimum use of natural resources.

The Role of Values

The question that now arises is what can be used as a guide to natural resource policy decisions if the intellectual disciplines which are commonly drawn upon are inadequate for specifying the ends or goals of resource management. In his book, Mind, Man and Land, Firey (6, p. 26) identifies the ethnological approach to resource phenomena. It has its roots in

anthropology and sociology and rests on the observation that different peoples, confronted with the same or similar natural resource situations, may make different use of those natural resources. From this observable fact it is deduced that the reason rests with the cultural differences among people. The optimum pattern of resource use, according to this approach, is that pattern which is most consistent with the important themes of peoples' culture such as their attitude toward progress, the way decisions are made, and the distribution of the fruits of their economic order. Its limitations as a definition of an optimum are two: (1) The main themes or values of a people's culture may be inconsistent at any point in time regardless of whether they may have been consistent at some point in time. Changes in technology, the natural resource base, population, the income level or other variables can throw existing value patterns into conflict. (2) The acceptance of any given set of values represents an assumption with respect to the desirability of those values. It may well be that if the consequences of a given set of values were clearly understood that they would no longer be accepted by the society (9).

As with the ecological and economic approaches to optimum natural resource use, we must conclude, with Firey, that the ethnological approach may be helpful to natural resource planners but that it does not supply the planner with a blueprint which will guide him to an optimum use of resources. The information of sociology and anthropology can be ignored only at the expense of realism and relevance but such information does not constitute the whole picture of man's desires and the means of satisfying those desires.

In his analysis of the role of values in agricultural policy, Brewster has traced the origin of the principal values in America. (1, 2, and 3 are relevant) Brewster shows how such concepts as (1) The Work Ethic, (2) The Enterprise Creed, (3) The Creed of Self-Integrity, and (4) The Democratic Creed were once in harmony. Early conditions on this Continent were such that these values could be held with deep conviction without inconsistency. The family type of farm and business enterprise combined with a virgin continent and a political system of a democratic nature made compatibility possible. The Work Ethic resulted in the judgment that if people work hard and well, they possess the means to close the gap between their "present circumstances and their aspirations". The Democratic Creed involved the value judgments that all men are of equal worth and dignity, and that no man is wise enough or good enough to have dictatorial power over any other. The Enterprise Creed conveyed to proprietors the right to prescribe the working rules for their production units; the individual family is responsible for its own economic security; and the role of government is to prevent interference with proprietors to run their businesses as they see fit. The Ethic of Self-Integrity provides for the right and obligation of the individual to dissent from generally held opinions, customs, and traditions.

Brewster argues that the coming of machine technology threw these values into conflict. He believes that the Enterprise Creed suffered from the formation of labor unions and social security. However, labor unions and social security were necessary in order to preserve the concept of justice implicit in the value of the work Ethic. We have been reluctant to choose among these values as they apply to agriculture and cannot agree on any one of several policies and resulting programs that might resolve the difficulty according to Brewster.

It is submitted that many of our government input programs in agriculture have been influenced by the pattern of value judgments identified by Brewster. One of the consequences of the work ethic was the importance of economic opportunity so that the "common man" could, by hard work and self-denial, close the gap between his "present circumstances and his aspirations". Our early land policy was characterized by conveying to private individuals parcels of land with safeguards to prevent an undue amount going to any one person. The establishment of Land-Grant universities was an effort to provide opportunity for the "common people". In more recent times, credit has been made available to the farmer who was unable to obtain credit from any other sources. One justification of the reclamation program from the beginning has been that it created opportunity in agriculture.

The philosophy underlying the agricultural input programs is also apparent in our natural resources policy. We have attempted to use our natural resources to create economic opportunity and to stimulate economic growth. This is consistent with the basic value system advanced by Brewster. Unless opportunity existed for the small proprietor, including the farmer, to accumulate wealth it was impossible to hold to both the work ethic and all that it implied and the Enterprise Creed. Viewed in this light natural resources become intermediate goods-factors of production to be transformed into consumption goods. Farmers, lumbermen, cattlemen, miners and power producers tend to view natural resources as intermediate goods. In a developing economy where the emphasis was placed on production and where natural resources were abundant, the use of natural resources as a final consumption good (for recreation) was automatically assigned an incidental role.

With the growth of national and per capita income and an increase in leisure time a different view of natural resources has developed on the part of many. This group, which may be called mass recreationists, views natural resources as a final consumption good. In large numbers they use natural resources for fishing, hunting, camping, water sports, and observation of scenery. Around the turn of the century it was possible for only a Roosevelt, a Pinchot or a Rockefeller to spend considerable time in the beauties of the West unless one lived there. If one lived in the area he was probably there for the purpose of earning his livelihood by treating natural resources as an intermediate good. He made multiple use of these resources. He hunted, fished, swam and hiked, but these uses were a by-product or incidental to his treatment of natural resources as an intermediate good. Today a large percentage of our population can spend a week or more in some type of outdoor recreation in the West even though they do not live there. They have the leisure time and they have the money. A strong feeling seems to exist that such resources belong to "all of the people". Consequently, they believe access should be guaranteed to any citizen on all public land. Further, those interests that use these resources as intermediate goods are viewed as special interest groups; such uses do not benefit "all of the people". Perhaps equality in consumption becomes a dominant goal in an affluent society, which also believes in the Democratic Creed. We have here a conflict as to whether we use public resources to create economic opportunity or to provide recreation for those who have achieved a sufficient level of income to enjoy such resources. Furthermore, when recreational resources are in private hands it is obvious there is a conflict between private property rights and the belief that "all of the people" have a right to enjoy such resources.

Still another group must be identified in this connection. This group is in favor of the establishment of wilderness areas (or what certain other groups have labeled limited multiple use). One argument in favor of wilderness areas is on scientific grounds. It is held that only by leaving certain areas undisturbed can principles of ecology be discovered; the wilderness becomes a laboratory. Others apparently derive satisfaction from contemplating or by actually observing the forces of nature at work without interference by man. It is also apparent that the term "wilderness" does not mean the same to all people. The type of use indicated above is an extreme case; it is evident that if such areas were visited by a significant number of people they would cease to be wilderness in this extreme sense. The motivation of this group may stem partially from the stern structures of the Work Ethic. In an affluent society when what were once called the necessities of life are provided for, additional consumption may be considered "bad" when it is at the expense of natural resources (7, p. 94-95). But regardless of the basic motivation, it is apparent that this group also views natural resources as a final consumption good rather than as an intermediate good to be used in the production of another commodity.

The conflict that is generated by these three groups over the use of our natural resources has been caused by the rapid and considerable economic development of our nation. The conflict has actually been with us for some time as John Ise's History of our National Parks makes quite clear (10). However, the growth of income relative to our resource base has made the problem much more acute.

When conflicts occur over the use of natural resources and, so long as there are unknown relationships, whether of a biological, social or

physical nature, associated with any of these alternatives the opportunity for positive scientific work exists. The fact that such work has arisen from a need in social problem-solving need not detract from its scientific nature whether the work is of a fundamental or superficial nature, from a scientific point of view, is independent of the immediate need for application of the results. This will depend upon the research organization and the caliber of the investigator.

Illustrations from Economics

The foregoing notions may be illustrated by reference to economic studies. Parallels undoubtedly exist in other disciplines but I leave their development to others.

In recent years computational techniques have been developed which permit selection of an "optimal solution" from many possible "feasible solutions" according to some predetermined objective criterion (15). These developments, coupled with the growth of increasingly larger electronic computers, have opened up the possibility of making the concepts of welfare economics operational on a wide scale. The close correspondence between the maximizing or minimizing process of the computational technique and the maximization concept in economics has permitted experimentation in the empirical estimation of theoretical economic concepts. For example, a linear programming study might be made of the optimal development and distribution of water for an area or a region given: (1) the costs and returns from alternative uses in the subregions and (2) some objective criterion such as net economic benefits to be maximized (4). There are many examples that might be given from the growing number of such studies that are being made.

My purpose here is not to single out particular studies for criticism. Rather it is to make some general observations that may be helpful to the users, doers and critics of such studies. Such studies may either be of a normative or positive nature. They are clearly normative if the "optimal plan", which is optimal only in a limited technical sense, is identified with a social optimum. If used in this way, the technical concept of an optimum is not an appropriate normative concept. At the present state of our knowledge, it is obvious the criterion can be only a partial and incomplete statement of the objectives of society.

This does not mean the techniques described have no value in investigations of a positive nature. They may be used to discover and make explicit both economic and physical relationships. For these reasons the interpretation and use of such studies is of crucial importance in determining whether they will be misleading or instructive. Still another possibility exists. It may be possible by the use of polls, surveys, or elections to obtain some consensus on objectives. While the formal conditions for maximum welfare may be violated, such a consensus might develop some operationally useful guides for the establishment of choice criteria in such studies.

It is also possible to use the concepts of economics in an analysis of the results of past programs and policies. For example, a standard of economic efficiency might be postulated and the results of a particular program be measured against such a yardstick. Such investigations need to be encouraged on the grounds of improving the predictive power of economics and on more practical grounds of improving the programs and policies themselves. However, deviation of the actual results from the economic efficiency ideal does not necessarily mean the program was "bad", "irresponsible", or

"ineffective". Such a conclusion clearly rests on the implicit value judgment that economic efficiency is the objective of such programs. Failure to recognize economic efficiency aspects, however, may result in either: (1) paying too high a price to attain these other objectives, or (2) failure to attain other objectives because economic forces were not taken into account.

It is possible to illustrate specifically what I have in mind. There have been studies made on the allocation of resources resulting from the program of the Bureau of Reclamation. These studies all tend to point in the same direction. The findings can be summarized as follows:

- (1) That the operating procedures under which the benefit-cost analysis is carried out is such that these projects are not adding to national income. The interest rate is too low, and there are many questionable assumptions with respect to the determination of benefits.
- (2) From the standpoint of the individual farmer, conditions of economic efficiency are violated because the farmer is not asked and does not pay the full cost of water development. The existence of power and interest subsidies are evidence of this.

If anyone needed convincing the studies certainly demonstrate that the program cannot be justified on the grounds of economic efficiency. Or, to put it another way, the studies demonstrate that the program is reducing our national income. It is important that we know this and by how much our income is being reduced. Furthermore, I have argued elsewhere that our benefit-cost analysis procedure could be easily modified to bring this cost into the open.

However, an examination of the Bureau of Reclamation objectives show them to be:

- (1) To provide opportunity for the maximum number of settlers on the land,
- (2) To distribute widely the Government involved interest-free funds for irrigation and,
- (3) To promote the family farm as a desirable way of life. (16).

In view of these objectives it should not be suprising that maximum economic efficiency is not attained. Of greater relevance in this connection are the following questions:

- (1) were the objectives, as stated, actually achieved?
- (2) If they were achieved, at what cost did they come in terms of national income and in terms of the income of already established farmers and the new settlers?
- (3) Would explicit recognition of economic efficiency concepts have better permitted the Bureau to achieve its stated objectives or are the planning techniques used consistent with the objectives?

In some of our research in Oregon we have attempted to address ourselves to these questions by examining the conditions on a Bureau of Reclamation project in Central Oregon (11). We compared project experiences with anticipated developments at the time the project was planned. The conclusions of the study can be summarized as follows:

1. The Bureau imposed on its planning procedures preconceived ideas with respect to how the farms would likely develop rather than making this a variable in their planning process. as a consequence they did a poor job of anticipating the type of farm organization and farm size that actually developed, even though

they predicted in a reasonably accurate manner yields, prices and costs. This had considerable impact upon subsequent success of the settlers.

2. Because of the desire to establish the maximum number of settlers on the land, farm sizes were established that were too small to survive the economic climate that prevailed. Ten years after the project had been established, approximately 40 percent of the farmers had been displaced and average size of farm had increased by nearly 60 percent. The rate of displacement of farmers and the rate of growth of the farms was about twice that for the remainder of Oregon.
3. Regression analysis indicated that beginning net worth and beginning acreage were correlated with subsequent farming success; that age was negatively correlated with success and years of education had little relation to success. From this and other techniques it was concluded it might be possible for the Bureau to develop prediction formulas for the establishment of minimum sized units. If the formula we developed had been used, and \$4000 labor and management income had been selected as a minimum goal, 40 percent fewer farm units would have been established. If attention had been paid to the average cost curves of these farms when the farm units were established, it is probable there would be a larger number of farmers on the project today than exist there at the present time.
4. while not strictly germane to the main body of this paper, it is interesting to note that there was considerable off-farm economic

activity associated with the project. The area is one where the off-farm activity is related directly to the agriculture being almost entirely service in nature. The project stimulated this activity to the point where the number of new employment opportunities created exceeded the number of displaced farmers. This is significant in several respects, but it does help explain why Chambers of Commerce are frequently more aggressive in promoting water resource development projects than farmers either individually or collectively.

From the above analysis it seems appropriate to offer the following hypothesis:

That an appropriate area of research for economists dealing with natural resource programs is to: (1) identify as accurately as possible the objectives of these programs, (2) attempt to measure the extent to which these objectives are being achieved, (3) Isolate area of complementarity and competition between these goals and economic efficiency. Such a procedure would bring into the open the conflicts among alternative social goals. It would seem, in some instances at least, this would be more fruitful than assuming a particular goal and measuring the extent of the enhancement of this goal.

The above is consistent with Lindblom's description of our political decision-making process (12). In other words, changes are usually made on an incremental rather than on a total basis. As economists we can best facilitate that process by focusing on those areas where incremental change is possible. Opposed to this view is the idea of more complete or total

changes. Following this line of reasoning, one would select some objective believed to be important. Frequently, institutional arrangements are assumed out of the analysis or held constant. When a particular institution appears to be an obstacle to (say) the enhancement of national income, certain information is suggested as being of value. The change in institutional arrangement needed to accomplish the enhancement may be developed. But this may involve a sacrifice in another value the institution was created to preserve. Some appreciation of these other values is necessary for the development of alternative institutional arrangements that will permit multiple values to be achieved. It appears that numerous values other than national income enhancement are associated with natural resource use and that some attention needs to be paid to these other values if research is to have the greatest impact.

When an economist first views the conflicts that exist over natural resource use, his reaction is often that a greater reliance on the market would resolve many of the conflicts. In other words, he would substitute the market as an institution for those that now prevail. Certainly there are many conflicts where this appears to make much good sense. Much of the concern in the midwest and the east with water law stems from an attempt to develop a non-market means of allocating water. Yet I am of the opinion that the Doctrine of Prior Appropriation with subsequent reliance on the market for transferring water rights would be the most satisfactory method of handling most problems of water allocation. There are other areas where it would appear that greater reliance on the market would also satisfactorily resolve major conflicts.

But we must recognize that there are many problems with which the market is not yet capable of handling. Certain uses of natural resources such as recreation, flood control, and pollution abatement are not at this time marketable commodities. I would predict that the market will be relied upon more in the future for recreation than it is at present but I have not yet been able to imagine all aspects of outdoor recreation being marketed. It appears much more likely that administrative arrangements will be developed that may incorporate market criteria into their decision-making but will not rely exclusively upon it. If this is so then economic research might profitably be devoted to simulating estimates of market variables for these administered resources. Examples of questions that might be investigated would be:

1. What would be the value of the Salmon-Steelhead sports fishery resource in the Pacific Northwest if a market actually existed for this commodity?
2. What is the marginal value productivity of grazing permits on our public range lands?
3. What is the opportunity cost of water used for pollution abatement?
4. Many interesting questions of this nature are also associated with the proposed wilderness areas. Here, range, water and timber production all come into the picture.

I realize the above questions are obvious and it is not necessary to catalogue them. My purpose in listing them is to indicate the positive economic research is needed but that the "what is" information which is developed will be of the most value if developed in relation to the various objectives of the natural resource programs involved.

The Role of the Planner

Thus far only positive research has been described and planning has not been treated. It is obvious some planning is normative in nature and it is on this basis that the work of the planner is to be distinguished from the activity of the scientist. As used here, research refers to the activity of searching for and establishing relationships with respect to the way things are. Planning refers to the activity of organizing information relevant to a particular policy decision. It may be normative in that it is oriented in the direction of bringing about changes in what is, so that they will conform with what "ought to be" (8).

The preceding analysis permits the formulations of some suggestions which may be helpful to planners. These suggestions are based upon the assumptions that although planners are an integral part of the decision-making process, their activity should not be substituted for this process and that no prejudgment is made as to the relative importance of the objectives of the numerous groups interested in natural resource decisions. The suggestions are:

(1) When the group for whom the planner is working specifies the objective to be achieved, he can call upon the relevant disciplines for appropriate information in developing a "plan" that will achieve the objective. When this is not the case he may have to assume alternative objectives which will shape his plans accordingly. When multiple goals exist, weights will have to be assigned if plans are to be developed. Of course, numerous plans are possible where multiple goals exist.

(2) By the identification of the main values or group objectives, it may be possible to eliminate those things which all groups are trying to avoid. Of those values that remain, areas of complementarity can be identified.

(3) when value conflicts prevail, the alternative plans which are developed should bring these conflicts into sharp focus; conflicts should not be submerged in plans.

(4) The planner should attempt to facilitate the "incremental decision-making" process described earlier. Sweeping and revolutionary changes in resource use or in the way such decisions are made are not likely in our environment.

(5) Rather than the planner searching for "a social optimum" he will do well to search for a range of possible solutions that will encompass varying combinations of different objectives. Because we have no way of weighting these objectives we are well advised to admit this frankly rather than to develop objective appearing formulas based on value judgments, which if made explicit, would not be acceptable.

REFERENCES CITED

1. Brewster, John M. "Society Values and Goals in respect to Agriculture." Chapter 6 in Goals and Values in Agricultural Policy. Iowa State University Press. Ames, Iowa, 1961.
2. _____. The Impact of Technical Advance and Migration on Agricultural Society and Policy. Journal of Farm Economics, Volume XLI, No. 5. December, 1959.
3. _____. Value Judgments as Principles of Social Organization with Special Reference to the Rural Scene. Southwestern Social Science Association. Galveston, Texas. March, 1958.
4. Ciriacy-wantrup, S.V. Resource Conservation. University of California Press. 1952. wantrup recognizes the limitations of his definition as a policy norm.
5. _____. "Concepts Used as Economic Criteria for a System of Water Rights." Land Economics, November, 1956, p. 307.
6. Firey, Walter. Mind, man and Land. The Free Press of Glencoe, Glencoe, Illinois. 1960.
7. Galbraith, John Kenneth. "How Much Should a Country Consume", in Perspectives on Conservation. Essays on America's Natural Resources edited by Henry Jarrett. John Hopkins University Press. 1958. Galbraith says, "In an opulent society the marginal utility of all kinds of goods is low. It is easy to bring our doubts and questions to bear on automobiles. But the case is not different for (say) that part of our food production which contributes not to nutrition but to obesity, that part of our tobacco that contributes not to comfort but to carcinoma, and that part of our clothing which is designed not to cover nakedness but to suggest it. We cannot single out waste in a single product without questioning the product."

8. Halter, A. N. "The Identification of Problems in Agricultural Economics Research." Journal of Farm Economics. Volume XLII, December, 1960. No. 5. p. 1459. Halter's technologist corresponds to my planner.
9. Hirschman, Albert O. The Strategy of Economic Development. Yale University Press. New Haven, Conn. 1959. Hirschman argues that the problem of development can be traced to the concept people have of their relationships to the groups of which they are a part. Either an extreme group focus or an extremely individualistic focus is inimical to growth. He argues that both are necessary for development. If we accept this line of argument, the formal definitions of these relationships--institutions--become important in effectuating change as well as in identifying obstacles to change.
10. Ise, John. Our National Park Policy: A Critical History. John Hopkins University Press. Baltimore, Maryland, 1961.
11. Kimball, N. D. The Impact of Economic and Institutional Forces on Farmer Adjustments in the North Unit Deschutes Project. A thesis submitted to Oregon State University in partial fulfillment of the requirements for the Doctor of Philosophy Degree. Oregon State University, 1961.
12. Lindblom, Charles E. "Handling of Norms in Policy Analysis" in the Allocation of Economic Resources. Essays in honor of Bernard Francis Haley. Stanford University Press. 1959.
13. Odum, Eugene P. Fundamentals of Ecology. W. B. Saunders Company. Philadelphia and London, 2nd edition, 1959.
14. Rasmann, Raymond F. Environment Conservation. John Wiley and Sons. New York, N. Y., 1959.
15. The reference is to linear programming or activity analysis.
16. U. S. Bureau of Reclamation. Land Ownership Survey on Federal Reclamation Projects, Washington, 1946. p. 54.