READINGS IN AGRICULTURAL ADMINISTRATION

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PREFACE

One of the tasks undertaken by the Research and Training Network of the Agricultural Development Council was to develop a set of teaching materials related to the *administration* of agricultural development programs. A Committee worked on this over a period of two years. The first publication based on the work of the Committee was *Serving Agriculture as an Administrator,* written by A. T. Mosher and now available from the Agricultural Development Council.

Readings in Agricultural Administration is the second publication to appear. Obviously many more readings than those included here were candidates for inclusion. The criteria followed by the Committee in selecting these articles were primarily:

1) that the reading is one that should be useful to middle-level administrators in developing countries;
2) that it is easy to understand; and
3) that it is relatively brief.

Professor Garland P. Wood of Michigan State University was Chairman of the Committee. The other members of the Committee who participated in selecting the readings and in editing individual articles were:

Professor David W. Brown, University of Tennessee
Professor Saul Katz, University of Pittsburgh
Dr. Kenneth Kornher, Agency for International Development
Professor John Montgomery, Harvard University

A. M. Weisblat
Director
Research & Training Network

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Section IV The Task Environment

INTRODUCTION

Garland P. Wood*

Agriculture brings pictures before the western mind of great fields of waving grain, miles of fruit orchards, truck gardens of vegetables, and a thousand cattle in automated feed lots. But to other peoples the viewpoint is different. They see the tiny handkerchiefs of paddy rice on the mountains of Nepal or the Philippines; the maize or potato patch in Peru or Mexico; the goatherds of Pakistan or Ethiopia. Agriculture is marked by great diversity; of crops, climate, soils, technology, and the way people organize to do their work. Agriculture is differentiated from others of man's industries because of its dependence on nature for sun and rain, its vulnerability to destructive storms, diseases, pests, killing temperatures and its batch-type process of production. The hundreds of millions of farms spread thinly over vast reaches in some regions of the world and crowded too closely in others creates other challenges and obstacles to development.

Development itself is a controversial word with connotations of good and bad. In these writings it means an increased production in quantity, an improved quality, or both. It assumes an efficiency of input uses, i.e. that the increase is done with lower per unit inputs or that the increased quality is produced with the same per unit inputs.

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The problem is how to enable the farmers of the world to be more productive, especially the 170,000,000 small farm units that comprise the majority of the world's farmers. These small farmers are plagued with many troubles which make their production per man hour very low and over which they can individually do little. Many nations now recognize that their destinies are linked with making these farmers more productive so as to feed the increasing urban population, to furnish fibre for the nation's industry, to keep them from flooding to the already overcrowded cities. These governments are creating governmental and quasi-governmental organizations that will help the farmer gain the needed inputs and a market for his products. These new organizations, as well as existing bureaucracies, require management skills if development is to be achieved. It is quite likely that the most limiting resource of all in the developing countries is this limitation of administrative skills. Agriculture is the focus of the following readings, development is the general goal, administrative improvements is one of the means of achieving this goal.

READINGS IN AGRICULTURAL DEVELOPMENT

SECTION I

THE SYSTEMS APPROACH

Garland P. Wood

Churchman in his book *The Systems Approach* tell us if we want to solve problems we should begin by examining our thinking process. Otherwise we are likely to get on the wrong pathway in our exploration and our thinking will come in too late. He states that in principle many of the world's needs can be solved by modern technology. Their interrelatedness, however, keeps us from thinking about them in any realistic sense. Taking as an analogy the objective of developing a rocket that is capable of sending an object to the moon he lays out the bare components of a systems approach. We shall use Churchman's article to stimulate our thinking about the challenges of Agriculture Development Administration and to keep us from drawing the net of our thinking process before it encloses the hard core of the problems confronting us.

Thompson in his book *Organizations in Action* details the twin approaches used in the past in the study of complex organizations. The closed system seeks certainty by including only those variables directly related to the chosen goal and putting them into a single decision-making process. The open-system strategy recognizes that organizations in

the real world must cope with uncertainty and a changing environment. Yet they too are subject to the criteria of rationality and so seek certainty. Thompson follows and enlarges this newer tradition of capitalizing on the strengths of the closed and open system strategies. He concludes that organizations create certain parts specifically to deal with uncertainties which cannot be controlled and creating other parts to operate under conditions of near certainty. Thompson contends that organizations faced with situations of great complexity including those things they cannot control must develop processes for searching and learning as well as deciding. The organization necessarily restricts the universe it will deal with, replacing the maximum efficiency criterion with one of satisfactory accomplishment. Decision making now involves satisfacing rather than maximizing.

He further proposes that organizations can best be understood if looked at from three distinct levels of observation—technical, managerial and institutional. The technical level would be the laboratory technicians, the field researchers, the teachers in the classroom. The managerial level controls or administers the technical suborganization. The overall integration of the organization with the surrounding community is a function of the institutional level of the organization.

The third article titled *Bringing Systems Analysis into the Rural World* argues for an overall analysis because the once isolated peasant is now an interacting part of a wide network of economic and cultural relationships. Egbert de Vries notes that although systems analysis is being used in the study of businesses, weapons production, governmental organizations, etc., he cautions that the unique characteristics of peasant agriculture be recognized before applying the systems approach to this sector.

The author centers his discussions around (a) national policy decision-makers; (b) specific public bodies; (c) private input suppliers; and (d) farmers' organizations. There is a multitude of combinations of these four components. Are more assistance and stimulation better than

supervision and regulation? Can some or many commercial agents be replaced by public bodies or farm organizations? What is the effect of governmental action on farmer's initiative, freedom of choice and income? New technologies affect the whole system and as one tries to take cognizance of the many and differently weighted variables, the author contends the systems approach becomes a useful tool.

Earl M. Kulp in his book *Rural Development Planning* defines system analysis as a body of decision tools, based on model building, for use with respect to complex problems not amenable to other techniques, and interdisciplinary in its approach. He illustrates his definition by discussing the concept of planning and its element of decision-making. Subsets of decision-making combine to give a decision output and this output is a part of a larger planning system. This planning system is yet a part of the larger environmental encompassing other societal elements including the government control system. Finally he cautions those who view systems analysis as a panacea. It can only work on problems for which there are theories which can explain relationships between variables in terms of observable data. Systems analysis is completely dependent on traditional disciplines to provide the theory to make it work.

SYSTEMS THINKING*

C. West Churchman

Suppose we begin by listing the problems of the world today that in principle can be solved by modern technology.

In principle, we have the technological capability of providing adequate medical care for every inhabitant of the world.

In principle, we have the technological capability of providing sufficient education for every inhabitant of the world for him to enjoy a mature intellectual life.

In principle, we have the technological capability of outlawing warfare and of instituting social sanctions that will prevent the outbreak of illegal war.

In principle, we have the capability of creating in all societies a freedom of opinion and a freedom of action that will minimize the illegitimate constraints imposed by the society on the individual.

In principle, we have the capability of developing new technologies that will release new sources of energy and power to take care of physical and economic emergencies throughout the world.

In principle, we have the capability of organizing the societies of the world today to bring into existence well-developed plans for solving the problems of poverty,

*Condensed from chapter 1, "Thinking", of Churchman, C. West, *The Systems Approach,* Dell Publishing Co., 245 E. 47th St., New York, N.Y. 10017.

health, education, war, human freedom and the development of new resources.

If the human being has the capability of doing all of these things, why doesn't he do it? Is there some perverse streak that runs throughout the human race that makes one human being indifferent to the plight of another? Are we essentially faced with a type of moral degradation that permits us to ignore our neighbor for the sake of our own good?

Or is there some deeper and more subtle reason why, despite our enormous technological capability, we are still in no position to solve the major problems of the world? If we look over the list of problems, one aspect of them becomes quite obvious: these problems are interconnected and overlapping. The solution of one clearly has a great deal to do with the solution of another.

They are so interconnected and overlapping, in fact, that it is not clear at all where we ought to begin. For example, suppose we have made up our mind that the first problem to be solved is that of adequately feeding, sheltering, and clothing every inhabitant of the world. How should we begin to solve this problem? The technological capability is there. We can produce the food necessary to do the job and the housing materials that will provide shelter and the textiles that will clothe each person. Then why don't we do so? The answer is that we are not organized to do so. In other words, the last objective, the development of a set of organizations that will solve the major problems of the world, has to be handled first. Is this where we should begin? Why don't we simply organize the world to do the job of feeding, sheltering, and clothing?

We seem in fact to be faced with a dilemma. On the one hand, it would be extremely foolish to ignore the problems of the world today and, so to speak, bury our heads in our own pile of gold, On the other hand, there seems to be no adequate way even to think about the major problems of the world in any realistic sense.

Logicians tell us that when we want to solve problems we should begin with the thinking process. Otherwise, we

are apt to go off on entirely the wrong pathway in our exploration, and our thinking will come in far too late. It is much as though a man who is somewhat lost dashes off on the first pathway he sees and lets his feet carry him some distance before he begins to think in some logical way about how he should get himself out of his difficulty; but then it may be too late.

Suppose we contrast our thinking about the world's problems with a far more specific set of thoughts about the development of one type of technology, say, the development of a rocket that is capable of sending an object to the moon. Here we have the very specific objective of landing an object on the moon within prescribed budgetary limits. We can start our thinking with the central objective and then begin to ask ourselves for a list of subobjectives which are obviously required in order to accomplish the central objective.

If we wish to land an object on the moon, then clearly we need (1) a propellant system, i.e., a substance capable of pushing the object out of the gravitational field of the earth; (2) the design of the "bird" that will fly to the moon and the boosters that will permit it to make its flight and to land satisfactorily. Quite obviously we will also need to have (3) a communication-control subsystem that will enable people on the earth to know where the object is and if necessary to control its flight, and to learn when it has landed. And, if the bird is to have a human inhabitant, then quite obviously we will have (4) to select and train the one or more people who are going to fly on it.

This "shopping list" of items that would be required in order to accomplish the purpose of landing something on the moon is not quite sufficient. We know we are going to have to ask a group of people to develop the propellant subsystem, the design of the bird and the booster subsystems, the communication and control subsystem, and the astronaut subsystem. We need to create guidelines that will enable them to do their job well. In other words, for each subsystem we are going to need a measure of the performance of the subsystem and a desired level of

performance which we can call a "standard" for the subsystem. That is, we are going to have to tell the engineer that we need a propellant capable of lifting a certain weight and shape of the bird out of the gravitational field of the earth. And we are going to have to tell him the amount of money that we can spend on creating such a propellant. If we tell him these things clearly enough, then he will be capable of measuring the performance of a given propellant, and we will be capable of deciding whether or not the particular propellant that he offers comes up to the desired standard. This means we are going to have to be able to measure whether or not a subsystem conforms to the standard. If it does so, then we are in a position to accept it and use it in the total system. If it does not, then we know we have further steps to take to develop a subsystem up to the level that we desire.

This is not all, however. We can't spend forever on the design of the subsystem. In fact, we can already begin to sense that if some of our efforts are delayed, then some of our other efforts are a waste of time. If it's going to take ten years to develop an adequate propellant, then we know we shouldn't develop highly trained astronauts to fly on the system next year because, by the time the propellant is fully developed, the astronauts will be too old to fly. Consequently we need a plan that will bring each subsystem up to the standard at a desired time so that the whole development effort goes along smoothly and there is no serious wastage on account of delay.

But because we can never make sure that a given set of plans or aspirations will come to fruition, we need something else besides. We need to set down the explicit steps that we will be willing to take and capable of taking when the plans fail. This is perhaps one of the most neglected aspects of the system approach to design and planning. The planners are often far too optimistic about their success so that when failures occur they are in position whatsoever to take the necessary steps because they have never thought about them before. In other words, to reiterate the point, when you postpone thinking about

something too long, then it may not be possible to think about it adequately at all.

If finally, in the plan for the development of a system for placing an object on the moon, we throw in as a component the activities that determine the overall objective and the justification of each of the subsystems, the measures of performance and standards in terms of the overall objective, then the whole set of subsystems and their plans and their measures of performance constitute a "systems approach" to the problem of putting an object on the moon. This last component, which determines the overall objectives and relates the subsystem standards to the overall, can be called the "management subsystem" It is the subsystem that thinks about the overall plan and implements its thinking. If the management subsystem works correctly, its thinking goes on continuously. It thinks about the relationship of the overall objective to the components at the very outset. It does not postpone its thinking until a crisis is reached. It does not begin by listing a set of things it wants to do without bothering its head about the reasons why it wants to do them. Each step of the plan is justified in terms of the overall objective. This does not mean that its thinking is rigid and closed because rigid and closed thinking is also inappropriate thinking. It thinks about how it should act when the unexpected occurs. Of course, the management subsystem may be surprised, because no thinking is ever perfect. But if the management subsystem is acting correctly, it is never caught in a situation in which prior thinking could have saved it.

STRATEGIES FOR STUDYING ORGANIZATIONS*

James D. Thompson

Complex organizations—manufacturing firms, hospitals, schools, armies, community agencies—are ubiquitous in modern societies, but our understanding of them is limited and segmented.

The fact that impressive and sometimes frightening consequences flow from organizations suggests that some individuals have had considerable insight into these social instruments. But insight and private experiences may generate private understandings without producing a public body of knowledge adequate for the preparation of a next generation of administrators, for designing new styles of organizations for new purposes, for controlling organizations, or for appreciation of distinctive aspects of modern societies.

What we know or think we know about complex organizations is housed in a variety of fields or disciplines, and communication among them more nearly resembles a trickle than a torrent. Although each of the several schools has its unique terminology and special heroes, Gouldner (1959) was able to discern two fundamental models underlying most of the literature. He labeled these the "rational" and "natural-style" models of organizations, and these labels are indeed descriptive of the results.

To Gouldner's important distinction we wish to add the

*Reprinted from Thompson, James D., *Organizations in Action*, McGraw-Hill, 1967, 1221 Avenue of the Americas, New York, N.Y. 10036.

notion that the rational model results from a closed-system strategy for studying organizations, and that the natural-system model flows from an open-system strategy.

CLOSED-SYSTEM STRATEGY

The Search for Certainty

If we wish to predict accurately the state a system will be in presently, it helps immensely to be dealing with a determinate system.

Fixing the present circumstances of a determinate system will determine the state it moves to next, and since such a system cannot go to two states at once, the transformation will be unique.

Fixing the present circumstances requires, of course, that the variables and relationships involved be few enough for us to comprehend and that we have control over or can reliably predict all of the variables and relations. In other words, it requires that the system be closed or, if closure is not complete, that the outside forces acting on it be predictable.

Now if we have responsibility for the future states or performance of some system, we are likely to opt for a closed system. Bartlett's research on mental processes, comparing "adventurous thinking" with "thinking in closed systems," suggests that there are strong human tendencies to reduce various forms of knowledge to the closed-system variety, to rid them of all ultimate uncertainty. If such tendencies appear in puzzle-solving as well as in everyday situations, we would especially expect them to be emphasized when responsibility and high stakes are added.

Since much of the literature about organizations has been generated as a by-product of the search for improved efficiency or performance, it is not surprising that it employs closed-system assumptions. It employs the rational model about organizations. Whether we consider scientific management, administrative management, or

bureaucracy, the ingredients of the organization are deliberately chosen for their necessary contribution to a goal, and the structures established are those deliberately intended to attain highest efficiency.

Three Schools in Caricature

Scientific management, focused primarily on manufacturing or similar production activities, clearly employs economic efficiency as its ultimate criterion, and seeks to maximize efficiency by planning procedures according to a technical logic, setting standards, and exercising controls to ensure conformity with standards and thereby with the technical logic. Scientific management achieves conceptual closure of the organization by assuming that goals are known, tasks are repetitive, output of the production process somehow disappears, and resources in uniform qualities are available.

Administrative management literature focuses on structural relationships among production, personnel, supply, and other service units of the organization; and again employs as the ultimate criterion economic efficiency. Here efficiency is maximized by specializing tasks and grouping them into departments, fixing responsibility according to such principles as span of control or delegation, and controlling action to plans. Administrative management achieves closure by assuming that ultimately a master plan is known, against which specialization, departmentalization, and control are determined. Administrative management also assumes that production tasks are known, that output disappears, and that resources are automatically available to the organization.

Bureaucracy also follows the pattern noted above, focusing on staffing and structure as means of handling clients and disposing of cases. Again the ultimate criterion is efficiency, and this time it is maximized by defining offices according to jurisdiction and place in a hierachy, appointing experts to offices, establishing rules for categories of activity, categorizing cases or clients, and then motivating proper performance of expert officials by providing salaries

and patterns for career advancement. Bureaucratic theory also employs the closed system of logic. Weber saw three holes through which empirical reality might penetrate the logic, but in outlining his "pure type" he quickly plugged these holes. Policymakers, somewhere above the bureaucracy, could alter the goals, but the implications of this are set aside. Human components (the expert officeholders) might be more complicated than the model describes, but bureaucratic theory handles this by divorcing the individual's private life from his life as an officeholder through the use of rules, salary, and career. Finally, bureaucratic theory takes note of outsiders-clientele-but nullifies their effects by depersonalizing and categorizing clients.

It seems clear that the rational-model approach uses a closed-system strategy. It also seems clear that the developers of the several schools using the rational model have been primarily students of performance or efficiency, and only incidentally students of organizations. Having focused on control of the organization as a target, each employs a closed system of logic and conceptually closes the organization to coincide with that type of logic, for this elimination of uncertainty is the way to achieve determinateness. The rational model of an organization results in everything being functional making a positive, indeed an optimum, contribution to the overall result. All resources are appropriate resources, and their allocation fits a master plan. All action is appropriate action, and its outcomes are predictable.

It is no accident that much of the literature on the management or administration of complex organizations centers on the concepts of planning or controlling. Nor is it any accident that such views are dismissed by those using the open-system strategy.

OPEN-SYSTEM STRATEGY

The Expectation of Uncertainty

If, instead of assuming closure, we assume that a system contains more variables than we can comprehend at one

time, or that some of the variables are subject to influences we cannot control or predict, we must resort to a different sort of logic. We can, if we wish, assume that the system is determinate by nature, but that it is our incomplete understanding which forces us to expect surprise or the intrusion of uncertainty. In this case we can employ a natural-system model.

Approached as a natural system, the complex organization is a set of interdependent parts which together make up a whole because each contributes something and receives something from the whole, which in turn is interdependent with some larger environment. Survival of the system is taken to be the goal, and the parts and their relationships presumably are determined through evolutionary processes. Dysfunctions are conceivable, but it is assumed that an offending part will adjust to produce a net positive contribution or be disengaged, or else the system will degenerate.

Central to the natural-system approach is the concept of homeostasis, or self-stabilization, which spontaneously, or naturally, governs the necessary relationships among parts and activities and thereby keeps the system viable in the face of disturbances stemming from the environment.

Two Examples in Caricature

Study of the informal organization constitutes one example of research in complex organizations using the natural-system approach. Here attention is focused on variables which are not included in any of the rational models: sentiments, cliques, social controls via informal norms, status and status striving, and so on. It is clear that students of informal organization regard these variables not as random deviations or error, but as patterned, adaptive responses of human beings in problematic situations. In this view the informal organization is a spontaneous and functional development, indeed a necessity, in complex organizations, permitting the system to adapt and survive.

A second version of the natural-system approach is more

global but less crystallized under a label. This school views the organization as a unit in interaction with its environment. Its view was perhaps most forcefully expressed by Chester Bernard and by the empirical studies of Selznick and Clark. This stream of work leads to the conclusion that organizations are not autonomous entities; instead, the best laid plans of managers have unintended consequences and are conditioned or upset by other social units: other complex organizations or publics on whom the organization is dependent.

Again it is clear that in contrast to the rational-model approach, this research area focuses on variables not subject to complete control by the organization and hence not contained within a closed system of logic. It is also clear that students regard interdependence of organization and environment as inevitable or natural, and as adaptive or functional.

CHOICE OR COMPROMISE?

The literature about organizations, or at least much of it, seems to fall into one of the two categories, each of which at best tends to ignore the other and at worst denies the relevance of the other. The logics associated with each appear to be incompatible, for one avoids uncertainty to achieve determinateness, while the other assumes uncertainty and indeterminateness. Yet the phenomena treated by each approach, as distinct from the explanations of each, cannot be denied.

Viewed in the large, complex organizations are often effective instruments for achievement, and that achievement flows from planned, controlled action. In every sphere—educational, medical, industrial, commercial, or governmental—the quality or costs of goods or services may be challenged and questions may be raised about the equity of distribution within the society of the fruits of complex organizations. Still millions live each day on the assumption that a reasonable degree of purposeful, effective action will be forthcoming from the many complex

organizations on which they depend. Planned action, not random behavior, supports our daily lives. Specialized, controlled, patterned action surrounds us.

There can be no question but that the rational model of organizations directs our attention to important phenomena: to important "truth" in the sense that complex organizations viewed in the large exhibit some of the patterns and results to which the rational model attends, but which the natural-system model tends to ignore. But it is equally evident that phenomena associated with the natural-system approach also exist in complex organizations. There is little room to doubt the universal emergence of the informal organization. The daily news about labor-management negotiations, interagency jurisdictional squabbles, collusive agreements, favoritism, breeches of contract, and so on, are impressive evidence that complex organizations are influenced in significant ways by elements of their environments, a phenomenon addressed by the natural-system approach but avoided by the rational. Yet most versions of the natural-system approach treat organizational purposes and achievements as peripheral matters.

It appears that each approach leads to some truth, but neither alone affords an adequate understanding of complex organizations. Gouldner calls for a synthesis of the two models, but does not provide the synthetic model.

Meanwhile, a serious and sustained elaboration of Barnard's work has produced a newer tradition which evades the closed-versus open-system dilemma.

A NEWER TRADITION

What emerges from the Simon-March-Cyert stream of study is the organization as a problem-facing and problem-solving phenomenon. The focus is on organizational processes related to choice of courses of action in an environment which does not fully disclose the alternatives available or the consequences of those alternatives. In this view, the organization has limited capacity to gather and process

information or to predict consequences of alternatives. To deal with situations of such great complexity, the organization must develop processes for searching and learning, as well as for deciding. The complexity, if fully faced, would overwhelm the organization, hence it must set limits to its definitions of situations; it must make decisions in "bounded rationality." This requirement involves replacing the maximum-efficiency criterion with one of satisfactory accomplishment, decision making now involving satisficing rather than maximizing.

These are highly significant notions, and it will become apparent that this book seeks to extend this "newer tradition." The assumptions it makes are consistent with the open-system strategy, for it holds that the processes going on within the organization are significantly affected by the complexity of the organization's environment. But this tradition also touches on matters important in the closed-system strategy: performance and deliberate decisions.

But despite what seem to be obvious advantages, the Simon-March-Cyert stream of work has not entirely replaced the more extreme strategies, and we need to ask why so many intelligent men and women in a position to make the same observations we have been making should continue to espouse patently incomplete views of complex organizations.

The Cutting Edge of Uncertainty

Part of the answer to that question undoubtedly lies in the fact that supporters of each extreme strategy have had different purposes in mind, with open-system strategists attempting to understand organizations per se, and closed-system strategists interested in organizations mainly as vehicles for rational achievements. Yet this answer does not seem completely satisfactory, for these students could not have been entirely unaware of the challenges to their assumptions and beliefs.

We can suggest now that rather than reflecting weakness in those who use them, the two strategies reflect something fundamental about the cultures surrounding complex or-

ganizations: the fact that our culture does not contain concepts for simultaneously thinking about rationality and indeterminateness. These appear to be incompatible concepts, and we have no ready way of thinking about something as half-closed, half-rational. One alternative, then, is the closed-system approach of ignoring uncertainty to see rationality; another is to ignore rational action in order to see spontaneous processes. The newer tradition with its focus on organizational coping with uncertainty is indeed a major advance. It is notable that a recent treatment by Crozier (1964) starts from the bureaucratic position but focuses on coping with uncertainty as its major topic.

Yet in directing our attention to processes for meeting uncertainty, Simon, March, and Cyert may lead us to overlook the useful knowledge amassed by the older approaches. If the phenomena of rational models are indeed observable, we may want to incorporate some elements of those models; and if natural-system phenomena occur, we should also benefit from the relevant theories. For purposes of this volume, then, we will conceive of complex organizations as open systems, hence indeterminate and faced with uncertainty, but at the same time as subject to criteria of rationality and hence needing determinateness and certainty.

THE LOCATION OF PROBLEMS

As a starting point, we will suggest that the phenomena associated with open- and closed-system strategies are not randomly distributed through complex organizations but instead tend to be specialized by location. To introduce this notion we will start with Parsons' suggestion that organizations exhibit three distinct levels of responsibility and control: technical, managerial, and institutional.

In this view, every formal organization contains a suborganization whose "problems" are focused around effective performance of the technical function—the conduct of classes by teachers, the processing of income tax returns and the handling of recalcitrants by the bureau, the pro-

cessing of material and supervision of these operations in the case of physical production. The primary exigencies to which the technical suborganization is oriented are those imposed by the nature of the technical task, such as the materials which must be processed and the kinds of cooperation of different people required to get the job done effectively.

The second level, the managerial, services the technical suborganization by (1) mediating between the technical suborganization and those who use its products—the customers, pupils, and so on—and (2) procuring the resources necessary for carrying out the technical functions. The managerial level controls, or administers, the technical suborganization (although Parsons notes that its control is not unilateral) by deciding such matters as the broad technical task which is to be performed, the scale of operations, employment and purchasing policy, and so on.

Finally, in the Parsons formulation, the organization which consists of both technical and managerial suborganizations is also part of a wider social system which is the source of the "meaning," legitimation, or higher-level support which makes the implementation of the organization's goals possible. In terms of "formal" controls, an organization may be relatively independent; but in terms of the meaning of the functions performed by the organization and hence of its "rights" to command resources and to subject its customers to discipline, it is never wholly independent. This overall articulation of the organization and the institutional structure and agencies of the community is the function of the third, or institutional, level of the organization.

Parsons' distinction of the three levels becomes more significant when he points out that at each of the two points of articulation between them there is a qualitative break in the simple continuity of "line" authority because the functions at each level are qualitatively different. Those at the second level are not simply lower-order spellings-out of the top-level functions. Moreover, the articulation of levels and of functions rests on a two-way interaction, with

each side, by withholding its important contribution, in a position to interfere with the functioning of the other and of the larger organization.

If we now reintroduce the conception of the complex organization as an open system subject to criteria of rationality, we are in a position to speculate about some dynamic properties of organizations. As we suggested, the logical model for achieving complete technical rationality uses a closed system of logic, closed by the elimination of uncertainty. In practice, it would seem, the more variables involved, the greater the likelihood of uncertainty, and it would therefore be advantageous for an organization subject to criteria of rationality to remove as much uncertainty as possible from its technical core by reducing the number of variables operating on it. Hence if both resource-acquisition and output-disposal problems which are in part controlled by environmental elements and hence to a degree uncertain or problematic can be removed from the technical core, the logic can be brought closer to closure, and the rationality increased.

Uncertainty would appear to be greatest, at least potentially, at the other extreme, the institutional level. Here the organization deals largely with elements of the environment over which it has no formal authority or control. Instead, it is subjected to generalized norms, ranging from formally codified law to informal standards of good practice, to public authority, or to elements expressing the public interest.

At this extreme the closed system of logic is clearly inappropriate. The organization is open to influence by the environment (and vice versa) which can change independently of the actions of the organization. Here an open system of logic, permitting the intrusion of variables penetrating the organization from outside, and facing up to uncertainty, seems indispensable.

If the closed-system aspects of organizations are seen most clearly at the technical level, and the open-system qualities appear most vividly at the institutional level, it would suggest that a significant function of the managerial

level is to mediate between the two extremes and the emphases they exhibit. If the organization must approach certainty at the technical level to satisfy its rationality criteria, but must remain flexible and adaptive to satisfy environmental requirements, we might expect the managerial level to mediate between them, ironing out some irregularities stemming from external sources, but also pressing the technical core for modifications as conditions alter.

Possible Sources of Variation

Following Parsons' reasoning leads to the expectation that differences in technical functions, or technologies, cause significant differences among organizations, and since the three levels are interdependent, differences in technical functions should also make for differences at managerial and institutional levels of the organization. Similarly, differences in the institutional structures in which organizations are imbedded should make for significant variations among organizations at all three levels.

Relating this back to the Simon-March-Cyert focus on organizational processes of searching, learning, and deciding, we can also suggest that while these adaptive processes may be generic, the ways in which they proceed may well vary with differences in technologies or in environments.

RECAPITULATION

Most of our beliefs about complex organizations follow from one or the other of two distinct strategies. The closed-system strategy seeks certainty by incorporating only those variables positively associated with goal achievement and subjecting them to a monolithic control network. The open-system strategy shifts attention from goal achievement to survival, and incorporates uncertainty by recognizing organizational interdependence with environment. A newer tradition enables us to conceive of the organization as an open system, indeterminate and faced

with uncertainty, but subject to criteria of rationality and hence needing certainty.

With this conception the central problem for complex organizations is one of coping with uncertainty. As a point of departure, we suggest that organizations cope with uncertainty by creating certain parts specifically to deal with it, specializing other parts in operating under conditions of certainty or near certainty. In this case, articulation of these specialized parts become significant.

We also suggest that technologies and environments are major sources of uncertainty for organizations, and that differences in those dimensions will result in differences in organizations.

BRINGING SYSTEMS ANALYSIS INTO THE RURAL WORLD

Egbert deVries

In rural areas, agriculture is the most important activity. Nevertheless, developers all over the world have come to the conclusion that development must encompass the totality of the rural areas and cannot be confined to improved agronomy or agricultural business. Therefore, it becomes necessary to treat the whole of rural society as a system. Furthermore, systems analysis, the technique of the critical path and similar procedures and organizational methods are coming into fashion.

In adopting this approach we must keep in mind a number of significant, differentiating characteristics inherent to the nature of agriculture and the structure of rural society.

To begin with, we are concerned with thousands—up to hundreds of thousands—of decision makers. These are generally small and often their goals are similar, which makes statistical analysis feasible. However, there is no unified command and efforts to institute the discipline of rural development by administrative means are difficult and limited. For example, irrigation schemes improve greatly the chances of administrative discipline up to adding fertilizer to the irrigation water. Control of pests and diseases also justify mandatory measures. In some

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cases (cotton) specified varieties are mandatory, others illegal, in order to achieve pest control and the uniformization of the product.

The first exercise in rural development administration would be research into decision preferences and differentiation. What are the advantages of homogeneity in types of crops, animals, fertilizers, insecticides, marketing, processing, etc? There should be no optimum, because complete homogeneity would certainly sharpen peaks of labour input and use of water, and perhaps provoke a glut in the market. But great heterogeneity makes nearly all operations, except labour, more expensive. Regional specialization and local similarity often prove to be the optimum solution. This, however, requires a well-established exchange economy and communications society. Without these elements, the result is "feast and famine," "death and glut" in rapid succession.

The second point is that although in every organized human activity various layers of input suppliers can be distinguished, these are particularly complex in agriculture. They cannot easily be influenced (bought, bought off, muted, changed, etc.) by peasant groups. This is partly because it is difficult to organize the peasants, scattered over large areas. To generalize, these layers are in four categories which influence farmers and their communities: a) national policy decision makers: b) specific public or parastatal bodies: c) private input suppliers: d) farmers' organizations.

In rural development administration we are first of all concerned with national policy and specific institutions created to improve conditions in rural areas. But development also means a strengthening of farmers' organizations and a manipulation, regulation, and control or management of private inputs. (More about these groups of input-suppliers later.) It might be said that in most countries, especially in transitional agriculture, a very large number of experiments have been and still are being carried out to improve the "input-fit."

Another important point is that agriculture is seasonally

bound, a rhythmic process, generally a yearly cycle (in forestry, of course, much longer). Occasionally the production process is almost continuous, like tapping rubber or picking tea during the season, or operating a dairy farm. In the latter, faint seasonal cycles are noticeable, but this is nothing as compared to rainfed cereals. Irrigation, greenhouses, crop diversification within the farm are some of the techniques which blunt the seasonal ups and downs. (In the building industry during a frost period or in the tourist industry some parallels are found, but in manufacturing and in service-industries the seasonal cycles are very faint and the choice between stocking up or slowing down can only be solved through very advanced business administration.) This means that supplies (inputs of seeds, water, fertilizer, credit, etc.) must be available at a specific date; the products which are harvested in a specific period must be stores, processed and financed over a long period; prices of products and to a much lesser extent industrial products used inputs show a cyclical up and down.

The fourth consideration is that in agriculture, labour must largely remain multifunctional. Because of seasonal variations and a mixture of feed crops (designed to stabilize ups and downs) the labourer must be able to perform a multitude of functions. In some cases, society has ritualized these as typically male or female. More often, in peak periods, everybody has to "lend a hand." But this also means that specialized skills are hard to develop. Migrant labour is a poor substitute for specialization. The "Adam Smith effect" of increased productivity through the division of labour has very limited applicability. According to a study by Eckaus, published by the Massachusetts Institute of Technology in the U.S.A., it takes three years to train a skilled farm labourer, against three months for a worker in the building industry. Nevertheless, because so few are specialized, farm labour is easy to substitute and wage differentials are limited (modern machinery, and in the old days the handling of valuable horses, make a difference). Where a continuous flow of labour from rural to urban areas occurs, average farm income tends to equal wages for unskilled labour in the cities.

Marginal Labour

Finally, in rural areas, the family still remains largely a production unit as well as a consumption unit.

This provides protection to the individual, especially where social norms prefer the multigeneration and the extended family. But this again means, coupled with a low degree of specialization, that most labour is "marginal," both in moving in and moving out of the family. The equalization of value of labour and consumption patterns then means that average and marginal income do not differ very much. This is an impediment against individual and against family or clan or village progress. In fact, the individual must detach him or herself physically to get a chance, even if better educated. And the trend is to move out. In fact, one of the difficult arts of rural development administration is to provide rewarding functions to the educated young.

Thus, rural areas, dependent to a large extent on agriculture, have a number of interrelated technical, economic, social and cultural characteristics. These must be taken into account in a system of rural development administration. Also one should not think that conditions are uniform; in most countries there are significant regional differences and patterns.

The Input Supplier

Who are they, and what are their functions? First comes government policy. Overall government policy is expressed in land tenure policies, import and export policies, taxation policies, educational and health services, transportation networks. In national development programmes agriculture must play an important role with regard to national product, foreign exchange balance, capital investment. It generally does but, significantly, implementation falls short of plans in most countries.

Public or parastatal bodies. In many cases, these are designed to fulfill functions or services where the private suppliers are too expensive or where the farmers' organizations are too weak. Marketing boards, credit institutions,

seed farms, irrigation districts are typical examples. It is a matter of overall policy, whether these are seen as a) temporary, bridging a business cycle or a development lag; b) competitive in service and price with private or self-organized institutions; c) structural as part of a social or political philosophy.

Private suppliers. These tend to be ubiquitous, most flexible, but expensive. They entered the scene first when "out-of-community sales" of products became an important element in farming. Very often they furnished essential consumer goods against future delivery of agricultural products. This led to lasting and often burdensome relations of credit and indebtedness. The "merchant-money-lender-usurer" typifies a dark syndrome of socioeconomic stagnation and misery. But the role of the merchant is essential. In more recent years, the same channel became available for the purchase of short-term production inputs, such as fertilizer, seed, insecticides. These services are valuable because they are—must be—well-timed and flexible. But again, they are expensive. Not only cash crops, grown primarily for the market, but also basic food crops may enter into the cycle of relationships between farmer and input-supplier.

A third group of relations centers on the ownership and use of farmland. Often the farmer must obtain arable land from an outside source. Share-cropping with a traditional fifty-fifty division of the product may be equitable when only land and labour enter the production process. But in many cases it becomes usurious or does not guarantee a basic income to the tenant. Where land reform has abolished feudal or "seigneurial" (commercialized semi-feudalism) relationships, the peasant, now legally an owner may not have gained much, if he pays high prices for production inputs and marketing-cum-processing services.

Farmers' organizations. In the second half of the nineteenth century most farmers in Western Europe and North America were caught in a squeeze between the widening of the scale of marketing and processing and the need for off-farm production inputs. Quite often they were also heavily in debt.

In many cases, they were able to pull themselves up through cooperative credit, marketing and processing. This example had a catalytic effect on governments and on progressive farmers in the developing continents. However, helping peasants to organize themselves is not an easy job. Eager government officials have tried their very best to introduce cooperatives schemes among the farmers of Latin America, Asia, Africa and the Mediterranean countries. The results at best were spotty and many rural areas became the object of a variety of governmental efforts or experimentation.

One may sometimes criticize these as "western-thought-impositions." Mostly, however, social and cultural circumstances make it very difficult for peasants to organize themselves. Governmental support, subsidies and even supply monopolies are not always effective. Even cooperatives may turn into monopolistic outside suppliers of services. The keys to success are education in general, the training of functionaries for the cooperatives, the availability of a seasonal key-crop which needs processing or storage. Increasingly, the recognized needs for fertilizer, pesticides and seeds become a basis for successful cooperatives. There are other forms of farmers' organizations (farmers' associations, lobbying groups, etc.), but these are less suited to the needs of the small farmer.

Local cooperatives need a framework, either in national cooperative banks and associations, or in national marketing systems. Usually, the marketing boards or similar institutions were set up and are sustained by governmental initiative and support—the latter up to specific monopolies. Only in a few countries could they be called farmers' organizations—they belong in the group of public bodies.

Thus, in most developing countries, farmers' organizations are weak. However, it is my firm belief that in the long run they are the main hope for the peasant, as he enters the exchange economy for supplies and markets.

The farmer, his family and possessions. This of course is the heart of the matter. There is a prevailing myth that he is nearly self-sufficient, producing what he can and consum-

ing what he produces. But the exchange of products and labour have penetrated deeply. The peasant family has multiple and far-reaching connexions with the outside world, even world markets. Land freed from community-bound distributive rules has entered into the market a great deal, and is consequently more expensive and less accessible to the small man. Borrowing has become a regular feature. Even the family itself is touched by development whenever its members must find work and become a nuclear two-generation family. The social and economic demand for money has risen rapidly, but the supply often lags behind as terms of trade deteriorate.

We must add the local rural community, closely related to the farm household. This in itself constitutes a network of economic, social and cultural relationships.

We can then identify schematically the elements in agricultural production and rural life (see chart).

A summary of the preceding may read as follows: When entering the market for inputs, including services, farmers encounter tremendous problems. Because it is difficult for them to organize themselves—the situation is too dynamic, the numbers of peasants too large, the size of their farms is small, education and skill cannot cope with the larger environment—and private, commercial supply channels are too expensive, a major role falls on governments. And most governments have accepted that function as a major component in national development, but they have done so in a variety of ways. Where governments can rely heavily on an interplay of competitive economic and social forces, their major function is in external trade and domestic prices. The United States is a prime example. On the other side of the spectrum, where governments cannot or do not want to promote these competitive forces, they generally have nationalized the agricultural land. The U.S.S.R. is a prime example. Of course, even in the U.S.A. and the U.S.S.R., there are accommodations with reality through mitigating or corollary action.

In many other areas, including Western Europe and most developing countries, government policy is a mixture

of direct action, stimulation and correction of non-governmental functions.

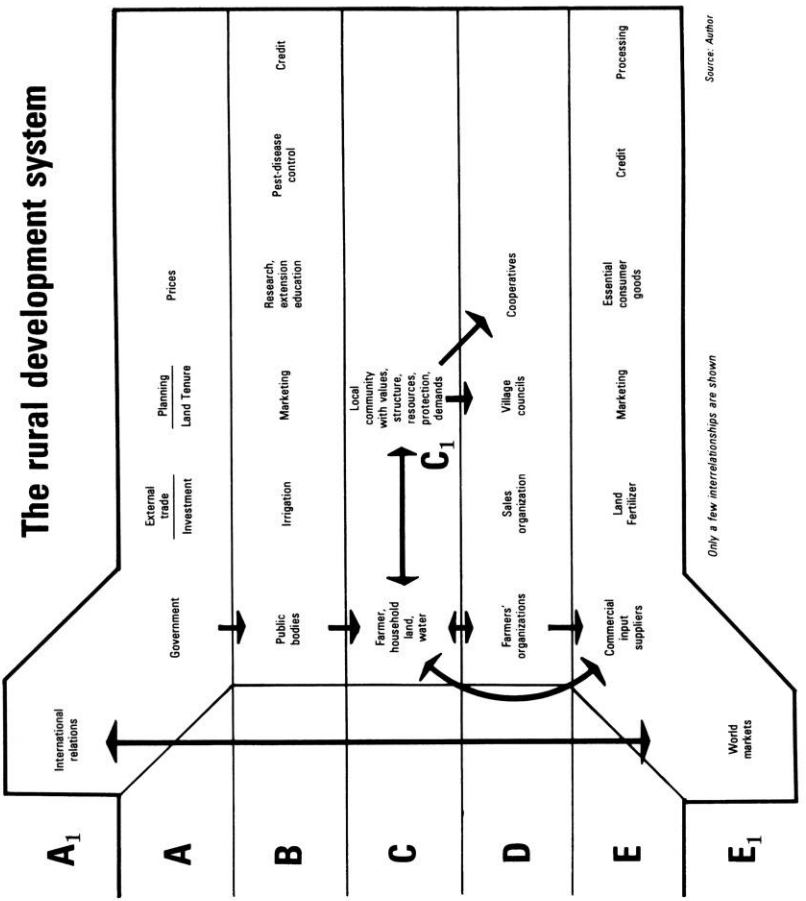
A Multitude of Combinations

It is in this realm that rural development administration is most important. According to the chart on the following pages, government (A) may issue policies, prepare studies, invest (in infrastructure mainly), but it also may create public (parastatal or mixed) bodies (B), in order to assist, stimulate, regulate and control action by farmers (C), farmers' organizations (D), and commercial agents (E).

As the type of interference varies and the number of agencies is large, the number of functions again is rather large. There is a multitude of combinations. Here the techniques of systems analysis can be used fruitfully. Are more assistance and stimulation better than more supervision and regulation? Can some or many of the commercial agents (E) be replaced by public bodies (B) or farmers' organizations (D)? What is the effect of governmental action on farmers' initiative, freedom of choice and income (C)? Can farmers' organizations stimulate governmental action or improve action by public bodies or instigate the import of commercial agents?

Other important issues are related to horizontal and vertical integration. Are monopolies (in the A, B, D, or E sphere) beneficial, temporarily necessary, dangerous or vicious? Where does enlargement of size have its optimum? Where does vertical integration of functions—national and international—lead to? Does a lack or an excess of it harm the viability of the whole system?

Here one may add that intergovernmental bodies—there is a wide variety besides FAO—mainly through external trade and prices, somewhat through planning and investment reach into a worldwide superstructure. Similarly, the commercial input suppliers, through world markets for products, production inputs and capital reach into the international sphere. And—as UNCTAD and GATT show—the world's economic superstructure and infra-



structures do not meet easily. Thus we added categories A^1 and E^1, the international world, to the system.

Rural development administration, in this context, has a variety of meanings. In a direct sense, as used by Guy Hunter, it relates to the action of sectors A and B on C, D, and E. Realistically, this should include intergovernmental action on world markets. A very fruitful study could be made of the interrelationships in a simplified model: government—rural areas.

It is also possible to start from the action of sectors C and D—farmers and their organizations—as affected by A and

B—government—and E—commercial agents. Whereas government has a wide choice of action, farmers generally are on the defensive. Their main policy is aimed at survival and continuity and increasingly, the rural community (C^1) is opened up through roads, markets and schools, and loses its protective and stabilizing influence. It is a moot question how it could be changed into a dynamic change agent.

New Methods are Essential

Commercial agents must rely on flexibility and agility. They are usually competent. Where they obtain economic, perhaps social or even political power, they endanger the stability of the stability of the system and governments generally come to the assistance of farmers and their organizations. In some parts of the world the role of commercial agents has become minimal; in others they are a stimulating force.

Rural development administration in the wider sense includes a study of the nongovernmental forces in rural areas as well as the public institutions. The interrelationships are very complex and differ from area to area. Individual farmers generally are eager to improve their situation.

Traditional communities and weak functional organizations often are an impediment. New technologies (high-yielding varieties) affect the whole system and require new methods of public action and socioeconomic interaction. The green revolution is revolutionary in the sense that it caught "the system"—most elements in it at least—sleeping and requires radically new interactions.

The solutions will differ from area to area, they will not be easy, but it is essential that they be found.

SOME BASIC CONCEPTS OF SYSTEMS ANALYSIS*

Earl M. Kulp

Over the past 25 years many activities other than rural development have suffered from working method gaps. They are simply too complex to be planned and managed by traditional working methods. At the same time the evolution of the computer has offered the possibility of massive data manipulation on a previously inconceivable scale, inviting new quantitative approaches to complex problems. Systems analysis has arisen in response to these new challenges and new opportunities.

Originally applied, under the name of operations analysis, to military problems, systems analysis has achieved breakthroughs in problem-solving and complex project management in a widening variety of fields: production, marketing, public administration, development planning, information retrieval, education, and public health. It has been used to open a Broadway show on time, to determine optimum feed mixtures, and to determine which weapon works best in an ambush.

As the range of successful applications has broadened, however, a comprehensive definition of systems analysis has become more elusive. Some explanations of the term would appear to limit the definition to "a mathematician linked to a computer." It is, indeed, a level of discourse, of conceptualization, somewhere between pure mathematics and traditional academic and professional disciplines.

*Adapted from Kulp, Earl M., *Rural Development Planning.*

Other explanations of the term are so broad as to imply that everyone is actively engaged in systems analysis from weaning to old age.

As an approach to a useful definition, one might start by saying that systems analysis is a body of decision tools for complex problems developed over the past 25 years, starting with model-building and cutting across traditional disciplines. Looking closer at the key words in this definition, one sees first that it is decision-oriented, not designed primarily to broaden or deepen basic understanding of phenomena. Second, it is based on model-building. Third, it is for problems too complex to be solved without these techniques. Finally, it is interdisciplinary; its tools of analysis are not confined to one field alone.

The Systems Approach

In addition to utilizing a variety of specific analytical tools, systems analysis is characterized by a consistent overall approach to problems. It starts from a highly formalized, carefully formatted exercise in definition. It aims at the broadest feasible, most rigorous consideration of relevant objectives and interrelationships, at a "look at the total system." The approach follows, roughly, the following sequence:

1. Define the scope of the problem and its objectives.
2. Define the relevant system and build a model of it.
3. Formulate alternative solutions, which may be either combinations of different activity systems or different systems configurations.
4. Select an optimum solution by applying the model and evaluating results on the basis of objectives and other criteria.

Types of Models

The heart of systems analysis, then, is the use of models. These may be adaptations of a standardized analytical structure or they may be specially designed, cut from whole cloth to handle a specific problem. One can distinguish three types of models:

Mathematical—At the top level, so to speak, are the advanced mathematical tools of operations research, used by the operations analyst. Paraphrasing Robert Dorfman's excellent description, an operations analyst is a man who tackles a problem by writing down some equations first. Some of the principal standard tools of model-building at this level are linear programming, simulation, queueing theory, game theory, search theory, and information theory.

Management—At the middle level are models which are fully quantitative but whose applications do not necessarily require mathematical formulations. These include a variety of scheduling techniques based largely on networking; techniques known generally by their acronyms: CPM (critical path technique), PERT (program evaluation and review technique), and LOB (line of balance), among others. Also at this level are the techniques of cost-benefit analysis.

Schematic—Finally, there are models used to handle mixed quantitative-qualitative problems. These are largely graphic devices, sundry types of matrix, grid, or network analyses of relationships and alternatives. Also at this level are techniques for improving conceptualization of relationships of activities to objectives; these techniques include definition of missions, hierarchies of objectives, cost-effectiveness analysis, and various aspects of PPBS (planning-programming-budgeting system), the planning system for the U.S. Federal Budget.

Planning as a System

The use of schematic models and basic systems concepts can be illustrated by applying them to a question which we must see as a starting point: What is planning?

Like many complex problems, the complexity of planning is concealed by the simplicity of its label. Planning is an everyday household word. People are generally quite confident they know its exact meaning. In reality the use of the term is highly confusing, and much of what passes for planning is not planning at all.

One might start by noting that any real activity or real processing system must have a control system like that in Figure 1.1.

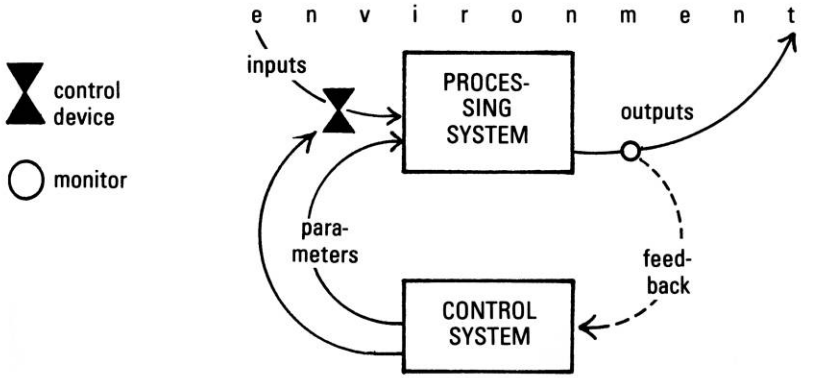


FIGURE 1.1 Control System

The figure is something of a simplification of the full relationship. Using some of the standard systems terminology the inputs to the control system are in part feedback from the output and in part data on the state of the processing system. The control system has two types of outputs: (1) regulation or changes in the flow of inputs and (2) changes in the parameters or systems structure of the processing system. The two systems are parts of each other's environment.

The entities (or elements) of the control system are decisions. Each decision can be, in turn, analyzed as a sub-system, having three types of attributes: rules, roles, and documents. The *rules* are the specified method of decision. They and their interrelationships generally constitute a model of the real processing system as well as a set of decision criteria. The *roles* are the people involved in the system and their relative responsibilities. Together they constitute an organizational system. The *documents* are the formats on which information and decisions are

carried throughout the system; collectively, they constitute the paperwork system.

Three classes of decisions should be distinguished. Each class constitutes a subsystem of the total control system:

1. *Policy decisions* determine future responses to environmental conditions expected to reoccur: (Whenever x occurs, do A.)
2. *Planning decisions* determine a sequence of actions to take place at specified future times, given certain assumptions of the future state of the environment: (Based on assumed conditions x and y, do A in period t = 1, B in t = 2, 2B in t = 3, etc.)
3. *Coping decisions* are reponses to events that have just occured: (Now that x has occurred, do A.)[9]

Coping is somewhat subordinated to planning, which in turn is subordinated to policy, as in Figure 1.2.

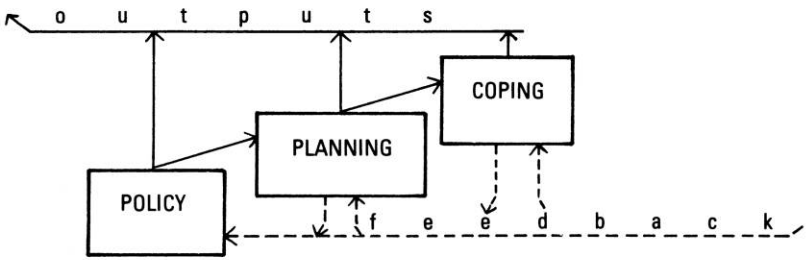


FIGURE 1.2 The Total Control System

The planning system by itself can thus be considered a process-type system whose entities or elements are decision-making operations. These entities are structured in a network, connected by flows of documents. Each operation conceived as a subsystem is composed of decision rules, or decision steps, and the people involved in the operation. The participants have, in turn, subattributes of time available, talent, and authority. The decision rules (the model) and the personnel and their attributes constitute the parameters of the planning system as a whole and the parameters of each subsystem. These parameters are, in turn, set by some broader governmental control system.

The planning system is visualized schematically in Figure 1.3.

Some Words of Caution

The above discussion of planning as a system illustrates, hopefully, the use of general systems terminology and schematic models to clarify and communicate concepts and interrelationships. It also helps illustrate some of the dangers of systems analysis.

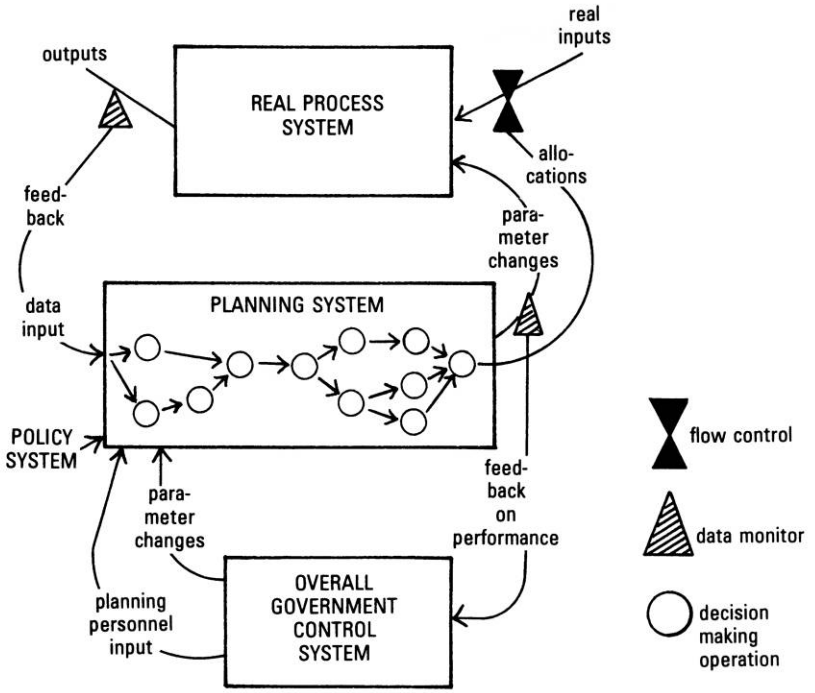


FIGURE 1.3 The Planning System.

Systems techniques have the aura of tremendously powerful tools, at times in the panacea class. One hears: "What the government needs is more systems analysis," or "They failed because they did not consider the total system."

Systems analysis has grown up talking to computers and it carries with it the programming jargon. This can give a very false aura, a delusion of rigor, incisiveness, and profundity—when one is actually saying nothing more than "The knee bone's connected to the leg bone." Worse, it can at times gloss over very illogical propositions, particularly in schematic diagrams in which entities of grossly different levels of abstraction are treated uniformly.

It is easy, perhaps too easy, to draw a chart full of boxes and arrows. But what are the specific interrelationships represented by those arrows? What counts the concreteness of the statements of interrelationships.

Systems analysis is interdisciplinary, but its results always depend on the quality of the behavioral theory of the field in which it is being applied. It can only work on problems for which there are theories which can explain relationships between variables *in terms of observable data.* This is a problem for mathematical as well as schematic models. A coefficient as well as an arrow is of value only if it can be given quantification or some concrete meaning that can be proven right or wrong by subsequent observations. For this reason, systems analysis is no revolutionary new tool that will replace traditional disciplines; it is completely dependent on traditional disciplines to provide the theory to make it work.

In addition to promote a false aura of incisiveness and profundity systems jargon can also get tedious.

SECTION II

THE MANAGER AND AGRICULTURAL DEVELOPMENT

Garland P. Wood

Managers and administrators in developing societies face a daily dilemma. They face an environment that requires change to meet new goals of social justice and income equities at a time of shifting national and international markets and further destabilizing effects of new technologies. They note the unsettling factors of inadequate roads, limited and poor quality storage facilities, drouths, pests, and highly fluctuating prices. They direct their attention to their own organization through which they must implement development programs and see a bureaucracy honed to a fine edge to protect the status quo.

The lead article in this section *Desirable Attributes of Development Administrators* by Hahn Been Lee states that there are two related attributes that an administrator needs so as to adapt his organization to the changing society. He needs an *outlook toward the future* and *analytic ability.*

The second paper, by John Montgomery, plots various ways the institution can be made amenable to development goals. Bureaucratic institutions are here to stay and if agricultural development is to take place it will, for the most part, be done through these much criticized bureaucratic institutions.

The third article in this section by Garland Wood suggests an information gathering plan to the administrator so that he may better understand his organization, its clientele and the institutional matrix surrounding his organization. The paper stresses the special problem of public institutions seeking to serve the small farmer.

John Fischer's paper focuses on the manager/administrator as supervisor. Managers many times make the right decision yet fail because of their inability to motivate their subordinates or to properly supervise the physical resources utilized in the operation. The management job is not finished until decisions have been translated into action.

Leonard Joy in the fifth article picks up this point and goes on to highlight the difficulties of implementing agricultural programs due to the unique characteristics of agriculture. He argues for a greater understanding of the inter-relatedness of implementation and planning. Joy directs his attention and illustrations to the Agricultural Extension Service.

The final paper in this section by Saul Katz looks to the problems of coordinating the programming for agricultural research, extension and credit. The analytical framework he has evolved to study coordination needs among these three agricultural functions should prove useful to the analytical administrator.

DESIRABLE ATTRIBUTES OF DEVELOPMENT ADMINISTRATORS*

Hahn-Been Lee

Introduction

Administrators in developing societies face a daily dilemma. This springs from the basic gap between the fast changing environment and the static administrative ethos and structure. Situationally, they are faced with unanticipated and unpleasant changes from their administrative environment. These changes range from such things as floods, typhoons, transportation accidents, labor strikes or threats, grievances among students, teachers and military organization, drops in farm income, business failures, urban disturbances to international monetary crises and sudden foreign trade barriers, and so forth. But when they look around much closer, they can see that the bureaucracy to which they belong is not so structured, in terms of its ethos and procedures, as to meet such changes. If they are perceptive persons, they could even see that they themselves share some of this ethos. Hence, the dilemma. "Development administrators" are the desired types of administrators to whom a normative task is given—the task of positively meeting these environmental demands with a conscious goal of achieving some definite progress in their respective fields of introduction of deliberate changes in

*Philippine Journal of Public Administration, Vol. XVI, No. 3, July 1972, pp. 390-398.

the very ethos and procedures of bureaucracy. Naturally, this involves a drastic change in his psychological attitude as well as in his mode of action. It is the task of this paper to ascertain the desired attributes of such persons with a view to searching for some curricular instrumentalities that will foster such attributes. But in order to consider the various attributes, we shall begin by examining in operational terms the functional requirements of such persons in action and derive the relevant attributes from these functions.

I. FUNCTIONAL REQUIREMENTS OF DEVELOPMENT ADMINISTRATORS

A development administrator shares the basic functions of any administrator in terms of managing the affairs of an organization, but there are two significant aspects which distinguish a development administrator from other administrators. One aspect is his primary engagement in the management of *change*—not only in meeting problems arising from the change but also introducing changes in the organization in anticipation of changes in the environment. The other is his conscious identification with the organizational goals in the context of some broader development values of the larger society. These two aspects are closely interrelated and form the distinguishing marks of a development administrator's action. Below we shall first consider more detailed functions emanating from these general characteristics and then examine the relevant qualities required by each of these functions.

1. *Defining and redefining goals,* and anticipating new tasks under changing environments.

The first task of a development administrator is to conceptualize the role of his organization in relation to the larger social environment. This involves essentially carving out useful tasks for his organization and spelling out the *why* and the *what* of the organization. A development administrator has to have a meaningful picture of the

cosmos in which he and his organization live and locate the position of his organization in the total context of that cosmos. This involves articulating what his organization is doing, comparing it with what the larger changing society may require of it in the future, and coming up with a new set of goals for the organization redefined in the light of the anticipated changes in the larger environment. This is obviously different from the function of a conventional administrator who only consults existing regulations and applies the detailed prescriptions of the books to every new problem that arises. While the preoccupation of a conventional administrator is a smooth maintenance of the status quo, the aim of a development administrator is the adaptation of his organization to the changing society.

What kind of attributes does this function require of a development administrator? It requires at least two related qualities: *an outlook toward the future* and *analytic ability.* The future outlook is related to the job of anticipating tasks in relation to system changes, while the analytic ability is necessary to obtain a detailed estimation of the kinds of organizational change involved.

As a goal definer, the development administrator needs a certain normative conviction that the administrative goal which he is proposing is in line with the larger public goals of the society.

2. *Initiating new plans and policies,* or reformulating existing policies.

The organizational goals visualized and articulated by a development administrator must be translated into new plans and policies to be organizationally effective, for plans and policies are the embodiment of organizational goals. In administration, goals which are not transformed into concrete plans and policies are hollow concepts and bear no fruit.

What forms do new actions take? First of all, existing regulations and procedures must be examined to ascertain the extent to which they can be reinterpreted or revised to accommodate the new actions that are being proposed to be

taken. New tasks require new procedures, but one of the most pervasive aspects of bureaucratic life is the resilience of bureaucratic procedures which were initiated in earlier times and under different situations when administrative problems were much simpler. Thus, development administrators, confronted with immense new tasks, often find a need to break the rules. In such cases, actions must be taken to introduce new procedures and policies. This springs from the fact that most of the existing regulations are the product of earlier situations and hence do not reflect the environmental changes that have taken place in the meantime.

Beyond procedures, new guidelines must be devised delineating the boundaries and general breakdown of the goals, the relative priorities among subgoals, the rate and sequence of various components of the subgoals. These are the content of plans and policies.

The function of formulation and reformulation of policies and plans above all requires a *grasp of the situation* as a whole. To have a grasp of the evolving situation, the administrator needs some kind of background, through either actual or simulated experience. Also some basic understanding of *substantive policy areas* is needed.

It is needless to say that the analytic ability needed for goal definition would be equally required for formulation of plans and policies.

3. *Adapting and restructuring the organizations to perform new tasks.*

Another facet of bureaucratic life which becomes a serious constraint for development administrators in carrying out new tasks is the organizational structure of the government. New approaches must be undertaken in using existing organizations as a vehicle for managing developmental tasks. This does not necessarily mean radically changing the structure. But a development administrator must look at the existing structure carefully in order to ascertain its relative strengths and weaknesses in relation to the task goals. Where should the organizational thrust be

in order to give momentum to the task? How can the weaker units be revamped? Often the first step in adapting an organization without affecting its formal structure is the formation of task forces to be assigned specific tasks and composed of individuals from different existing units. This provides opportunities whereby individuals with different orientations and capabilities can blend flexibly without being bound by formal channels of authority and where natural linkages for more productive formal organizational arrangements can evolve. Such preliminary steps could be followed up by more definitive restructuring of the organization, giving organizational expression to the more important program thrusts.

This function requires first of all an *innovative mind.* The development administrator is eager to try new ideas through his organization. He tries to blend men and organization. This implies enormous enthusiasm and risk-taking.

Secondly, the administrator must possess considerable *organizing skills.* This requires some experience in handling people and organizations. He has to understand the aspirations and frustrations which people experience in organizational life. He has to be able to forge people into effective teams.

4. *Motivating and energizing people toward task goals.*

New procedures and new structures are meaningless, and even wasteful, if there are not men and women who can use these as instruments for carrying out tasks. In the final analysis, it is people who perform the tasks. Men and women in the organization must experience excitement and personal satisfaction in carrying out their tasks and achieving the goals of the organization. Convergence of individual goals and organizational goals is essential for achieving development.

Thus, a development administrator must motivate and energize the men and women in his organization. He must try to discover some potentials in each of them which may not have been brought out before and which could be

useful for the realization of the organizational tasks. The very act of his paying this extra attention to his staff will help the process of their reorientation to the new organizational goals and tasks. As his programs are formulated in clearer detail involving concrete individuals, there would naturally emerge areas and subtasks which would require new kinds of staff. He should reach out for relevant talents and should do everything in his power to recruit them for his organization. He should make a special effort to create a new dynamic organization, blending the old and new staff into a creative harmony.

This kind of function requires above all a *positive view of human nature*—an attitude that sees growth potentials in people. Further, it also requires some *knowledge about human behavior and motivation* but above all some degree of *skill in handling human sensitivities and relations.*

5. *Cultivating a favorable task environment.*

Formulating new task goals, introducing new procedures and structures, and recruiting new staff—this kind of thing normally creates apprehensions in and around an organization. In order to minimize possible repercussions and maximize task effectiveness, there is a need for cultivation of a favorable environment, particularly among the people who have decisive influence in making decisions related to the proposed new plans and policies of the organization. Thus, it takes a development administrator who recognizes the cultivation of a favorable political climate as an essential part of his task rather than something to be shunned. Due recognition to the authority of political decision-making bodies, and painstaking cultivation of contacts and relationships of understanding regarding the objectives and tasks of the organization is an essential function of a development administrator. This is something which has been played down in the conventional theory of a "neutral" bureaucrat, but in the context of development administration political adaptability and viability of administrative leadership is an essential ingredient of success. This requires a reasonable degree of

sensitivity to the power situation in the political environment. Knowledge about the political power structure surrounding the particular organization is important and *skill in communicating* the organization's goals and tasks to politically influential people is critically important.

6. *Mobilizing resources to carry out tasks.*

Closely related to the cultivation of a favorable task environment is the function of mobilizing task resources. A development administrator needs to broaden and deepen his support base securing new financial and human resources. He should avail himself of every opportunity to obtain new resources, even marginal ones, in the form of funds for experimentation. A development administrator should regard these marginal developmental resources as that crucial leverage whereby he can demonstrate his developmental goals and generate further resources for a larger program. Resources, scarce as they are, can generate more resources. Thus, if one begins with one or two among many related kinds of resources—reputation, trust, prestige, good staff, good program, money, connections, etc.—he can secure more resources through a cumulative process. This may not always be the case, but the development administrator should be convinced that it is possible.

This means that a development administrator must have the *entrepreneurial will* and *skill* to take risks and to combine different factors and resources. He has to have the will and skill to engineer a positive chain reaction of events. He has to be on the look out for opportunities and should be quick in exploiting every opportunity that opens up.

This further requires a tremendous concentration of energy, will power and conviction. On many occasions, this may imply that a successful development administrator may have to posses's some *power motive,* explicit or implicit, which would make him exhibit such energy and power.

On the intellectual level, resource mobilization requires

skill in resource allocation and in accounting regarding the relative efficiency of various inputs of resources, which implies that he needs analytic ability here also.

7. *Giving meaning to on-going tasks.*

It is important to keep his staff aware of the organization's goals, and of the significance of daily operations toward meeting those goals. This involves a continuous process of drawing meaning out of current programs, and giving meaning to on-going tasks.

This requires again a *normative conviction* regarding the organization's goals and tasks and, at a deeper level, a kind of philosophy of life on the part of a development administrator. He needs a sense of public responsibility in regard to the impact which his program can have upon the people affected by its implementation.

In the context of developing societies, a development administrator must be above suspicion of corruption or irregularities related to his tasks. To that end he has to have a sound set of *personal ethical standards.*

THE BUREAUCRACY AS A MODERNIZING ELITE: CAN GOVERNMENT ROUTINES LEAD TO DEVELOPMENT?

by John D. Montgomery

The most dramatic increases in agricultural production have occurred as a result of special "non-bureaucratic" efforts under gifted and dedicated leadership. Task forces and pilot projects often succeed where conventional approaches fail, sometimes for the very reason that they are exempt from conventional limitations. But most agricultural development must take place where task forces cannot reach; the need for improving conventional approaches cannot be defined away.

A task force can concentrate on specific geographic or problem areas, and it can succeed nearly everywhere if there is the necessary "will to develop" on the part of the national leadership. Each such effort has its own element of uniqueness, but the essential elements of these successes seem clear: inspired leadership, support from the highest political authority, full participation of local leaders, coordination among different technical approaches, and participation of staff members from appropriate public and private agencies. Exploration of these and other general principles, and of the various ways of applying the "plastic bag" philosophy (as opposed to the more rigid, permanent "boxes" on an organization chart), will indicate when the task-force approach can be generally used. It seems probable that it would be useful in at least two

situations: those of greatest agricultural promise, where major increases in productivity are desired; and those representing the most difficult problems, where improvement is necessary to the government for political or other reasons. The task-force approach is adaptable to all levels of governmental operation.

It is the conventional bureaucracy, however, that performs the major role in promoting increased agricultural productivity. It must provide technical and logistical support to any task forces; it often supplies most of their personnel. Its opposition or indifference could hamper the effectiveness of task-force operations, however skillfully led. Its continuing activities represent, and it controls, the largest share of public resources in manpower and capital devoted to the agricultural sector. It is responsible for carrying out the rule of law, a role often deeply resented by political leaders, who see procedure as delay rather than a form of protection. The bureaucracy should not be neglected in any national concentration of the agricultural effort on local task-force operations. It may represent a resource capable of equally important development as an indirect contribution to agricultural productivity.

The limitations of the bureaucratic system in the less-developed countries are well known. They are the subject of bitter acrimony on the part of foreign advisers and domestic politicians. It is safe to say that almost nobody loves a bureaucracy. But the limitations of bureaucratic effectiveness should not be laid to moral deficiencies, lack of good will, or sheer irrationality on the part of the bureaucrats themselves. Like other social institutions, a national bureaucracy behaves as it does because of internal factors and external forces. These are not necessarily immutable, and an examination of bureaucratic behavior patterns and their causes may suggest ways of changing them. Bureaucracies have changed in the past, as the history of U.S. Civil Service legislation demonstrates and as recent postcolonial developments in Ghana, Guinea, and China would suggest.

THE "PATHOLOGY"

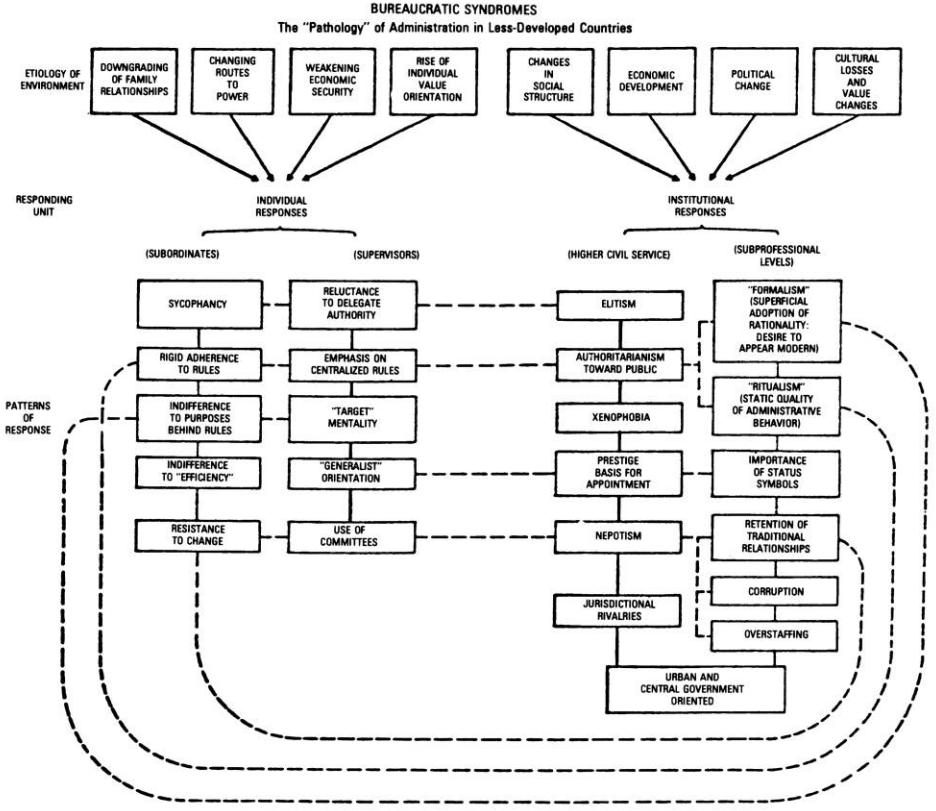
The symptoms of "pathological" behavior of the bureaucracies in the less-developed countries are to some extent recognizable as characteristics of any bureaucracy. Any listing of the most frequently voiced complaints about a national civil service seems to produce varying degrees of recognition and assent, no matter what country is being described; and everyone—bureaucrats included—seems ready to agree that these characteristics are an obstacle to economic development, although no one thinks development can take place without administration. Not all of these objectionable features affect development, however, except perhaps in the negative and general sense that they imply failure to reach maximum efficiency and influence. Some symptoms are cited repeatedly: resistance to change, rigid adherence to rules, reluctance to delegate authority, sycophancy toward superiors, the "target" mentality implying an indifference to "efficiency" and the purposes behind rules, a "generalist" or "elitist" orientation combined with hostility to technology (especially in the despised field of agriculture), insistence on status and prestige symbols, adherence to traditional relationships while desiring to appear modern, overstaffing, corruption, xenophobia, and nepotism. These attitudes and behavior patterns undoubtedly appear in varying degrees of intensity in many countries; amusing and horrifying examples of each could be cited by almost anyone who has tried to lure or bulldoze a bureaucracy into action on a large-scale development operation.

Closer examination of such symptoms suggests that they may be part of a larger system of interacting responses. These responses may be grouped roughly into two categories: those relating to the protection of the civil service as an institution, and those that are individual responses to various perceived threats from within and outside the bureaucracy. (See Chart.) In both cases changes in the social order (including those associated with the process of

modernization) appear to be regarded as a potential threat to survival.

The whole social order that has produced elitist bureaucracies (whether of the mandarinal, feudal, or colonial type) has gradually changed, often to the disadvantage of the former elite groups. The changing economy threatens the privileged position of a government administrator as more and more of the basic decisions relating to production and distribution begin to fall into other hands, whether those of technicians, political leaders, or perhaps an increasingly important private sector. Even the changing political situation may threaten the bureaucracy as national (or ethnic) pride begins to affect the staffing of the civil service. "Africanization," for example, may mean new civil service standards as well as personnel, and in a one-party state much of the routine decision-making authority may shift to local party politicians. New cultural values attached to modernization tend further to undermine the self-confidence and authority of the traditional bureaucracy. It is small wonder that the members of a bureaucratic system feel vaguely threatened and seek to perpetuate their elitist claims while at the same time formally adopting the purposes and forms of organization appropriate to a modern society.

In their individual response also, members of the bureaucracy feel threatened by the changes taking place about them. In many countries the civil servant's family responsiblities—as eloquently portrayed by Joyce Cary's *Mister Johnson*, for example—are attenuated as public employment forces a family man to become an individualist competing for advancement, and then rationalizes his pay to a job-related scale. In return his family becomes resentful at being denied its traditional share in the privileges and duties of public office. Because politics and commerce open up new routes to power, the civil servant often finds his career and even his position threatened, or at least reduced in its importance and opportunity. Even employment security is not what it once was in countries where surplus employees suddenly find that they have no


BUREAUCRATIC SYNDROMES
The "Pathology" of Administration in Less-Developed Countries
ETIOLOGY OF ENVIRONMENT
DOWNGRADING OF FAMILY RELATIONSHIPS
CHANGING ROUTES TO POWER
WEAKENING ECONOMIC SECURITY
RISE OF INDIVIDUAL VALUE ORIENTATION
CHANGES IN SOCIAL STRUCTURE
ECONOMIC DEVELOPMENT
POLITICAL CHANGE
CULTURAL LOSSES AND VALUE CHANGES
RESPONDING UNIT
INDIVIDUAL RESPONSES
INSTITUTIONAL RESPONSES
(SUBORDINATES)
(SUPERVISORS)
(HIGHER CIVIL SERVICE)
(SUBPROFESSIONAL LEVELS)
PATTERNS OF RESPONSE
SYCOPHANCY
RELUCTANCE TO DELEGATE AUTHORITY
ELITISM
"FORMALISM" (SUPERFICIAL ADOPTION OF RATIONALITY: DESIRE TO APPEAR MODERN)
RIGID ADHERENCE TO RULES
EMPHASIS ON CENTRALIZED RULES
AUTHORITARIANISM TOWARD PUBLIC
"RITUALISM" (STATIC QUALITY OF ADMINISTRATIVE BEHAVIOR)
INDIFFERENCE TO PURPOSES BEHIND RULES
"TARGET" MENTALITY
XENOPHOBIA
INDIFFERENCE TO "EFFICIENCY"
"GENERALIST" ORIENTATION
PRESTIGE BASIS FOR APPOINTMENT
IMPORTANCE OF STATUS SYMBOLS
RESISTANCE TO CHANGE
USE OF COMMITTEES
NEPOTISM
RETENTION OF TRADITIONAL RELATIONSHIPS
CORRUPTION
JURISDICTIONAL RIVALRIES
OVERSTAFFING
URBAN AND CENTRAL GOVERNMENT ORIENTED

automatic job tenure. Any shift toward an individualistic value orientation threatens the civil servants who had previously found protection in their family or in their status in the bureaucracy.

Any such classification of the interrelationships of bureaucratic behavior (and many others are possible) seems to lead to one fundamental conclusion: sometimes neither the civil service system nor individual civil servants seem to consider the goals of agricultural development as paramount, even if they are formally assigned to a ministry of agriculture. The problem in using existing government agencies for development purposes is to find ways to remove these perceived threats and encourage more productive attitudes and behavior. Although this is a problem of enormous difficulty, it is not a hopeless one. Human institutions—even bureaucracies—can improve, and institutional changes bring about changes in individual behavior. But resistance to any change that appears threatening may be taken for granted; indeed, any change at all may be resisted unless it seems reasonable and has strong and continuing political support.

SOME "PRESCRIPTIONS": INSTITUTIONAL CHANGE

The easiest changes to make in a bureaucracy are shifts of leadership: getting a "new permanent secretary" who accepts the desired development goals, backing him when he encounters resistance, and keeping him in office long enough to carry out his policies. Usually a strong leader in command of an organization can select lieutenants who share his views: countless testimonials can be cited to document the dramatic changes introduced by merely getting the "right man at the top" and keeping him there. But sometimes even the "right man" is helpless when pitted against the system. Leadership changes that merely rotate civil servants among suitable positions seldom achieve any significant reorientation in the system. Neither does the mere assignment of new titles to an existing bureaucracy. Changes in the functioning of a bureaucracy and in its

relationship to the society as a whole are necessary if the old elite is to become a modernizing one.

A more ambitious means of changing the bureaucratic institution is to reorganize it. Organization and reorganization should take place whenever changes in the functions or relationships require them; many governments have established "organization and management" offices to study such problems (though they are often captured by special interest groups). Formal reorganization may not have much influence on the actual routines that seem to dominate bureaucratic behavior. It may even become a delaying tactic itself. Moreover, the connection between government organs and the private sector (even with government-dominated corporations like the Sudan Plantations Syndicate or the Gezira Scheme) is often overlooked in organization charts and civil service regulations. Important changes in organization may not be reflected on formal charts at all, such as the introduction of "participative" techniques that soften hierarchic distinctions and make use of group deliberation as a means of reaching decisions and establishing goals. Studies of such organizational approaches in American industry have demonstrated their superiority in achieving high levels of productivity, flexibility, and morale over sustained periods of time. The style of management that involves frequent conferences between a supervisor and his immediate subordinates, at which communication passes freely in both directions, is adaptable to a wide variety of situations. When under these circumstances new organizations and position titles also convey a productivity or service orientation, behavior as well as form beings to change. The staff conference itself is sometimes a radical change in the sociology of the bureaucracy.

A third form of institutional change is in its incentive system. Salaries in many countries are tied to years of service, size of family, amount of education, and other factors that may have only a casual relevance to the goals of development. The pay scales involved may be so low that some form of supplementary graft or corruption is neces-

sary if the civil servant is to achieve even a modest living standard. In any case, the pay scales of administrators and technicians in the field of agriculture are usually attached to a civil-service-wide schedule that cannot be changed without inviting bankruptcy, especially in countries where the civil service is padded as an indirect form of social security. Thus if the governmental will to develop agriculture is real, the only solution is to offer bonuses in the agricultural sector. (In the SCIPA* organization in Peru, for example, bonuses given in addition to regular salaries brought about an 80 per cent pay increase in three years.) In JCRR (Joint Commission on Rural Reconstruction, Taiwan) the highest take-home pay of agricultural technicians is directly related to their productivity. If what is desired is frequent trips to the villages on the part of the civil servants, adequate travel expenses must be paid (a rarity in most underdeveloped countries); if extension workers are expected to live in villages lacking in amenities important to family life, either some form of hardship allowance should be offered or village assignments should be made an integral part of the career ladder. Nonmonetary incentives can also become part of the civil service system, especially where "participative" forms of organization have been introduced, where local units establish their own goals, and where ways are found to reward appropriate performance. The high esprit of JCRR in Taiwan probably resulted in part from the financial rewards, prestige, and social approval offered as performance incentives.

Some of the most profound changes in the institutions of bureaucracy have to be introduced outside the civil service altogether. One way to gain bureaucratic aproval of development goals is to give them social and political value. Creating public awareness of the technological requirements of agricultural productivity will help remove the contemptuous images of the farmer that pervade the thought of the intelligentsia in many underdeveloped

*Servicio Cooperative Inter-Americano de Producción de Alimentos.

countries. In some countries, changes in the educational system, although slow in producing new manpower, have already shown that the role and status of agriculture can be dignified. Changing entry standards to the civil service (especially by deviating from the traditional emphasis on law and literature) can offer new careers to development-oriented candidates who would not qualify under the traditional patterns of recruitment. Closer relations between the central civil service and local government in the tradition-bound rural sector can alter the attitudes of each in making use of the resources that other can offer to agricultural development.

The above approaches to the bureaucracy as an institution offer some hope of changing the behavior of individual civil servants by reducing hampering ties to the past, by removing the sense of insecurity of those capable of contributing to development goals, and by creating an environment conducive to initiative and innovation. Other devices may also be used more directly to influence individual behavior.

MORE PRESCRIPTIONS: INDIVIDUAL CHANGE

Receptivity to innovation can be increased by enlisting individual participation in the search for new ideas. The well-worn notion of the "suggestion box," with rewards commensurate with the value of the suggestions, has been applied with surprising success in Vietnam and other underdeveloped countries. The use of "brainstorming" conferences as an in-service training device at all levels is only an enlargement of the same concept and may be appropriate in some bureaucratic societies. When employees find that progressive attitudes lead to promotions and other rewards (SCIPA, in Peru, includes references to the innovative role of agricultural technicians in personnel rating forms), their receptivity and perspectives change markedly. Innovation for its own sake is not desirable, to be sure; but the tradition of social punishment for innovators is hard to change. (Berger tells of the ostracism

inflicted by the Egyptian bureaucracy on the discoverer of the solar ship that made international headlines for the archaeological service.) One innovating civil servant in Vietnam adopted the policy of introducing revolutionary changes in his agency (in this case, moving from a rule-of-thumb bookkeeping system to computer accounting) so that old routines were completely outmoded, and his staff was forced to adopt fundamentally new procedures of postauditing. He feared that the introduction of postaudit controls without changing existing procedures would only double the red tape involved in releasing funds for development purposes because the system would "swallow" the innovation without abandoning the procedures it was designed to replace. Another approach is to keep introducing innovations at a fairly rapid pace so that routines never become sacred. There is danger of "jamming" the system with too many changes, of course, but that point has rarely been reached.

Motivating civil servants to the goals of development is almost as difficult as motivating farmer-producers to change their traditional patterns of decision making. The risk that farmers must take in accepting an innovation has its counterpart in the bureaucracy. One means of insuring against the risk of failure is to socialize the experiences and the responsibility that each civil servant takes, so that he no longer works in isolation. Frequent meetings of local agricultural workers, attended by high-ranking civil servants from headquarters can remove the sense of isolation and encourage meaningful exchange of experiences from the "firing line" of innovation. When such meetings are rotated among villages, each playing host in its turn, the role of the local worker is dignified, and new attitudes may be introduced in the host villages themselves. Inviting leading farmers to attend such meetings may also create receptive attitudes toward the progressive elements in the agricultural sector and help modify the traditional contempt for the peasant.

The concept of "reverse influence" requires that higher civil servants receive as well as transmit information.

When they do, their own attitudes change; the farmer-producers take on added dignity; the governmental programs themselves begin to show greater relevance to the needs of the agricultural sector. Delegation of authority is possible when no "face" is lost, when the most appropriate centers of decision making in fact make the decisions, and, in short, when mutual respect prevails between the bureaucrat and the farmer. In part at least these conditions obtain when the flow of communications is not impeded by artificial barriers. Changes in bureaucratic attitudes and behavior can be observed just as readily as among peasants or voters. Research into receptivity to innovations on the part of the supposed instruments of modernization—the civil service—may be just as rewarding as studies of diffusion at the farm.

None of the approaches suggested here can be offered in a "package" program, to use a favorite agricultural term. The bureaucracy of each country is unique in its history, organization, ability, and requirements. Nor is it prudent to expect that anything approaching a controlled experiment in the manipulation of bureaucracy can be undertaken. These insights—if such they be—may imply appropriate forms of action in a variety of situations. But they are no substitute for judgment, experience, and discrimination on the part of the leadership of any country—and any foreign adviser—that really intends to use civil servants in the interests of agricultural development; and none can bring important changes without strong political support. And they are no substitute for a political will to develop.

PUBLIC INSTITUTIONS, ADMINISTRATORS AND AGRICULTURAL DEVELOPMENT*

Garland P. Wood

Introduction

The purpose of this paper is two-fold. The first is to present a flexible method of analysis to the administrator or researcher who desires a deeper knowledge of a given organization or institution.[1] Secondly, it is a presentation of the nature of the evidence gained by such inquiry so the reader can judge the usefulness of the approach to his or her own situation. In the concluding sections of the paper I discuss some of the difficulties an institution faces when it attempts to serve a new clientele such as the small farmer. I will also suggest several approaches an administrator might consider to minimize the strains to his organization in implementing new responsibilities or serving a new clientele.

For the sake of brevity, the paper accepts without debate three premises that are in fact being debated in the literature and in the life laboratories of many countries. The paper takes as given that agricultural development is an accepted goal that public institutions have been and will continue to be assigned major responsibility in ag-

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[1]For purposes of this paper, administrator and manager are used interchangeably as are the terms organization and institution.

ricultural development and that an institution or organization's ability to achieve development goals is largely a function of management.

The Administrator

The administrator works through the human resources of his organization and its structure and operating procedures to accomplish certain objectives. The organization constitutes a major segment of the administrator's ambience, his task environment. Since the organization is a major element in an administrator's efforts to achieve agricultural development, the question arises, what does one need to know about institutions in order to make useful generalizations about their functions? Do we know enough about organizations and institutions to allow assigning priorities to types of institutional changes in order to gain certain objectives?

Institutions

Institutions are man's creation. "An institution is merely collective action in control, liberation, and expansion of individual action." (1) These organization creations were studied by Plato, but institutions far antedated the father of systematic inquiry. Although man's recorded history is rich with his creativity of institutions, there are serious gaps of knowledge in the definition of their essential components. When organizations are given developmental responsibilities as contrasted to the usual service and regulatory functions, the knowledge gap widens. It follows that it would be extremely hazardous to assign priorities to types of institutional change until the *knowledge base* about institutions and their *process of change* are more definitive. This paper and the research on which it was based are directed to these two areas of inquiry, i.e., gaining detailed information on institutions having development responsibilities, and gaining some sense of priorities in attempt-

(1) Commons, John B., Institutional Economics: Its Place in Political Economy, Vol. I and II, The University of Wisconsin Press, Madison, 1959, p. 902.

ing institutional change. In the process of the study, the research team learned much about the pressures to change institutions, the inherent resistances, bottlenecks, etc., especially for public programs directed to a new clientele, the small farmer. (2) As a result of the study in the social laboratory of Costa Rica, the research team recognized more fully than before the risks and uncertainties an institution faces in implementing change.

The report concludes with suggested strategies for change that would reduce these risks and uncertainties and set the conditions for sustained change in a predetermined direction. (3)

The Study Approach

The team sought to develop a *system* of *analysis* for public institutions having agricultural development responsibilities. They wanted a practical approach that would enable the administrator and manager to know his organization better, spot its bottlenecks, and guide him in the planning, design and implementation of rural development activities. The team's goal was to develop a flexible investigative procedure, one requiring minimum dependence on outside consultants.

The system of analysis the team developed was termed the modular approach. Within the modular approach the team chose six points of study. These points are modules or subsystems of the total model. The modules are not all-inclusive nor mutually exclusive. They probe the institution at various levels of operation, with different forms of analysis seeking insight into social, psychological and structural characteristics of the organization and its performance. The modules of inquiry represent a judgmental choice of how to gain maximum relevant information on an institution or set of institutions within given budget and time limitations.

(2) The research team was a multidisciplinary group of professors largely from Michigan State University.

(3) Wood, Garland P., Project Director, *Studying Agricultural Institutions, A Modular Approach*, 1974, Michigan State University, 104 pp.

There is no magic formula proposed by the use of the six modules or areas of study. The number of modules needed and the depth of inquiry to be made within each module is dependent upon the existing knowledge of the institution and its surrounding "matrix of organizations," the resources of time and money available and the nature of the change facing the institution. The team developed the following six modules of study to present an integrated source of data suitable to understand and suggest priorities of change in agricultural development institutions.

1. *Systemic linkages among national institutions*
   This module helped specify those national institutions having agricultural development responsibilities. The module gave information as to how important one institution viewed another as being in carrying out its development responsibilities.
2. *Intra-institutional status-role study*
   This module sought information on happenings within the life of an institution. What are the formal and informal relationships? What institutional doctrines do its members adhere to? What are the work objectives and who sets them? The team wanted to know what subordinates thought of their bosses in terms of being innovative, committed to their jobs, etc. Did the organizational personnel know about the small farm projects and what did they think their organization was doing about them?
3. *Institutional interfaces*
   An institution exists in an environment of change and stress. Other institutions are seeking to enlarge their own responsibilities, personnel, budget, and authority, often at the expense of existing institutions. This module sought information on these struggles and boundary disputes especially as they concerned new programs such as small farmer development projects.
4. *Leadership characteristics of institutions*
   Few deny the critical element of leadership in institutions but the research team was not given clearance to

carry out this part of its study. The research approach was developed and a future study is planned to test this module.

5. *Communication flows within institutions and to clientele*
   This module sought information on channels of information within institutions and where blockages seem to occur. The researchers wanted to know the content of the communication, how often it took place and between whom. The team wanted to know what communications took place within the various institutions on the small farm projects and what information got back to the institutions from the farmer and the agent directly serving him.
6. *Farmer clientele*
   One very effective way of testing an institution's ability to implement small farm programs is to measure the impact of one such program at the farm level. This module did such measuring and the results are a major input into this paper.

As the research team went about its work, it recognized its debt to historical and current colleagues. The team gave credit to its colleagues in an annotated bibliography covering the six modules detailed above as well as other readings on general methodology, evaluation and workshop approaches. (4)

What Was Learned

Institutional insights. "The proof of the pudding is in the eating" and in a very real sense the test of a research approach or system of analysis is the adequacy of insights the data provide. The team concluded the research approach did meet the test of adequacy and that it did provide relevant information on an institution that would be useful to an administrator. The analysis of the data suggested some ordering of priorities to bring about institutional change. As the team studied its data, it recog-

(4) Wood, Garland P. and Shwedel, Kenneth, *Rural Development Administration, An Annotated Bibliography,* 1974, Michigan State University, 85 pp.

nized the special problems of the public institution trying to serve the small farmer. The team faced its charge to recommend remedial action and suggested some strategies to the administrator to minimize the stresses and strains of bringing about institutional change.

The institutional linkage module clearly pointed to the Ministry of Agriculture (MAG) as the institution most important in the agricultural sector network in terms of frequency of contact and importance of contact. The rating was made by other institutions in the agricultural sector including those considered most competitive. MAG thus became the logical institution to analyze in depth.

The *intra-institution study* of top level management and their subordinates in MAG indicated a lack of agreement on organizational objectives; yet the majority believed their organization had accomplished the past year's objectives.

The concept of doctrine helps identify what an organization stands for, what it hopes to achieve, how one organization differs from another. Respondents were not clear on the doctrine of their organization and one-half said there was no difference in doctrine between their own and other organizations. Most officials within MAG and in the other agricultural sector institutions were only dimly aware of the agricultural development projects. Many officials said their organization could serve the agricultural sector in the future through technical assistance but didn't specify how this could be done. Most subordinates thought their supervisors were resistant to change. However, there were departments within MAG in which subordinates believed their bosses to be change-oriented. The most critical problems of the institutions were listed as lack of resources, political interference and political instability. When responding to the question of how to improve the effectiveness of their institution, they gave reorganization as the number one priority. If reorganization would improve the effectiveness of the organization, why wasn't this listed as a critical problem of the institution? Wasn't effectiveness important to gaining resources?

The *institutional interface* questions revealed some of

the political tensions and jealousies between organizations. They also pointed to coordination problems between sections within MAG and the jealousies aroused by the favored treatment given to the coordinating agency employees of the Ministry. The responses articulated the lack of commitment by some administrators and top political leaders to the goal of helping the small farmer. This module proved useful in highlighting top administrators' conceptions of their institutions' goals, work, problems, challenges and frustrations faced in carrying out their responsibilities.

The *communication module* studied the flow of information within the institutions and to clientele. Although one of the objectives of setting up regional offices was to facilitate the flow of information for agricultural development projects, the objective has not been achieved. There is considerable communication about the projects from the local office to the regional office within MAG, but little project-related communication from the regional to the national offices. There is almost no project-related communication going directly from the local to the national office.

One MAG regional office has communication links that operate much more frequently than a second regional office and produce a much better information flow. Extension agents of one regional project reported themselves as being highly involved with small farmers and their project. The farmers of that project disagreed and listed the agents of another institution as being more involved.

The farm clientele module. The framework for the study of institutions and administrators was uncomplicated. If a policy decision had been made to enact a program that would benefit a given segment of agriculture, one could learn much about the involved institutions by evaluating what happened. In Costa Rica, two projects were organized to bring credit and improved production technology to groups of small farmers producing rice and corn. As this paper has revealed, the modules of the study gave information on the institutions and organizations nation-

ally involved in agricultural development efforts; they showed how key institutions viewed themselves in terms of doctrine, objectives, problems and willingness to change; another module focused on key administrators as they looked at the opportunities and difficulties in their jobs; still another checked the flow and frequency of information at different levels of the institutions. The final module of study was made at the farm level. If agricultural projects were drafted, enacted into law, funded, and implemented through organizations and institutions, the monitoring of what happened at the farm level would present critical insights into the effectiveness of said institutions through which the projects took place.

What Did We Find at the Farm Level?

We found that drought conditions in the project area of Cartagena and less rain than normal in La Fortuna caused both first-year crops to be economic failures. Diseases, insects, lack of knowledge of soils and fertilizers, late clearing of brush from fields and late plantings were a part of the failure. There were no new seed varieties available and the traditional varieties had a limited response to additional fertilizer inputs. There were failures to provide technological inputs.

There were institutional failures of communication. The agricultural development loan foresaw there might be losses incurred by farmers undertaking new technology and provisions were made for an income supplement. However, a year after the projects were started the agents in the field were not yet informed about this provision.

The two crop years covered by the study constituted too short a time span on which to evaluate fully whether production for the individual farmer and the nation could be increased by such projects. The fact that only eleven of the first year's 48 participants in the Corn project at La Fortuna signed up for the second year indicated the seriousness of the problem. The project was dropped after the second year. Comments of farmers leaving the project

indicate that MAG lost considerable credibility in that locale. Poor planning, weakness of implementation and inability or unwillingness by the institution to adjust to possible drought problems doomed the project.

The data would suggest that many of the farmers were worse off economically after participating in the project. However, the land that was cleared in La Fortuna was available for future crops and some of the new technologies adopted for the project were continued with only a partial reversion to previous levels.

The stated objectives of the projects to increase farmer incomes, increase production and lessen income disparities were not achieved by these two projects during the two years studied.

Little success was achieved with respect to the objective of gaining farmers' participation in decisions affecting them. Farmers were rarely asked their opinions and evaluations. In La Fortuna they were well informed on project goals and objectives, but few were asked for their advice. In Cartagena, only a few farmers knew they were in the project, so even minimal communication did not take place.

The fourth objective was employment generation in the rural areas. The almost complete mechanization of the Corn project of La Fortuna resulted in a lessening of farm labor used for this enterprise. In Cartagena the increase of loans allowed some laborers to rent land and thus move out of the precarious agricultural labor class into the precarious land rentor status. Field workers reported an increase in the total land in cultivation and some increase in labor utilized in the Cartagena area.

This research gave other insights concerning the small farmer in Costa Rica. He is generally receptive to government efforts in spite of known failures. He does not blame the government for things outside the government's control but is intelligent enough to place blame when government requirements lead to failure. He has criticized the government agencies for poorly trained agents and agents that show off their "knowledge"; those who talk but do not listen. He complains, but not loudly, that no one asks his

opinion on the project. When he complains, nothing happens. He is critical of an organization that requires his rigid adherence to the project rules yet itself failed in getting land cleared on time, providing improved seeds, testing the recommended fertilizer application or developing market outlets.

He has some knowledge of the regional organization that was set up to make such small farmer projects more responsive to the small farmer's needs. Some of his neighbors sit on these regional boards, but he knows little of what goes on or why things have not changed.

The research indicated the small farmer was more willing to change than many of the administrators in the public institutions serving him. The small farmer has long used credit to finance his needs and when new credit was to be coupled with other technological inputs, he agreed. He adopted fertilizers, herbicides and new seeds in both regions. In La Fortuna he signed for mechanical land clearning, corn planting, cultivation and even corn harvesting by mechanical means in addition to the use of better seeds, fertilizers and herbicides. When most of the farmers dropped out of the La Fortuna project the second year, they didn't completely revert to their former level of technology. Most still plowed their land but fewer used fertilizers and herbicides. Fewer farmers used machinery for cultivation and harvesting.

The farmers remaining in the project worried that the government would soon be setting up some other project and abandoning them. Farmers spoke of projects on cotton and beans that were dropped after a year or two. Abandoned cotton gins remain along the roadside, and such projects are remembered with bitterness or apathy. The farmers knew that new projects were already being talked about and that the technician and the agent were directing most of their attentions to a new effort.

Other Insights

The team puzzled over the unfolding picture of agricultural institutions in Costa Rica. They found sharp contrasts of traditional and change-oriented approaches within the

same institutions and between institutions. One regional director in MAG was highly committed to encouraging small farm group organizations that would operate as a unit to help themselves. Other officials said "the farmer just doesn't know enough; if you're going to help him you've got to tell him." There was a new coordinating agency set up at the national level to bring together the many semi-autonomous agencies and institutions involved in agricultural development programs, but delegated authority never matched designated responsibility. Coordination ranged from weak to nonexistent.

Mobile banks were set up to go to different communities to aid the farmer in preparing credit forms. Mobile schools were used in some communities to explain better production methods. Some farmers complained that credit approval still came so late that ground preparation and planting were delayed. Content and follow-through in the mobile schools was termed inadequate. New production methods aren't usually incorporated after an afternoon filmstrip showing production increases reported at a different location on an experimental farm.

Some MAG officials energetically studied new agricultural products that might be introduced in an area and they also looked for new markets, both domestic and international. Along with such innovations there were the traditional approaches. A feasibility study was made for the development loans which funded projects that would require farmer participation. The recipient of the loan, the small farmer, wasn't involved in the feasibility study. The small farmer's chief concerns, according to this research, were drought and pests. The government project gave them credit and seeds on a take-it-or-leave-it basis. This technological package was not new as reported in the press. The rice seed recommended was highly discounted in the market place because of poor cooking quality.

The view of the agricultural institutions in Costa Rica revealed by the data was one of cautious hope. There were capable people and leaders who cared. There were others who had little concept of the institution's goals; they were doing only what they were told to do. There were depart-

ments and officials within the larger institutions who were eager and willing to do a job for the small farmer or other clientele. The total institutions and their officials never made that commitment.

How does one explain the gap between expectations of institutional implementation of projects such as this corn rice project in Costa Rica and the studied results? Does the public institution deliberately seek to divert such efforts? The team believes this generally is not the case. The explanation is best understood in the task environment within which the institution operates.

As members of the team probed the organization and its response to the development loan and its new small farmer clientele, they saw that the major export crops of Costa Rica, including coffee and livestock products, were specifically excluded from this loan. The livestock loan for large producers came from another source. In brief, most of the traditional commitments of MAG were to powerful clients excluded from this small-farmer-oriented loan.

If one reflects on the structure of MAG, the institutional matrix of competing organizations, MAG's traditional functions and clientele and the new agricultural development effort thrust upon it, could MAG be expected to operate differently than in the past? If so, why? A new clientele is not likely to be able to protect MAG from competing institutions. The projects studied constituted only a small part of MAG's total human and financial resources. The loan, too, was for a limited period. Was there sufficient incentive for MAG to make organizational and personnel changes for projects of such limited duration? Under present conditions, probably not. And this may well be the conclusion reached by most public institutions in the LDC's assigned small farmer development projects. How then can the benefits to an institution be changed to make reaching the new clientele worthwhile?

The Small Farmer Clientele—A Special Case

The record of public institutions meeting small and medium farmers' needs has been poor. The research team

gained an appreciation of the costs and apparent minimal rewards for the institution attempting to make organizational changes to serve the small and medium farm clientele.

Can present institutional changes be made at less social, economic and political cost? Or is the preferred route the one taken in many countries—that of creating new institutions which also are costly?

There are three important considerations an institution may wish to explore to assess its capabilities before making a decision concerning its future commitment to the small farmer clientele: *first,* its ability to reorient and upgrade its management skills through management training workshops; *second,* its ability to train and retrain its personnel who will be expected to work directly with the small farmer; *third,* the feasibility and desirability of organizing small farmer groups for purposes of program implementation. Let us explore these capabilities further.

The Management Workshop

Let us assume that an agricultural institution has made a top level commitment to serve the small farmer. It has made the decision to allocate part of its personnel and budget to meet this commitment. The institution wants to meet the small farmer's needs and is willing to interact with him. It is willing to encourage a two-way communication flow rather than the usual top-down variety. How does the institution go about making the necessary changes in skills, attitudes and operations in its organizations?

One way of instituting the necessary changes at little cost to the institution is through management workshops. Such workshops have been useful in sharpening the self-evaluative processes of institution personnel. Once a program commitment has been made, an administrator may seek the help of a consultant to evaluate and recommend changes in organizational structures and procedures that would facilitate implementation of development tasks. These structures and procedures should be the focus of the management workshop. Workshop discussions should be

problem oriented, dealing with familiar or anticipated problems grounded in the economic, social and cultural conditions of the particular country. Through initial and subsequent workshops, an ongoing, self-correcting and self-improving mechanism can be built into development institutions that will make them viable in their society.

Change Agent Training

In the Costa Rican setting, MAG personnel at the farm level are key people in any successful small farmer development project. These are the people who work with the farmers, and such personnel include immediate supervisors of these workers. They must know, experientially, the work of the small farmer (their clientele). The change agent must have a bond of empathy with the small farmer, for the small farmer will only interact with those who have earned his trust. The agents need technical knowledge of the agricultural enterprises they are dealing with. This knowledge must be based on an understanding of the principles involved in the technology so they can relate the general recommendations to the farmer's specific situation. Above all other traits, these agents should be trained in communicating, which includes listening and understanding. Part of the training of these change agents might focus on group dynamics of farm organizations, leadership training, group discipline, etc.

Small Farmer Organizations

Experience suggests that unless rural and/or agricultural development projects that purport to reach the small farmer can find or help create viable small farmer groups, the development effort will generally fail. It will fail from an economic point of view. The expenses of credit projects are too costly for them to be administered on a one-to-one basis. They will fail for sociological reasons. Group discipline, intragroup information exchanges and the group defenses against an often hostile environment, including man-made and physical, are needed for survival of development efforts.

Conclusions

The conclusion from these observations is that an effective small farmer program requires strong, consistent commitments at the national political level. In addition, administrative leaders of the implementing institutions must likewise be committed, innovative and teachable if they are to make a positive contribution in this new task. The penalty-reward system will need to be revised to encourage and facilitate working with the small farmer clientele.

Projects should be chosen with care, making sure they are realistic in terms of national goals and resources and capable of being implemented at the local level. These projects require the intended clientele's input in terms of priorities and administration. Project objectives should be spelled out in measures subject to reasonable evaluation including by whom, when and where evaluation would take place.

The change agent who constitutes the connecting link between the institution and the small farmer is of such key importance that any small farm program that hopes to succeed must invest in training and motivating him to serve his new client.

THE MANAGER/ADMINISTRATOR AS SUPERVISOR

John L. Fischer

Introduction

In addition to the role of decision maker, managers play another role, that of supervisor. Many illustrations can be cited where managers made the right decisions, yet were not successful because of their inability to motivate their subordinates, or to properly utilize the physical resources devoted to the operation. They failed as supervisors. The management job is not finished until decisions have been translated into action. Implementation of decisions calls for supervision, thus it is equal in importance to decision making.

Many who are promoted into management positions are technically trained, and have been working as technicians. As technicians they made decisions, therefore the decision making role is not new to them. However, decisions made by management are different from those made by technicians. A major difference is that managerial decisions are implemented by others.

In a series of posters distributed to management of U.S. Department of State missions throughout the world, Donald I. Eidston is quoted as follows, "A professional manager get results through other people." From the time a man becomes a manager, whether he succeeds or not depends in large degree upon how other people react to him.

New managers often see a paradox in the situation they

face as a manager compared to the situation they faced as a technician. Many accept a managerial position because it provides them with more power. Many think that by moving into a management position they can "do something" about the problems they have faced as technicians. However, they soon discover that as managers they are more dependent upon others. They learn that a manager's destiny rests on the actions of other people. Their technical knowledge means less than before. It seems a paradox that in getting more power, they have become more dependent. The answer to the paradox is that managers have more power *only* if they are good at organizing activities and supervising both people and things.

Almost all managers at one time or another are frustrated by being so dependent on others. The newly appointed manager is typically awed by the sense of power and importance he thinks comes with his promotion. But the feeling of awe soon turns to concern when he realizes how limited he is in terms of what he can control directly by his own hand. When he realizes that problems involved in getting subordinates to follow directives and instructions can lead to his downfall, the feelings of concern may even turn to fear.

It is reported that even John F. Kennedy when he was President of the United States, a job purported to be the most powerful in the world, was bewildered about how as President he could make decisions and give orders, yet nothing seemed to change much. Even he faced the paradox noted above. He learned that making sound decisions was not enough to guarantee success.

While the supervision of people is extremely important, management's role as supervisor of things—buildings, material, vehicles, machinery, equipment, land, supplies, or whatever physical resources are involved, is important too. In some operations management of the physical resources is of equal importance to supervision of people.

One helpful way to view management is to recognize that every managerial unit is a *producer* of some type of goods or services. Production (of something) is the purpose

of the organization. The manager combines labor (people) with physical resources (things) in a given capital setting (buildings, plants, farms) in order to produce the goods or services. His effectiveness as a manager depends upon his ability to combine people with physical resources so as to produce efficiently.

Approaches to Improving Supervision:

Some supervisory problems are a result of the over-all administration system being as it is, and middle level managers as individuals can do little about them. Other supervisory problems are amenable to correction by individual middle level managers. The relevant question is therefore, "What can the middle level manager do?"

Unfortunately, there is no ready made formula that can be given which, if followed, will solve supervisory problems. In supervising people we are dealing with human interaction, and it is a very complex phenomena. Human reactions are highly influenced by culture; therefore, the temptation to think in terms of simply "doing it like they do it in America" (Europe, or any other area) is very risky. What works in one culture may not in another. However neither should the administrator think he can learn nothing by examining how it is done elsewhere. Experience has shown that much can be learned if he will but approach the topic objectively.

The administrator should be equally wary about assuming that common beliefs about human motivation and interaction in his home culture are necessarily true. For example, in some countries that have made the greatest progress in the past 20 years, it has been learned that the people react to various situations quite differently from what was commonly believed in the past. Traditional wisdom about people is not reliable.

In this brief paper, the variables that affect human relations in a specific culture are too many for all to be discussed. However, the more important ones can be found in some form in all cultures, and they can be related to how the supervisory function can be performed most

effectively. Selected variables that have direct impact on alternative methods of supervising are:

1. The educational level and calibre of personnel involved in the unit managed. The way management deals with personnel in a research institution, a hospital, an education institution, or a technical agency must be quite different from the way management might deal with people in, for example, a public works program.

2. The type of supervision that is most appropriate depends on whether the operation is routine, or requires on the spot innovation and decision making. A routine operation can be performed under a very specific set of supervisory instructions, but an operation that involves on the spot problem solving and rapid shifts in routine cannot.

3. The extent of the geographic area covered by the operation. An operation which can be performed in one room or one building such as a laboratory or factory can be under the constantly watchful eye of a supervisor, so supervisory practices could be applied that would never work successfully in an operation involving outside salesmen, or personnel such as extension agents who must call on farmers independently. An operation that is limited to one town or a small area permits supervisory techniques that cannot be applied if the personnel of the organization are spread over a wider area.

4. Whether the goals of the organization are so fixed that personnel must be moulded to achieving them, or programs can be adjusted to take advantage of available human skills and abilities.

5. The amount of control management has over employees. In some situations management has much control, but in others, little. For example, managers of a military operation have much control over their personnel, but those in a voluntary organization have almost none. If employees with particular types of skills are scarce and job opportunities plentiful, management may find it unwise to try to use certain supervisory tactics. If employees are organized and have a strong union, certain tactics will not work.

6. The urgency with which tasks must be performed.

Guidelines:

While prescriptions cannot be given to supervisors that will guarantee success in handling people, there are some guidelines which, if applied, will keep them from going very far astray.

Guideline #1: "Put yourself in the place of those you supervise."

This guideline is sometimes called the "golden rule" of supervision. Applying it will not guarantee success for a supervisor, but will help him to understand why those being supervised feel as they do, and this is a prerequisite to improved supervision.

Guideline #2: Think of supervision as a tool to be used in achieving the goals of the organization.

This guideline sets the stage for a proper evaluation of supervisory techniques over time. It makes supervision "goal" oriented.

Many new managers fall into the trap of thinking the goal for good supervision is to eliminate conflict among the people under them. Conflict can never be eliminated because there are personal differences among people that will from time to time become abrasive. Also, it is sometimes a wise strategy to make employees compete, and this in itself is a form of conflict. Total harmony is just not the nature of the real world. In any organization that is action oriented and moving ahead, conflict will arise.

A far better goal for good supervision is to *structure* working relationships so that conflict makes a positive contribution toward achieving the goals of the organization, or at least is not destructive.

Guideline #3: Communicate to the supervisee an understanding of the goals of the organization in general, and be sure he *understands* and *accepts* the specific goals for the position he occupies.

Supervisors are prone to assume too much. They assume that employees know more than they do or that employees have no need to know. In either case, frustrations among employees and lack of purpose drag the organization down.

Guideline #4: Respect the supervisee's RIGHT to know what is expected of him.

More destructive conflict between those wo supervise and those who are supervised develops over a lack of agreement over what is expected of supervisees than from any other single point. Sometimes the problem is inadequate communication, but often equally serious is the fact that expectations really have never been clearly defined in the mind of the supervisor, let alone for the supervisee! The key to an understanding about what is expected is the job description. *Every job should have one, and it should be in writing.*

Before hiring a new employee, a tentative job description should be prepared and used as a basis for personnel selection. In on-going organizations where there are no job descriptions and employees already fill positions the new manager is urged to avoid the temptation to write a job description himself without counsulting the person who fills the position. The manager may wisely initiate action to get a job description prepared, but an input from the person supervised is needed. The description that will make the maximum contribution to everybody is one that is a *two-way communicative device* between the supervisor and those who are supervised. *A good job description is in a sense an agreement between supervisor and supervisee concerning what is to be done.*

Guideline #5: Delegate authority commensurate with responsibility.

It is unrealistic to try to hold someone responsible for a situation which he lacks the means to control. Supervisors sometimes recognize the desirability of holding subordinates responsible for what happens in the operations for which the subordinate is responsible, yet they do not grant

the authority needed to get the job done. This is unrealistic, and grossly unfair to the subordinate. Low morale in the organization is a natural result.

Guideline #6: Evaluate supervisees objectively in terms of how effective they have been at accomplishing the goals prescribed and agreed upon.

It is unfair for an employee to be evaluated in terms of criteria which he has not discussed with his supervisor, and to which he has not agreed. (If he cannot agree to the criteria he should be reassigned.) In discussing being evaluated on the basis of criteria about which he had not been consulted, one employee said, "I cannot be expected to win a game in which I do not know the rules in advance."

Guideline #7: Reward (promote, increase pay, compliment, honor, etc.), on the basis of contribution toward achieving the goals of the organization, within the framework of specific job descriptions.

This is simply a matter of rewards being based on productivity in terms of goal accomplishment.

Guideline #8: Be honest, open, above board, and fair with those supervised.

This guideline sounds so simple and obviously logical that it may affront the sensitive reader. Yet, a very high percentage of supervisors at all levels are *NOT* honest with supervisees. The reader is asked to think about the personnel action cases with which he is familiar. When employees have not been promoted in what percent of the cases was the reason *cited* the *real* reason? What percent of promotions have been based on the reasons given for promotion?

Employees will remain loyal, continue to work hard, and not become discontented even when they think management is wrong, *if they believe management is honest and fair.* Nothing damages employees' morale as quickly or as seriously as believing they are being treated unfairly.

PROBLEMS OF AGRICULTURAL ADMINISTRATION AND EXTENSION SERVICES*

Leonard Joy

There is concern in developing countries about the efficiency of agricultural policy decision-making and programme implementation. More concern is expressed about implementation than about planning (1, p. 47). But it is important to recognise that these two aspects are inseparable.

Agricultural administration undoubtedly acts as a constraint on development. The extent of this constraint is seldom made explicit in published official documents but both academics and administrators have considered it important.[1] (2), (3, p. 125).

Some problems of administrative efficiency are purely technical and the province of experts in public administration. Agricultural administration has a particularly strong claim upon their attention both because of the complexities by which it is characterised and because agricul-

*A paper presented to the 13th Conference of the International Association of Agricultural Economists held in the University of Sydney, Australia, in 1967.

[1]One group of administrators gathered for frank discussion reported: "there seemed to be unanimous agreement that existing organisational and administrative problems are inhibiting agricultural development and reducing the efficiency of technical and scientific knowledge in serving agricultural production" (4, p. 3). (This is an excellent survey of problems in agricultural administration which, although it was produced in relation to one specific region, is capable of wide generalization).

ture is intolerant of administrative inefficiency. Relatively minor delays and oversights in co-ordination can have the effect not simply of reducing output but of rendering programmes wholly abortive.

The complexity of agricultural administration stems from the nature of agriculture itself. The range of policy instruments relevant to agriculture is large, e.g. the range of policy instruments affecting the availability and use of new resources and techniques, the pattern of land tenure and settlement, the availability and efficiency of markets is, for each of these categories alone, very considerable. Moreover, there is often differentiation of agricultural regions within a nation. Thus settlement schemes, crop spraying programmes, training programmes, crop insurance schemes, pricing policies, nutrition programmes, ranching developments, export production drives and so on only begin to exemplify the range of activities subsumed under agricultural policy. These activities may each be carried out in a wide variety of ways, together or separately, and differently in different parts of the same country—or even to different farmers within the same region.

Even if all government agricultural policies were to be the responsibility of one single Ministry of Agriculture, it would need to be organised into many departments and units. As it is, there are inevitably many policy instruments vital to agricultural development which normally are not the immediate concern of the Ministry of Agriculture. Policies affecting the prices paid and received by farmers may be the concern of a whole variety of other ministries, especially finance, co-operatives, commerce, transport and labour.[2] Often too, irrigation, community development, land reform—and even livestock development—may be the particular concerns of ministries other than agriculture. That there should be a division of ministerial responsibility is inevitable when so vast a span of control would be

[2]Depending, of course, on how ministerial responsibilities are in fact organised.

required of a single ministry. The optimum pattern of this division may well repay study but the inevitability of some division of responsibility must be faced.

Repeated reshuffling of the division of responsibility between ministries may be symptomatic of an awareness of the difficulties of co-ordination (though it often does more harm than good). It may also be symptomatic of problems which give rise to the proliferation of semi-autonomous agencies. Among these the administrative inadequacies of the agriculture ministry may figure large. Particular stimulus to the creation of para-statal agencies is given by the need to be free from the restrictions of civil service procedures with regard to salaries, terms of service, promotion and seniority, accounting procedures, ploughback of trading surpluses and so on. The recognition of these needs may indicate a need for revision of traditional civil service procedures.[3] It may simply reflect general problems such as shortage of skilled manpower which the overbidding of a new agency may do little to solve.

The complexity of agriculture makes the problems of co-ordination especially great. The seasonality of agriculture makes failure to solve these problems especially serious. It is not surprising that Waterston concludes that, in policy implementation, the greatest shortfalls are usually in agriculture (2).

1. POLICY-MAKING ASPECTS OF AGRICULTURAL ADMINISTRATION

Effective policy-making requires (a) the identification of relevant policy alternatives; (b) the selection from these of the optimum pattern of consistent policies based on sound prediction of the outcomes of policies considered, and (c) the appropriate evaluation of these outcomes in relation to policy objectives.

[3]Consulting firms sometimes prove to be far more efficient in their work than would be a government department doing the same job. One important reason is that they are allowed to concentrate on the work in hand. New agencies may seek simply to do this.

A major shortcoming of agricultural policy-making is the failure to base agricultural development policies on an effective diagnosis of the constraints on agricultural (i.e. farming) development. Sometimes this derives from an approach to national development planning in which agricultural policy is a means not to agricultural development but to national economic development. This approach—even in situations where these two objectives can hardly be sensibly distinguished—leads to the posing of a set of questions in relation to agriculture which, however necessary, are insufficient for the formulation of good agricultural policies. It asks "what quantity of food and exports are required of agriculture in order to support industrial development and what minimum quantity of inputs is required to produce this output?" rather than "what are the constraints on farm output and which combination of measures will most effectively relieve them and stimulate farm production?" or even "how great is the agricultural potential of the country and what is required and justified to secure its exploitation?" It is not suggested that any of these approaches is adequate in itself: nor perhaps is any of them to be found exclusively adopted. However, one effect of the direction of policy-making by economist planners has been an unbalanced concern for the role of agriculture in promoting industrial development and too little awareness of farming realities or farming potential. Unfortunately, too, this imbalance is not always corrected by agricultural administrators who also suffer typically from "urban bias" (5).

Effective diagnosis of constraints on farming-development must be the basis of agricultural policy-making. This demands a regional approach to agricultural planning (6, p. 172), (7). It also indicates a major role for agricultural economists. For it is insufficient simply to list constraints on farming development—even where they are obvious. And they almost never are obvious.

I have often found extension campaigns offering advice which farmers were patently not following and which, on examination, they could not reasonably be expected to

follow. Last year I spent a day with extension officers convincing them that it was infeasible—not just unprofitable—for farmers to follow their recommended package of cultivation practices on paddy rice, given the labour available to them. Such recommendations arise from failure to diagnose the true constraints on farm output. That diagnosis is not a simple matter is demonstrated by the ability of senior extension officers to generate and pursue misguided programmes. Even if it were a simple matter to identify the constraints on farming development, however, it is in any case additionally necessary (a) to propose policies for relieving these constraints; (b) to predict the impact of these alternative policies—separately and together—in such a way as to allow sensible choice. For this the agricultural economist is essential—if not sufficient.

Yet how many countries have any unit whose purpose is the diagnosis of constraints on farming development in the sense I have discussed? I believe that such a unit is essential to sound farm policy-making. It would use a farm level approach and it would concern itself with an understanding (a) of what to the farmer constitutes an optimal farming system and how this varies with farmers' circumstances; (b) of the constraints which govern these systems; (c) of ways of releasing these constraints and of inducing changes in farmer behaviour; and (d) of the implications of various policies for injecting new inputs and techniques, reducing risk and uncertainty and increasing incentives. Such studies are essential for the generation of useful hypotheses about relevant policies. In my experience, it is a mistake to rely on the relatively superficial observations of field officers or the armchair deductions and ready generalization of planning economists to perform this function.

Successful work in the above manner would indicate a wide range of policies to be relevant, not all of which would relate to the activities of one ministry or agency. It would, therefore, be essential that the unit acted as a focus for policy coordination.

From the findings of such farm-level research would emerge indicators of priorities for further agro-technical research as well as appraisal of the significance of current research or existing results. Thus it is essential that the work of the unit be brought to bear also on agricultural research programmes.[4]

One of the activities for which there is commonly inadequate provision is that of programme and project appraisal. (I speak now of ex ante appraisal rather than ex post). Clearly the work of the farm level research unit would lead directly to programme appraisal. Again, this requires access to policy makers in many agencies. One product of pre-project appraisal is a strengthening of the evidence for desirable policies at the central planning level. Another is a raising of the standards of evidence and criteria required to support the adoption of policies.

The need for planning units at ministry level is argued by a number of writers (2), (8). Waterston calls them "programming units" and sees their role as project planning. It is argued that implementation is impeded by inadequate project design and that the place for this is with the implementing agency. The inadequacy of project design is one of the most serious weaknesses of policy formulation and implementation. A fundamental administrative weakness is the shortage of qualified personnel on the planning side. The essential skills of diagnosis, programme preparation, programme prediction and programme selection are quite critically scarce.

2. THE ORGANISATION OF POLICY MAKING

Ideally, the policy decision process is as follows:—

Stage I (a) The diagnosis of constraints on agricultural

[4]The research-extension relation is a critical one. Again, I would stress the role of agricultural economics in defining research priorities and in the translation of research findings into extension advice; (see (7) for a more general discussion of the problem).

output (undertaken by a Special Unit[5] attached to the Central Planning Authority but operating at field level), together with considerations of

(b) broad policy objectives and

(c) initial targets set for agricultural sector (undertaken by the Central Planning Authority), leading to:

Stage II — Preliminary broad choice of strategic policies (undertaken by joint consultation between ministries, agencies, central planning authorities and the special unit).

Stage III — Design of detailed programme and policies (undertaken by programming units in ministries and agencies. Co-ordination is required at the planning stage).

Stage IV — Prediction and appraisal of outcome of programmes and policies designed at Stage III (undertaken initially by programming units as part of the process of design elimination; ultimately by the special unit. At this stage reference back to Stage II might be necessary).

Stage V — Selection of optimum policy and programme package (undertaken by the agricultural sector branch of the Central Planning Authority)

Stage VI — Check for consistency with other sector programmes (undertaken by the Central Planning Authority. Discrepancies might involve reference back to Stage V or even revision of initial targets. Iteration of procedures is likely to be necessary).

Stage VII — Finally, the plan is accepted for implementation as government policy.[6]

[5]This refers to the unit discussed above. I see it as a research unit of the agricultural division of the Central Planning Authority.

[6]Government policy will ideally make itself felt in Stages I, II and V and, to a lesser extent, in Stage III also. The important thing is that it should be in turn affected by independent findings—especially those of Stage IV.

The purpose of this outline is not to lay down a universal blueprint for the administration of agricultural planning, but to contrast a logical decision-making process with the typical situation in order to reveal its inadequacies. Typically, explicit and considered choice from the broad range of available policies (Stage II) is lacking. Policy is seldom referred to, or suggested by, sufficiently detailed preliminary diagnosis of constraints on development (Stage I). Detailed project, programme and policy design is lacking (Stage III); prediction of the likely outcomes of policies is lacking (Stage IV) and selection of the optimum policy set is inadequately related to rate of return or other relevant criteria. Consistency checks seem quite commonly to be attempted but, lacking effective prediction of policy outcomes, this exercise may not be too meaningful. All too commonly, targets and programmes are totally unrelated.[7] At best they may be related by crude capital: output ratios and a planned value of investment. This latter is particularly irrelevant in situations where most farm investment is simply the unobserved and uncounted sum of innumerable small investments and where the marginal impact of investment projects is small in comparison with that of the routine services of the Ministry of Agriculture.

Policy-making problems of agricultural administration thus derive especially from the lack of skilled manpower[8] but a comparison of actual with desirable planning procedures may suggest serious weaknesses in those actually followed. In particular, it is suggested that, in most countries, too little attention is paid to the understanding of farm-level realities; to the diagnosis of constraints on farming development; to the detailed design of projects and programmes and, to the prediction of the outcomes of proposed policies.[9]

[7]Both are susceptible to becoming articles of political faith which inhibit revision and discourage examination and objective prediction. They also mean the adoption of programmes before they are designed.

[8]One way of meeting manpower shortages is to undertake only what cannot be neglected and what can successfully be achieved.

[9]We have emphasized the need for timeliness, however, and "better planning" which takes longer and may, for this reason, be worse. What is required is

3. PROBLEMS OF IMPLEMENTATION

The need for co-ordination of plans and for detailed programmes of implementation has already been stressed.[10] Failure of such co-ordination leads to nitrogen without potash, fertilizers without credit and irrigation water without distribution canals; it leads to the generation of positive bad feelings between departments and to loss of morale.

The need for a flow chart approach to the timing and phasing of activities and the need to spell out the decisions and action required cannot be over-emphasized. Even the routine monitoring of project progress—increasingly undertaken by central planning authorities—can be meaningful only in relation to initial detailed programmes which set out target dates for various stages in project development.

Budgeting, in particular, becomes an impossible exercise unless planned expenditures are realistically phased. Over-optimism with regard to initial rates of spending can induce a false sense of the seriousness of the financial situation and lead either to cutting back or to the imposition of higher tax burdens than are necessary.

Where planned priorities cannot in practice be pursued, new guidance is necessary to assert fresh priorities. Provision for plan revision must be built into organisational procedures.

But even the best laid plans may fail to be implemented. Given that sound and detailed initial plans are available, and given the staff to carry them out, a major problem of implementation is feedback and control.

Feedback of information may be inadequate, false or too late to be useful. It may be inadequate because of the low

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effective decision making and this does not always, if ever, depend on precise, time-consuming evaluation.

[10]Somewhat away from my main theme but a prize example of lack of policy co-ordination I would quote one instance where failure of a marketing board, government tax authorities and co-operative bodies to consult together—or at all with the Ministry of Agriculture—over the fixing of prices, crop cesses and other deductions, led to the announcement of a negative price to growers of a particular crop.

competence of the man on the ground or false because of his interest in hiding the truth. It may be delayed because of the pressure of other work or the low priority assigned to reporting back. It may also not be clearly understood that a critical, realistic appraisal of progress is what is truly required. Indeed, often it is not. This is a fundamental problem for it means that senior staff are not fully committed to the success of the programme but rather are deflected by other considerations such as "seeking to please the boss" (9, p. 463). These problems must be tackled from the top by precept and by the explicit encouragement of critical realism; by review of training programmes and the concept of roles that they generate (10), (11); and finally, by augmenting the provision for feedback by arrangements for effective inspection and ex post evaluation.[11] Such feedback is necessary, not only for improved implementation but for improved planning also.[12]

Effective implementation frequently demands that a large element of discretion be given to the field officer. Accounting procedures can severely hamper both the conferring and the acceptance of such discretion. If this is so, the case for their revision may need to be pressed. Where reference must be made to higher authority simple inefficiency with paperwork may lead to critical delays and inadequate co-ordination. These may also arise through insufficient delegation of authority or because of a reluctance to accept responsibility. Training programmes and organisation and methods reports may be of some help here, but where attitudes are at fault the problem may be too deeply seated for these approaches to offer much scope for improvement.

[11]Effective ex post evaluation is not a question of comparing achievements with targets. It involves comparing what was done with what could have been done. It also involves appraisal of the reasons for limited success and the scope for improving the approach.

[12]The concept of "visiting agent" as practised on colonial tea estates is out of fashion but it was a formula that achieved effective feedback and control without unduly inhibiting the initiative of the local manager. By this formula too, the concept of accountability rather than "control through the accounts" was often made to work extremely well.

An understanding of the root causes of defective attitudes and the ways in which they lead to inefficiency is necessary and studies in this field should be encouraged (10). Even so, some of the problems are obvious or have already been identified and can be tackled immediately. Recruitment, training, pay scales, career grades and conditions of service (especially for field officers) relative to other occupations may all be accountable for the creation of ill qualified, low calibre, and poorly motivated administrative and extension organisations. Such a situation is self-sustaining and drastic revisions of status, pay and training may be required to break the vicious circle.

Extension services have particular problems of efficiency and warrant a paper to themselves. Inherent is the problem of transport. Once in the field there are severe and specialist problems of who to communicate with and how best to do it. There is the perennial dilemma of how far it is possible to offer "average advice for the average farmer" and how far it is essential to create a service capable of tailoring advice to particular needs. The shortage of tailors usually solves this problem in the short run; in the long run it need not (12).

Effective extension programmes making the best use of partly qualified staff imply a strong emphasis on group contacts: clear cut, simple, limited and relevant objectives; special short course training for field workers for each programme; fully worked out routines and ample provision of necessary extension materials and required farm inputs.[13] By contrast, the scattering of poorly qualified and insufficiently directed field workers in remote villages is likely to yield very low returns.

However, the basic requirement of extension effectiveness is having something to offer.[14] In this respect the need for special diagnostic units in generating and appraising

[13]The provision of services as distinct from information should not, however, be the function of extension officers.

[14]In this connection, I have said too little about the organisation of research. On this, see especially (7): it is a useful general reference in this field; and also (12).

relevant and productive extension programmes cannot be overemphasized. Neither can the fact that diagnostic analysis is a completely different operation from farm costing studies—interminably perpetrated, seriously misused and sadly identified as farm economics.

I hope I shall be excused for having chosen to emphasise that among the most fundamental weaknesses of agricultural administration and extension is the failure to incorporate relevant economic analysis at the critical stages of policy-making and implementation. In improving agricultural administration, there is the most urgent need to increase the supply of highly skilled analysts and generate a demand for their services by the quality and demonstrable significance of their product—especially, a true understanding of what makes a farmer "tick". In addition, there is still much to be studied which is the province of sociologists, political scientists and experts in public administration whose interest we should seek to mobilise.

REFERENCES

1. J. Price Gittinger, The Literature of Agricultural Planning Centre for Development Planning, Planning Methods Series, No. 4, Washington, National Planning Association, 1966.
2. Albert Waterston, Development Planning: Lessons of Experience, Baltimore, Johns Hopkins Press, 1965.
3. Food and Agriculture Organization, The State of Food and Agriculture, Rome, F.A.O. 1965.
4. United Nations, Department of Economic and Social Affairs, The Workshop on Organisation and Administration of Agricultural Services in the Arab States, New York, United Nations, 1964.
5. M. Lipton, "Urban Bias and Agricultural Planning," in P. Streeten and M. Lipton (eds.), The Crisis of Indian Planning. London, Oxford University Press, 1968.
6. A. T. Mosher, Getting Agriculture Moving; Essentials for Development and Modernisation, New York Praeger, 1966.

7. Raanan Weitz (ed.), Rural Planning in Developing Countries, London, Routledge and Kegan Paul, 1965.
8. Victor W. Bruce, "Factors and Functions in the Organization of a Ministry of Agriculture," in The Workshop on Organization and Administration of Agricultural Services in the Arab States, New York, United Nations, 1964, pp. 78-87.
9. H. S. Mann, in discussion on paper by K. Skovgaard, "Environmental Conditions for Agricultural Development; Institutional Environment," Proc. 11th Int. Conf. Agric. Econ., London, Oxford University Press, 1963, pp. 463-465.
10. C. C. Taylor, et al., India's Roots of Democracy: A Sociological Analysis of Rural India's Experience in Planned Development since Independence, Calcutta, Orient Longmans, 1965.
11. Raymond E. Borton (ed.), Selected Readings to Accompany Getting Agriculture Moving, New York, Agricultural Development Council, 1966.
12. David W. Hopper, "The Mainsprings of Agricultural Growth," the Dr. Rajendra Prasad Memorial Lecture to the 18th Conference of the Indian Society of Agricultural Statistics, 1965 (mimeo).

ELEMENTS OF A STRATEGY FOR THE COORDINATED PROGRAMMING OF AGRICULTURAL RESEARCH, EXTENSION AND CREDIT*

Saul M. Katz

Agricultural development is a complex of many interrelated functions which require coordination. Among them, research, extension and credit are particularly important because these help power the changes and innovations of development. They are also difficult to coordinate since they represent rather different, even though related, functions. Thus, a key problem of agricultural development is to find an effective strategy for coordinating the programming of these and other related agricultural functions.

Finding a strategy for coordinated agricultural programming, however, is no easy matter. Strategies are effective only if the tactics to carry them out are available. The eminent German military historian von Clausewitz,[1] a long time ago, noted that there is no clear line of demarcation between strategy, that is, the general policies and plans, and tactics, the techniques and instruments for implementing the policies, and he emphasized the dependency of one on the other. It follows that strategy and tactics have to be considered together. When we talk here about strategy we also include tactics. This also makes it

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exceptionally difficult to develop a general strategy that is applicable to all individual country programs. The strategy and tactics suitable for one country may be quite inappropriate to another. Directions, policies and plans differ greatly between countries as do the availability of particular techniques and instruments of action.

We approach the problem by considering the elements of a strategy for coordination rather than proposing one particular strategy. Such an approach facilitates framing a strategy appropriate to a particular country by combining the elements in a suitable mix.

The approach is also useful because it facilitates incorporating the elements of a strategy for coordinating research, extension and credit into an overall strategy for agricultural development. Other functions, such as formal education and agricultural regulation need to be coordinated as well; and there are other strategy needs, in addition to coordination, that also must be taken into account in formulating an over-all strategy. While we focus primarily on the coordination of research, extension and credit, the elements of strategy should have application to the coordination of other functions as well.

Coordination, the harmonious combining of activities toward given goals, is a broad and complex aspect of administrative action. It must be seen from many perspectives: from the goals toward which the activities are directed; from the perspective of the activities and tasks themselves; from the viewpoint of the organizational structures which carry the goals and activities; and from the perspective of the human being as an individual and group member. In this paper we consider coordination from these four perspectives and, in the process, suggest eleven elements of a strategy for the coordinated programming of research, extension and credit. While we identify each element in connection with only one perspective, the elements are interrelated and often concern several, if not all, of the perspectives.

[1]Karl von Clausewitz, *War, Policies and Power* (Chicago: Henry Regnery Co., 1962).

1. COORDINATING GOALS

Our first perspective relates to goals. Coordination begins and ends with the purposes and goals of agricultural development. This had two sides. On one, agricultural development goals are an integral part of national goals, and in fact often are the means by which other national goals are achieved. On the other side, agricultural goals are related to and made up of the goals of the component functions of agriculture such as research, extension and credit. The goals of these functions, thus, both influence and are influenced by agricultural development goals. We briefly identify some of the goals of agricultural development and then characterize research, extension and credit which contribute to the achievement of the agricultural goals. In the process of this discussion, we suggest the first two of our elements of a strategy of coordinated programming.

Goals of Agricultural Development

Agricultural development is concerned with transforming or, as it is often called, "modernizing" the nation's agriculture and specifically its rural sector. The nature of this transformation is best indicated by its goals which are part of over-all national development goals. Agricultural goals vary from country to country and from time to time but three main sets of goals seem to recur, although in varying mixes.[2]

The *first* and most evident set of goals is concerned with improving the output and productivity of agriculture. This may take the form, for example of increasing the output for national consumption of staple crops such as corn, rice, beans or potatoes or protective foods such as dairy or meat; or it might emphasize increasing cash crops for export such as coffee, sugar or beef.

A *second* set of goals is aimed at expanding farmer's

[2]S.M. Katz, "Administrative Capability and Agricultural Development: An Institution Building Approach to Evaluation", *American Journal of Agricultural Economics*, 52 (5), December, 1970.

income, for example, by a shift from subsistence to cash crops by improved marketing, and by channelling a greater proportion of income produced in agriculture to farmers.

The *third* main goal-set, broader than the others, stresses the welfare of farm people, for example, by providing expanded employment opportunities, and particularly by "agrarian reform" to improve social and political as well as economic conditions of farm families. This last set of goals often involves a mix including selections from the first two goal-sets.

The broad national character of agricultural development goals and their contribution to, as well as dependence upon, other national goals, such as those in industry and finance suggest our first element in a strategy of coordinated programming.

Element 1. Agricultural goals should be clearly and explicitly related to other national development goals.

Functional Goals

The achievement of agricultural development goals, whatever the mix, depends on the fulfillment of various agricultural functions. Among them are research, extension and credit which might be characterized as follows:

The Research Function: is concerned with fact finding, and communicating its findings. It provides the factual or empirical basis for making judgements and guiding extension, credit and other functions such as formal agricultural education, land tenure reform, and the government regulation of the nation's agriculture and rural life.

The Extension Function: is concerned with "extending" education, outside formal classrooms, to any persons interested in the knowledge offered. This is generally interpreted to mean an education program that will assist people to develop within themselves the ability to make better use of their resources and opportunities. It usually focuses on agricultural production and marketing, rural family living, and youth activities that contribute to them.

The Credit Function: is to make capital available to

agricultural producers, marketers and suppliers of goods and services. This is generally done through acquiring or accumulating funds and making, supervising and collecting loans.

The detailed functional goals are implied by the characterizations of the functions just given. I hesitate to go into specifics with so many functional experts here and we do touch upon them further in the discussion of activities in the following section. In any case, what is important is that the goals of research, extension and credit and of the other functions contribute to and help carry out national agricultural goals. That is their excuse for being. All of this suggests our next strategic element for program coordination.

Element 2. Functional goals need to be clearly and explicitly related to national agricultural goals, and represent an adequate and appropriate translation of national purpose into functional terms.

2. COORDINATING ACTIVITIES AND TASKS

Our second perspective is concerned with the activities and tasks through which the research, extension and credit functions are carried on. Activities are the coherent combinations of tasks related to achieving functional and overall agricultural development goals. Thus, finding a new rice variety or developing an improved fertilization technique might be a task; similarly extending information on the new rice variety to farmers or encouraging farmers to use the new fertilizer loans. A coherent combination of such tasks, say for increasing rice production might constitute an activity. The activity might involve a combination of tasks from the same function, such as educating youth club members but more often involves a combination of tasks from several functions, as in our rice production illustration.

In discussing coordination of activities and tasks, we have the same problem, noted earlier, that activities tend

to be specific to particular places and times. However, by noting three main ways of grouping tasks we can use them to suggest four more strategic elements.

Commodity Groupings

One of the most common grouping of tasks is in relation to a particular commodity. Thus, all tasks concerned with cattle or coffee or rice are grouped together. National agricultural development goals usually involve some assessment of future demand for a particular commodity, the setting of production and marketing objectives, and the programming of activities and tasks to fulfill the objectives. This grouping of tasks by commodity has been in use a long time and in many places. The increasing interest in commodity oriented development models[3] and particularly in agricultural commodity systems illustrate the importance of the commodity task grouping.

In commodity system, all the tasks relating to the commodity, from seed to consumer, are viewed as forming an integrated system for the commodity and for the environment in which it takes place. The commodity system emphatically illustrates the importance of sequencing and timing of tasks. Improved variety development comes before seed multiplication and distribution. Improved seed availability and knowledge of the variety and its required special production techniques precede widespread planting. Expanded production of the commodity comes before marketing and processing but the latter two are essential if expanded production is to be maintained. All of these take place in sequence, and timing is also important since different lead times are necessary to provide for the different tasks. It takes one length of time to develop seeds, another period to educate farmers in the growing requisites of the variety, and still another time

[3]*Application of Commodity Models to Policy Analysis and Development Planning*, prepared for the Colloquium on Advanced Methodologies for Agricultural Investment and Policy Analysis, Economic Development Institute, International Bank for Reconstruction and Development, Washington, D.C., January 8 to February 2, 1972.

period for financing and distributing production inputs which must also be used in a particular sequence. A new, powerful, and fairly simple technique for such coordination is through critical path analysis, sometimes called PERT.[4] All of this suggests our next element in a strategy of coordinated programming.

Element 3. Sequencing and timing relationships including lead and lag times, of tasks and activities need to be made clear and explicit.

Process Groupings

Another well known, and widely used, grouping of tasks is by process. The functions themselves, in a broad sense, are process groupings for research, for extension, and for credit. More specifically, the achievement of agricultural development goals involve tasks that cut across commodity lines. To put it another way, many tasks are common to a large number of commodities. For example, improved seed availability usually involve similar techniques of development and, similarly, distribution channels are the same for many different kinds of seeds. Soil fertility determination involves common analytic techniques whatever the commodity. So too, soil improvement often involves crop rotations and the common use of synthetic fertilizers. Range management relates to many kinds of livestock as do animal health and sanitation techniques. Similarly, farm investment and agricultural infrastructure such as for machinery, drainage and irrigation, buildings, and roads are not necessarily commodity specific.

The process groupings highlight the importance of identifying and using common incremental units of expansion for related tasks. Thus the expansion of research, extension and credit components of the tasks involved in range improvement activities should be expanded at a comparable rate. Improving grass varieties, range from maintenance, changes in animal husbandry, effects of changes in

[4]See, for example, D.C. Robertson, *Project Planning and Control: Simplified Critical Path Analysis)* London: Heyward Books, 1967).

quality, quantity and costs of livestock products, and so on, all need to be expanded at a similar rate that is consistent with the technical constraints of the given task. The difference in units of expansion of investment in irrigation differ between a large dam and individual farm tubewells and this applies all the way through tasks involved in the construction, use and effects of the irrigation. The techniques of cost-benefit or, more correctly, cost-product-benefit analysis helps in identifying these incremental units, as well as their resource requirements.[5] All this suggests our next element of strategy.

Element 4. The incremental unit of expansion should be identified and be used in common for related tasks and activities.

District Groupings

The last type of grouping of tasks we discuss is district or geographic groupings. Agricultural production and marketing is dispersed over the whole countryside and the task of research, extension and credit must likewise be spatially dispersed. This geographic distribution of tasks cuts across commodity and process groupings. Or more correctly, the tasks must also be grouped in spatial units, what we may call here districts. In any given district, a variety of commodities are produced and marketed; and inputs must be supplied; incentives provided; infrastructure facilities made available; and other tasks fulfilled.

It is evident that most agricultural activities will involve spatial dispersion. How they will be grouped spatially, that is the particular district groupings, will depend on a variety of factors such as national policy, local conditions and technical requirements. National policy may dictate emphasis on particular development areas, what are sometimes called "growth poles" or contrariwise may seek a balance of development between areas. In other situations, the policy may call for increased output of selected crops

[5]E. J. Mishan, *Economics for Social Decisions: Elements of Cost-Benefits Analysis* New York: Praeger, 1973).

such as wheat or sugar or coffee. Similarly, the way particular tasks are spatially grouped are affected by local conditions such as population density, types of farms, and availability of transportation and communications facilities. District groupings are also affected by technical considerations such as soil types and climates, the presence or absence of local markets, and similar differences. Poor roads and few telephones require smaller extension districts. Lower population and farm density imply larger credit districts.

Yet, spatial coordination of research, extension and credit activities require approximately similar districts. If each function operates on a different district basis, they are each likely to be concerned with varying goals, different problems, and different conditions. As a consequence, each will be preoccupied by a different combination of tasks; and the difficulties of coordinated activities will be greatly increased. This suggests one more element of strategy.[6]

Element 5. Task groupings, whatever the type, need to be approximately similar for all agricultural functions.

There is, however, another problem that must be noted. Some functions, for various reasons, favor particular types of task groupings. Thus, research may find an advantage in using commodity groupings. Extension may find district groupings most convenient. Credit may prefer process groupings. Where there is a comparative advantage in using a particular type of grouping, clearly the function may emphasize that type, more or less standardized, of grouping for the bulk of its work. However, the other types of groupings are also necessary if only for support and for communication with other functions, and should be maintained in skeletal or liaison form. This suggests one additional strategic element.

Element 6. Each function should maintain all three types of task groupings. Where most of the work passes

[6]See Mosher, A.T. *Creating a Progressive Rural Structure*, New York, Agricultural Development Council, 1969, pp. 13-30; 79,

through one type, the others should be maintained, in abbreviated form for liaison.

3. STRUCTURE FOR COORDINATION

Our third perspective relates to organizational structures. All the economic and social activities of a government are carried on by or through organizations. Coordination requires organizational arrangements or structures that provide vehicles for its achievement. These structures, among other things, must provide for: decision-making; appropriately detailed programming of the decisions which assign authority, responsibility and accountability; communication of the decisions and programs; and control to ensure that implementation actions do not deviate excessively from the decisions. Such organizational structures need to be present at all levels of administration. We illustrate this perspective by considering three levels, identifying examples of structural arrangements for coordination at each level.

Top Level Coordination

The top level of coordination of agricultural activities is at the national and sectoral levels. It involves authoritative and informed decision-making that is both consistent with national goals and responsive to agricultural needs. This suggests, on one hand, a *cabinet-level policy coordinating committee* to make authoritative decisions on national agricultural policy consistent with national goals and ensuring the availability of the required resource-inputs; and on the other hand, a *functional coordinating board* made up of the directors of the various agricultural functions including, but not limited to, extension, research and credit, and chaired by the minister of agriculture. This latter board would have several responsibilities: informing and advising the policy committee on the needs and possibilities of agriculture and of the related resource requirements; translating the policy decisions into coordinated functional program decisions with associated re-

source allocations; and communicating all of this to the various functional organizations.

These two coordinating committees will need to be supported by other national management structures such as a *national communications network* that facilitates the rapid flow of accurate agricultural information and statistics. This latter may be based in the Ministry of Agriculture, the National Planning Office, a National Statistics Office or somewhere else. Wherever based, it would be responsible for drawing relevant data from all government offices and providing the information to all concerned agencies.

Element 7. Establish and maintain a network of national management structures that facilitate interrelated decision-making, programming, communication and control.

Function Level Coordination

Each of the functions may be encompassed by one government agency but more likely involves several agencies. There is a need to ensure coordination of the agencies involved in the same functions as well as of activities involving, as they usually do, more than one function. Since we are focussing on coordination between functions, we shall not be particularly concerned with internal agency coordination. We have already discussed the importance of similar task groupings in strategic elements 5 and 6. This finds its expression in what is often called departmentalization or how the agency is divided into organizational units. These should be based on groupings of tasks that are similar between all government agencies in agriculture although, as already noted, the emphasis on one type of grouping or another may vary from agency to agency.

Our emphasis on authoritative coordination of functions within and between agencies suggests the use of *activities working teams* made up of responsible representative of units concerned with the activity within an agency and/or

from different agencies. These representatives from different units should be technically informed and have been given the authority and responsibility for making definitive operational decisions more or less binding on their own units, the ones to which they are accountable.

Element 8. The functional agencies should have a pattern of delegating authority, responsibility and accountability for making operational decisions.

Grass Roots Level Coordination

Coordination at the grass roots, or point of action, level is particularly important. This is the point at which policy decisions are expressed in actions that directly affect the lives of the farmers, marketers and other rural people. Three organizational techniques that can facilitate coordination at this level are noted. First is the *joint project,* in which a variety of functional tasks that contribute to a common project target are related to each other by bringing together as a common working group the people from the various functional agencies. Thus, the research, extension and credit people concerned with expanding beef production in a given area work together in designing and implementing the project. Second is the *district action board* comprised of the local district managers of the various functional agencies. This board would coordinate local activities of the agencies so that these can be made more effective in achieving targets; and more efficient in reducing overlaps, duplications, and in increasing the use of common facilities. The emphasis here is on the close cooperation of the local agency representatives in planning and managing agency activities in a coordinated manner. The third organizational structure, the *local advisory committee,* is somewhat different but supports the preceeding two types. It involves the bringing together of selected local people who are knowledgeable, influential and concerned with the matters being dealt with in the joint projects and by the district action board.

Agricultural development can only take place if the

farmers, marketers, other rural people, and the government officers who work with them are all involved and committed to what is being proposed and being done. This has at least three aspects. First, the people concerned must feel that their own purposes, needs and problems are being taken into account. At the same time, there is an opportunity for them to provide inputs of information, and to relate local needs to project and district goals. Second, commitment and support requires some degree of participation in actual planning and decision-making. Third, the joint discussions, planning and consideration of the decision-making will help develop the perceptions and understandings of all concerned, and contribute to improved coordination. All of this suggests the next strategy element.

Element 9. Organizational structures should be set up so as to engage the participation, involvement and commitment of as many as possible of the people concerned with the developmental activities.

Incidentally, the set of structures noted under the three levels should contribute to what is sometimes called top down-bottom up programming. They facilitate passing down to the grass roots level a clearer knowledge of goals, perspectives and programs. At the same time they make it possible to pass up to top levels the problems, purposes, needs and demands of the local levels.

4. THE HUMAN PERSPECTIVE

Our fourth, and last, perspective is that of the human being who makes decisions and carries out the necessary actions. This is fitting since, in the final analysis, it is the human being as an individual, and as a member of formal groups, whose behavior forms the core of agricultural development just as it does of all social action.

Individual Attitudes

Individual behavior, actual and potential, is wide-ranging and complex, embracing all human endeavor.

Obviously, we cannot cover even a fraction of this, in the time available. However, our special interest is coordination so, at the risk of over-simplification, we consider only one major attitude set here (we have indirectly considered others, earlier), that of cooperation.

Coordination is particularly dependent upon a favorable attitude toward cooperation between individuals and groups rather than competition. In many areas of human life, cooperation is basic to human survival and development. The continuing importance of cooperation is illustrated by man's (and woman's) ability to live and work together whether it be in the family, in the community, or in the host of voluntary and involuntary social groupings that form a society.

The effective coordination of agricultural development activities places a premium on attitudes of cooperation. It requires that individuals involved in all aspects of agricultural activity be predisposed to cooperate with other members of the agricultural "community". They have to be ready and willing to share information, make joint (and jointly acceptable) decisions and work together in the carrying out of agreed upon activities.

It would, of course, be naive to assume away competition. Individuals and groups do compete for power, for resources and for personal gain. Nevertheless, in the long run, successful competition in social situations requires a great deal of cooperation, and in principle, successful competition should be made to depend upon cooperation. For example, promotion and individual awards should have as one of their major requirements evidence of cooperativeness.

Individuals must start with strongly positive attitudes toward cooperation action if there is to be successful coordination of research, extension, credit, and other agricultural functions. Such cooperative attitudes need to be recognized as an important part of all professional and agency behavior and socialized into all individuals at the very beginning of their involvement in development activities. This may be epitomized by the old truism—

"cooperation is the road to success". Each individual's success depends on the cooperative contribution of others. Thus,

Element 10. All individuals, at all levels, must be inculcated with the importance of attitudes of willing and ready cooperation.

Institutionalization

The human perspective also has a special relevance to group behavior. In the preceeding discussion of the other three perspectives of goals, activities and organizational structures, we focused on technical aspects of coordination. However, as just suggested, customs, mores and especially attitudes greatly affect behavior. The usefulness of the elements of a strategy for coordination depends upon their being made a basic part of regular group behavior and doctrine. They need to be institutionalized into agency structure and operating policy.[7] That is to say, the policy and practice of cooperative coordination needs to be infused into goals, activities and organizations. This suggests that cooperation and coordination become positive values to those working within the functions and is seen as an appropriate norm or guide of conduct by those outside. A simple technique for fostering a favorable view of coordination is to make allocation of funds partly dependent on its presence in the function's policies and practices. This leads to our eleventh, and last, element of a strategy of coordination.

Element 11. Cooperative coordination should be institutionalized as a basic part of policy and practice in all agricultural activities and agencies.

5. EVALUATION OF COORDINATION

We have considered, briefly, the problem of a strategy (and tactics) for the coordinated programming of research,

[7]S.M. Katz, "The Institution Building Model: A Systems View", in J.W. Eaton (ed.), *Institution Building and Development* (Sage Publications, 1972.)

extension and credit, from four viewpoints: goals, activities, structures and the human perspective. In the course of this consideration, we have suggested eleven elements of such a strategy:

These elements, it will be recollected, are:

1. Agricultural goals should be clearly and explicitly related to other national development goals.
2. Functional goals need to be clearly and explicitly related to national agricultural goals, and represent an adequate and appropriate translation of national goals into functional terms.
3. Sequencing and timing relationships, including lead and lag time, of tasks and activities need to be made clear and explicit.
4. The incremental unit of expansion should be identified and be used in common for related tasks and activities.
5. Task groupings, whatever the type, need to be approximately similar for all agricultural functions.
6. Each function should maintain all three types of task groupings. Where most of the work passes through one type, the others should be maintained, in abbreviated form, for liaison.
7. Establish and maintain a network of national management structures that facilitate interrelated decision-making, programming, communication and control.
8. The functional agencies should have a pattern of delegating authority, responsibility and accountability for making operational decisions.
9. Organizational structures should be set up so as to engage the participation, involvement and commitment of as many as possible of the people concerned with the developmental activities.
10. All individuals, at all levels, must be inculcated with the importance of attitudes of willing and ready cooperation.
11. Cooperative coordination should be in-

stitutionalized as a basic part of policy and practice in all agricultural activities and agencies.

Characteristics of the Elements

The foregoing eleven elements of a strategy for coordinated programming have several interesting characteristics. Examination shows that not only are they interrelated but also that they apply across perspective lines. Thus, national goals are related to agricultural goals (Element 1), these are related to functional goals which are also related to each other (Element 2), and both are related to a network of management structures (Element 7). The individual elements, although developed in connection with one perspective, often have application in other perspectives. For example, similarity in task groupings (Element 5) from the activities perspective, is also important in the departmentalization of organizational structures, and delegation of authority (Element 8) under structures, and both are relevant to cooperative attitudes (Element 10) under the human perspective, and vice versa.

We indicated earlier that the elements of a strategy for coordinated programming of research, extension and credit must be applicable to other functions and fit into a larger strategy. The elements proposed have been deliberately couched in terms that are not function specific. I believe, for example, similarity among task groupings applies equally well to land tenure reform, formal education and agricultural regulation, and are just as essential. Certainly, the proposed organizational coordination structures, and other elements, specifically provide for including other functions. Equally important, the proposed elements of a strategy for coordination are suitable for incorporating, together with other strategies, into an overall strategy. For example, the elements proposed here are consistent with and supportive of a strategy of innovation, and of a strategy for enhancing the dignity and welfare of rural people.

Evaluation

Coordination is a characteristic, and an expression, of

the entire administration. The elements of strategy proposed here contribute to the more effective overall guidance of the administration. We suggested earlier that there are four aspects to guidance: decision-making, programming, communication and control. We have, to some extent, discussed the first three. We now comment on the fourth, control, used here in the sense of checking on the actions taken to determine their degree of coincidence with the original decisions, and, as appropriate, initiating corrective action.

In order to achieve, and not just talk about, coordination, there must be effective administrative guidance. Decisions must be made and translated into appropriate detailed programs. These decisions and programs must then be communicated to the action centers. All of this, hopefully, should take account of a suitable mix of the strategy elements proposed here. In addition, the performance needs to be controlled. That is to say, the action steps need to be evaluated and, where necessary, adjustments made.

Evaluation involves making judgements about the success or failure of a program or an organization. From the standpoint of coordination, it asks how meaningfully has the coordinating strategy been formulated and how well it has been implemented. The suggested eleven elements can be used as a checklist to ask questions about coordination of the functional programs, and help in devising corrective measures.

REFERENCES

(1) Karl von Clausewitz, *War, Policies and Power* (Chicago: Henry Regnery Co., 1962).

(2) S.M. Katz, "Administrative Capability and Agricultural Development: An Institution Building Approach to Evaluation," *American Journal of Agricultural Economics,* 52 (5), December, 1970.

(3) See, for example, D.C. Robertson, *Project Planning and Control: Simplified Critical Path Analysis* (London: Heyward Books, 1967).

(4) E.J. Mishan, *Economics for Social Decisions: Elements of Cost-Benefit Analysis* (New York: Praeger, 1973).
(5) See Mosher, A.T., Creating a Progressive Rural Structure (New York, Agricultural Development Council, 1969) pp. 13-30; 79.
(6) S.M. Katz, "The Institution Building Model: A Systems View," in J.W. Eaton (ed.), Institution Building and Development (Sage Publications, 1972).

THE MANAGERS JOB: FOLKLORE AND FACT*

Henry Mintzberg

Just what does the manager do? For years the manager, the heart of the organization, has been assumed to be like an orchestra leader, controlling the various parts of his organization with the ease and precision of Seiji Ozawa. However, when one looks at the few studies that have been done—covering managerial positions from the president of the United States to street gang leaders—the facts show that managers are not reflective, regulated workers, informed by their massive MIS systems, scientific, and professional. The evidence suggests that they play a complex, intertwined combination of interpersonal informational, and decisional roles. The author's message is that if managers want to be more effective, they must recognize what their job really is and then use the resources at hand to support rather than hamper their own nature. Understanding their jobs as well as understanding themselves takes both introspection and objectivity on the manager's part.

If you ask a manager what he does, he will most likely tell you that he plans, organizes, coordinates, and controls, then watch what he does. Don't be surprised if you can't relate what you see to these four words.

When he is called and told that one of his factories has just burned down, and he advises the caller to see whether

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temporary arrangements can be made to supply customers through a foreign subsidiary, is he planning, organizing or controlling? How about when he presents a gold watch to a retiring employee? Or when he attends a conference to meet people in the trade? Or on returning from that conference when he tells one of his employees about an interesting product idea he picked up there?

The fact is that these four words, which have dominated management vocabulary since the French industrialist Henri Fayol first introduced them in 1916, tell us little about what managers actually do. At best, they indicate some vague objectives managers have when they work.

SOME FOLKLORE AND FACTS ABOUT MANAGERIAL WORK

There are four myths about the manager's job that do not bear up under careful scrutiny of the facts.

Folklore: The manager is a reflective, systematic planner. The evidence on this issue is overwhelming, but not a shred of it supports this statement.

Fact: Study after study has shown that managers work at an unrelenting pace, their activities are characterized by brevity, variety, and discontinuity, and that they are strongly oriented to action and dislike reflective activities. Consider this evidence.

Half the activities engaged in by the five chief executives of my study lasted less than nine minutes, and only 10 percent exceeded one hour. A study of fifty-six U.S. foremen found that they averaged 583 activities per eight-hour shift, an average of one every forty-eight seconds. The work pace for both chief executives and foremen was unrelenting. The chief executives met a steady stream of callers and mail from the moment they arrived in the morning until they left in the evening. Coffee breaks and lunches were inevitably work related, and ever-present subordinates seemed to usurp any free moment.

A diary study of 160 British middle and top managers found that they worked for a half hour or more without interruption only about once every two days.

Of the verbal contacts of the chief executives in my study, 93 percent were arranged on an ad hoc basis. Only 1 percent of the executives time was spent in open-ended observational tours. Only one of 368 verbal contacts was unrelated to a specific issue and could be called general planning. Another researcher finds "*in not one single case* did a manager report the obtaining of important external information from a general conversation or other undirected personal communication."

No study has found important patterns in the way managers schedule their time. They seem to jump from issue to issue, continually responding to the needs of the moment.

Is this the planner that the classical view describes? Hardly. How then, can we explain this behavior? The manager is simply responding to the pressures of his job. I found that my chief executives terminated many of their own activities, often leaving meetings before the end, and interrupted their desk work to call in subordinates. One president not only placed his desk so that he could look down a long hallway but also left his door open when he was alone—an invitation for subordinates to come in and interrupt him.

Folklore: The effective manager has no regular duties to perform. Managers are constantly being told to spend more time planning and delegating, and less time seeing customers and engaging in negotiations. These are not, after all, the true tasks of the manager. To use the popular analogy, the good manager, like the good conductor, carefully orchestrates everything in advance, then sits back to enjoy the fruits of his labor, responding occasionally to an unforeseeable exception.

But here again the pleasant abstraction just does not seem to hold up. We had better take a closer look at those activities managers feel compelled to engage in before we arbitrarily define them away.

Fact: In addition to handling exceptions, managerial work involves performing a number of regular duties, including ritual and ceremony negotiations, and processing of soft information that links the organization with its

environment. Consider some evidence from the research studies:

Study of the work of the presidents of small companies found that they engaged in routine activities because their companies could not afford staff specialists and were so thin on operating personnel that a single absence often required the president to substitute.

One study of field sales managers and another of chief executives suggest that it is a natural part of both jobs to see important customers, assuming the managers wish to keep those customers.

Someone, only half in jest, once described the manager as that person who sees visitors so that everyone else can get his work done. In my study, I found that certain ceremonial duties—meeting visiting dignitaries, giving out gold watches, presiding at Christmas dinners—were an intrinsic part of the chief executive's job.

Studies of managers' information flow suggest that managers play a key role in securing "soft" external information (much of it available only to them because of their status) and in passing it along to their subordinates.

Folklore: The senior manager needs aggregated information, which a formal management information system best provides. Not too long ago, the words *total information system* were everywhere in the management literature. In keeping with the classical view of the manager as that individual perched on the apex of a regulated, hierarchical system, the literature's manager was to receive all his important information from a giant, comprehensive MIS.

But lately, as it has become increasingly evident that these giant MIS systems are not working—that managers are simply not using them—the enthusiasm has waned. A look at how managers actually process information makes the reason quite clear. Managers have five media at their command documents, telephone calls, scheduled and unscheduled meetings, and observational tours.

Fact: Managers strongly favor the verbal media—namely, telephone calls and meetings. The evidence

comes from every single study of managerial work. Consider the following:

In two British studies, managers spent an average of 66 percent and 80 percent of their time in verbal (oral) communication. In my study of five American chief executives, the figure was 78 percent.

These five chief executives treated mail processing as a burden to be dispensed with. One came in Saturday morning to process 142 pieces of mail in just over three hours, to "get rid of all the stuff." This same manager looked at the first piece of "hard" mail he had received all week, a standard cost report, and put it aside with the comment, "I never look at this."

These same five chief executives responded immediately to two of the forty routine reports they received during the five weeks of my study and to four items in the 104 periodicals. They skimmed most of these periodicals in seconds, almost ritualistically. In all, these chief executives of good-sized organizations initiated on their own—that is, not in response to something else—a grand total of twenty-five pieces of mail during the twenty-five days I observed them.

An analysis of the mail the executives received reveals an interesting picture—only 13 percent was of specific and immediate use. So now we have another piece in the puzzle: not much of the mail provides live, current information—the action of a competitor, the mood of a government legislator, or the rating of last night's television show. Yet, this is the information that drove the managers, interrupting their meetings and rescheduling their workdays.

Consider another interesting finding. Managers seem to cherish "soft" information, especially gossip, hearsay, and speculation. Why? The reason is its timeliness; today's gossip may be tomorrow's fact. The manager who is not accessible for the telephone call informing him that his biggest customer seen golfing with his main competitor may read about a dramatic drop in sales in the next quarterly report. But then it's too late.

The manager's emphasis on the verbal media raises two important points:

First, verbal information is stored in brains of people. Only when people write this information down can it be stored in the files of the organization—whether in metal cabinets or on magnetic tape—and managers apparently do not write down much of what they hear. Thus the strategic data bank of the organization is not in the memory of its computers but in the minds of its managers.

Second, the manager's extensive use of verbal media helps to explain why he is reluctant to delegate tasks. When we note that most of the manager's important information comes in verbal form and is stored in his head, we can well appreciate his reluctance.

Folklore: Management, is or at least is quickly becoming, a science and a profession. By almost and definitions of *science* and *profession,* this statement is false. Brief observation of any manager will quickly lay to rest the notion that managers practice a science. A science involves the enaction of systematic, analytically determined procedures or programs. If we do not even know what procedures managers use, how can we prescribe them by scientific analysis? And how can we call management a profession if we cannot specify what managers are to learn? For after all, a profession involves "knowledge of some department of learning or science" (Random House Dictionary).

Fact: The managers' programs—to schedule time, process information, make decisions, and so on—remain locked deep inside their brains. Thus, to describe these programs, we rely on words like *judgement* and *intuition,* seldom stopping to realize that they are merely labels for our ignorance.

I was struck during my study of the fact that the executives I was observing—all very competent by any standard—are fundamentally indistinguishable from their counterparts of a hundred years ago, (or a thousand years ago for that matter). The information they need differs, but they seek it in the same way—by word of mouth. Their

decisions concern modern technology, but the procedures they use to make them are the same as the procedures of the nineteenth-century manager. Even the computer, so important for the specialized work of the organization, has apparently had no influence on the work procedures of general managers. In fact, the manager is in a kind of loop, with increasingly heavy work pressures but no aid forthcoming from management science.

Considering the facts about managerial work, we can see that the manager's job is enormously complicated and difficult. The manager is overburned with obligations; yet he cannot easily delegate his tasks. As a result, he is driven to overwork and is forced to do many tasks superficially. Brevity, fragmentation, and verbal communication characterize his work. Yet these are the very characteristics of managerial work that have impeded scientific attempts to improve it. As a result, the management scientist has concentrated his efforts on the specialized functions of the organization, where he could more easily analyze the procedures and quantify the relevant information.

But the pressures of the manager's job are becoming worse. Where before he needed only to respond to owners and directors, now he finds that subordinates with democratic norms continually reduce his freedom to issue unexplained orders, and growing number of outside influences (consumer groups, government agencies, and so on) expect his attention. And the manager has had nowhere to turn for help. The first step in providing the manager with some help is to find out what his job really is.

BASIC TO BASIC DESCRIPTION OF MANAGERIAL WORK

Now let us try to put some of the pieces of this puzzle together. Earlier I defined the manager as that person in charge of an organization or one of its subunits. Besides chief executive officers, this definition would include vice-presidents, bishops, foremen, hockey coaches, and prime ministers. Can all of these people have anything in common? Indeed they can. For an important starting point,

all are vested with formal authority over an organizational unit. From formal authority comes status, which leads to various interpersonal relations, and from these comes access to information. Information in turn, enables the manager to make decisions and strategies for his unit.

The manager's job can be described in terms of various "roles," or organized sets of behavior indentified with a position. My description comprises ten roles. As we shall see, formal authority gives rise to the three interpersonal roles, which in turn give rise to the three informational roles; these two sets of roles enable the manager to play the four decisional roles.

Interpersonal Roles

Three of the manager's roles arise directly from his formal authority and involve basic interpersonal relationships.

First is the *figurehead* role. By virtue of his position as head of an organizational unit, every manager must perform some duties of a ceremonial nature. The president greets the touring dignitaries, the foreman attends the wedding of a lathe operator, and the sales manager takes an important customer to lunch.

Because he is in charge of an organizational unit, the manager is responsible for the work of the people of that unit. His actions in this regard constitute the *leader role.* Some of these actions involve leadership directly—for example, in most organizations the manager is normally responsible for hiring and training his own staff.

In addition, there is the indirect exercise of the leader role. Every manager must motivate and encourage his employees, somehow reconciling their individual needs with the goals of the organization. In virtually every contact the manager has with his employees, subordinates seeking leadership clues probe his actions: "Does he approve?" "How would he like the report to turn out?" "Is he more interested in market share than high profits?

The influence of the manager is most clearly seen in the leader role. Formal authority vests him with great potential

power; leadership determines in large part how much of it he will realize.

The literature of management has always recognized the leader role, particularly those aspects of it related to motivation. In comparison, until recently it has hardly mentioned the *liaison* role, in which the manager makes contacts outside his vertical chain of command. This is remarkable in light of the finding of virtually every study of managerial work that managers spend as much time with peers and other people outside their units as they do with their own subordinates—and, surprisingly, very little time with their own superiors.

As we shall see shortly, the manager cultivates such contacts largely to find information. In effect, the liaison role is devoted to building up the manager's own external information system—informal, private, verbal, but, nevertheless, effective.

Informational Roles

By virtue of his interpersonal contacts, both with his subordinates and with his network of contacts, the manager emerges as the nerve center of his organizational unit. He may not know everything, but he typically knows more than any member of his staff.

Studies have shown this relationship to hold for all managers, from street gang leaders to U.S. presidents. In *The Human Group,* George C. Homans explains how, because they were at the center of the information flow in their own gangs and were also in close touch with other gang leaders, street gang leaders were better informed than any of their followers.

The processing of information is a key part of the manager's job. In my study, the chief executives spent 40 percent of their contact time on activities devoted exclusively to the transmission of information; 70 percent of their incoming mail was purely informational (as opposed to requests for action). The manager does not leave meetings or hang up the telephone in order to get back to work.

In large part, communication *is* his work. Three roles describe these informational aspects of managerial work.

As *monitor,* the manager perpetually scans his environment for information, interrogates his liaison contacts and his subordinates, and receives unsolicited information, much of it as a result of the network of personal contacts he has developed. Remember that good part of the information the manager collects in his monitor role arrives in verbal form, often as gossip, hearsay, and speculation. By virtue of his contacts, the manager has a natural advantage in collecting this soft information for his organization.

He must share and distribute much of this information. Information he gleans from outside personal contacts may be needed within his organization. In his *disseminator* role, the manager passes some of his privileged information directly to his subordinates, who would otherwise have no access to it. When his subordinates lack easy contact with one another, the manager will sometimes pass information from one to another.

In his *spokesman* role, the manager sends some of his information to people outside his unit—a president makes a speech to lobby for an organization cause, or a foreman suggests a product modification to a supplier. In addition, as part of his role as spokesman, every manager must inform and satisfy the influential people who control his organizational unit. For the foreman, this may simply involve keeping the plant manager informed about the flow of work through the shop.

The president of a large corporation, however, may spend a great amount of his time dealing with a host of influences. Directors and shareholders must be advised about financial performance; consumer groups must be assured that the organization is fulfilling its social responsibilities; and government officials must be satisfied that the organization is abiding by the laws.

Decisional Roles

Information is not, of course, an end in itself; it is the basic input to decision making. One thing is clear in the

study of managerial work: the manager plays the major role in his unit's decision-making system. As its formal authority, only he can commit the unit to important new courses of action; and as its nerve center, only he has full and current information to make the set of decisions that determines the unit's strategy. Four roles describe the manager as decision-maker.

As *entrepreneur,* the manager seeks to improve his unit, to adapt it to changing conditions in the environment. In his monitor role, the president is constantly on the lookout for new ideas. When a good one appears, he initiates a development project that he may supervise himself or delegate to an employee (perhaps with the stipulation that he must approve the final proposal).

There are two interesting features about these development projects at the chief executive level.

First, these projects do not involve single decisions or even unified clusters of decisions. Rather, they emerge as a series of small decisions and actions sequenced over time. Apparently, the chief executive prolongs each project so that he can fit it bit by bit into his busy, disjointed schedule and so that he can gradually come to comprehend the issue, if it is a complicated one.

Second the chief executive I studied supervised as many as fifty of these projects at the same time. Some projects entailed new products or processes; others involved public relations campaigns, improvement of the cash positions, reorganization of a weak department, resolution of a morale problem in a foreign division, integration of computer operations, various acquisitions at different stages of development, and so on.

While the entrepreneur role describes the manager as the voluntary initiator of change, the *disturbance handler* role depicts the manager involuntary respond to pressures. Here change is beyond the manager's control. He must act because the pressures of the situation are too severe to be ignored: Strike looms, a major customer has gone bankrupt, or a supplier reneges on his contract.

The third decisional role is that of *resource allocator.* To

the manager falls the responsibility of deciding who will get what in his organizational unit. Perhaps the most important resource the manager allocates is his own time. Access to the manager constitutes exposure to the unit's nerve center and decision-maker. The manager is also charged with designing his unit's structure, that pattern of formal relationships that determines how work is to be divided and coordinated.

Also, in his role as resource allocator, the manager authorizes the important decision of his unit before they are implemented. By retaining this power, the manager can ensure that decisions are interrelated; all must pass through a single brain. To fragment this power is to encourage discontinuous decision making and a disjointed strategy.

One common solution to approving projects is to pick the man instead of the proposal. That is, the manager authorizes those projects presented to him by people whose judgment he trusts. But he cannot always use this simple dodge.

The final decisional role is that of *negotiator.* Studies of managerial work at all levels indicate that managers spend considerable time in negotiations: the president of the football team is called on to work out a contract with the holdout superstar; the corporation president leads his company's contingent to negotiate a new strike issue; the foreman argues a grievance problem to its conclusion with the shop steward. As Leonard Sayles puts it, negotiations are a "way of life" for the sophisticated manager.

These negotiations are duties of the manager's job; perhaps routine, they are not to be shirked. They are an integral part of his job, for only he has the nerve center information that important negotiations require.

The Integrated Job

It should be clear by now that the ten roles I have been describing are not easily separable. In terminology of the psychologist, they form a gestalt, an integrated whole. No role can be pulled out of the framework and the job be left

intact. For example, a manager without liaison contacts lacks external information. As a result, he can neither disseminate the information his employees need nor make decisions that adequtely reflect external conditions. (In fact, this is a problem for the new person in a managerial position, since he cannot make effective decision until he has built up his network of contacts.)

To say that ten roles form a gestalt is not to say that all managers give equal attention to each role. In fact, I found in my review of the various research studies that . . . sales managers seem to spend relatively more of their time in the interpersonal roles, presumably in reflection of the extrovert nature of the marketing activity; . . . production managers give relatively more attention to the decisional roles, presumably a reflection of their concern with efficient work flow; . . . staff managers spend the most time in the informational roles, since they are experts who manage department that advise other parts of the organization.

Nevertheless, in all cases the interpersonal, informational, and decisional roles remain inseparable.

TOWARD MORE EFFECTIVE MANAGEMENT

What are the messages for management in this description? I believe, first and foremost, that this description of managerial work should prove more important to managers than any prescription they might derive from it. That is to say, *the manager's effectiveness is significantly influenced by his insight into his own work.* His performance depends on how well he understands and responds to the pressures and dilemmas of the job. Thus managers who can be introspective at their jobs.

Let us take a look at three specific areas of concern. For the most part, the managerial logjams—the dilemma of delegation, the data base centralized in one brain, the problems of working with the management scientist—revolve around the verbal nature of the manager's information. There are great dangers in centralizing the organiza-

tion's data bank in the mind of its managers. When they leave, they take their memory with them. And when subordinates are out of convenient verbal reach of the manager, they are at an informal disadvantage.

The manager is challenged to find systematic ways to share his privileged information. A regular debriefing session with key subordinates, a weekly memory dump on the dictating machine, the maintaining of a diary of important information for limited circulation, or other similar methods may ease the logjam of work considerably. Time spent disseminating this information will be more than regained when decisions must be made. Of course, some will raise the question of confidentiality. But managers would do well to weigh the risks of exposing privileged information against having subordinates who can make effective decisions.

If there is a single theme that runs through this article, it is that the pressures of his job drive the manager to be superficial in his actions—to overload himself with work, encourage interruption, respond quickly to every stimulus, seek the tangible and avoid the abstract, make decisions in small increments, and do everything abruptly.

Here again, the manager is challenged to deal consciously with the pressures of superficiality by giving serious attention to the issues that require it, by stepping back from his tangible bits of information in order to see a broad picture, and by making use of analytical inputs. Although effective managers have to be adept at responding quickly to numerous and varying problems, the danger in managerial work is that they will respond to every issue equally (and that means abruptly) and that they will never work the tangible bits and pieces of informational input into a comprehensive picture of their world.

The manager is challenged to gain control of his own time by turning obligations to his advantage and by turning those things he wishes to do into obligations. The chief executives of my study initiated only 32 percent of their own contacts (and another 5 percent by mutual agreement). And yet to a considerable extent they seemed

to control their time. There were two key factors that enabled them to do so.

First, the manager has to spend so much time discharging obligations that if he were to view them as just that, he would leave no mark on his organization. The unsuccessful manager blames failure on the obligations; the effective manager turns his obligations to his own advantage. A speech is a chance to lobby for a cause; a meeting is a chance to reorganize a week department; a visit to an important customer is a chance to extract trade information.

Second, the manager frees some of his time to do those things that he—perhaps no one else—thinks important by turning them into obligations. Free time is made not found, in the manager's job; or is forced into the schedule. Hoping to leave some time open for contemplation or general planning is tantamount to hoping that the pressures of the job will go away. The manager who wants to innovate initiates a project and obligates others to report back to him; the manager who has to tour facilities commits himself publicly.

No job is more vital to our society than that of manager. It is the manager who determines whether our social institutions serve us well or whether they squander our talents and resources. It is time to strip away the folklore about managerial work, and time to study it realistically so that we can begin the difficult task of making significant improvement in its performance.

SECTION III

TOOLS FOR THE DEVELOPMENT ADMINISTRATOR

The milieu that faces the administrator on any particular morning may include a new program announced by the just appointed Agriculture Minister, a delegation of farmers requesting seed, a hundred civil servants demanding over-due pay and on the other hand, a bureaucracy that reinforces the person who follows its rigid rules. In this setting the administrator is expected to forecast the likely outcome of various development projects. He must estimate the human and physical resources required and decide how to meet the accountability requirements of his government. As a development administrator he will evaluate different methods of monitoring the progress of the project chosen so that the different inputs to the project reach the "production line" at the planned time, in the right amount, at the specified place. In most situations the administrator has little lead time to order and receive the research and planning input the project requires. What tools are useful to the administrator facing such tasks?

Arthur T. Mosher is persuasive in this lead article saying that we can learn as we proceed with a project even if we have not had the desired lead time for research and detailed planning. In his article *Administrative Experimentation as a 'Way of Life' for Development Projects* he contends that development projects offer an unusual opportunity to build comparative experimental approaches

into action programs making it possible to test different administrative and program content techniques. Based on the cases cited this experimentation will improve the training component of the program and is likely to make the action program more effective as well.

The next paper is by A. Premchand *Budgetary Process Under Performance Budgeting* and gives a different tool to the innovative administrator. This article sets out the different stages of the budgetary process and how a "performance budget" is prepared. The author then points to the advantages of performance budgeting in gaining the effective functioning of planning and financial agencies required to meet general development objectives.

The third and fourth readings focus on a management tool widely proven in industrial and agricultural development projects in both developing and developed countries. PERT (Project Evaluation and Review Technique) is this versatile tool. Kenneth Smith in the article *What Is PERT and What Can It Do* takes the reader step by step through the rationale and construction of a PERT network. *"PERT" A Planning Tool* written by the Institute for Extension Personnel Development, Michigan State University, illustrates PERT's applicability by planning a beef cattle management meeting.

The administrator who doesn't have time to read and think and improve his professional skills is a familiar figure to all in the development field. He is an especially tragic figure in an area of human enterprise that stresses change and professional adaptability. Edmund N. Fulker writes to this problem in his paper *Self Development Checklist for Administrators, Managers and Executives.* Brief and readable, it should prove a valuable tool to the administrator using it.

Finally, this section concludes with four brief notes on very practical aspects of managing an organization. Donald Green and David W. Brown discussed *Determining the Work Program.* Brown discusses *Assessing Programs Progress and Results,* and *Deciding What To Do Yourself.* John L. Fischer writes on *Maintaining Morale.*

ADMINISTRATIVE EXPERIMENTATION AS A "WAY OF LIFE" FOR DEVELOPMENT PROJECTS*

Arthur T. Mosher

This paper constitutes an invitation to discuss six propositions with respect to relations between research and administration in developmental programs, whether wholly domestic or involving bilateral or international technical cooperation:

First, that developmental projects offer an unusual opportunity to build comparative experimental approaches into action programs, thereby making it possible to test different administrative and program content techniques under reasonably uniform exogenous conditions;

Second, that having an experimental element in an action program enhances the training component of the program for members of its staff;

Third, that building such experimentation into an action program is more likely than not to make the action program more effective as an action program;

Fourth, that to conduct such experimental programs successfully it is important that reporting, and some analysis, of data for "research" purposes be a function of the line elements of the administration of the project and not delegated solely to a separate staff section of the project or to investigators wholly outside the agency;

Fifth, that while line members of the staff should be

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involved in reporting and analyzing research data, the time required for such participation should be kept modest, with the summarizing of data and preliminary analyses performed by a separate clerical staff under the direction of a Research Officer; and

Sixth, that the results of any such experiments in project administration can seldom result in findings of universal applicability; experiments covering the same variable need to be repeated afresh in each cultural setting.

The context in which I shall present these propositions briefly is that of agricultural development projects, primarily in Asia. I have not considered whether these propositions might have wider applicability. The two projects that are discussed briefly in the latter part of the paper are most closely related to propositions IV and V but they constitute a major part of my experience giving rise to the other propositions as well.

I. Developmental projects offer unusual opportunity to build comparative experimental approaches into action programs.

Many developmental projects are now in operation and many more are certain to be undertaken over the next few years. In most cases these are designed without prior experience with such projects within the country or region and therefore are likely to draw heavily on techniques and forms of organization used for similar projects elsewhere. A good rationale for the need for experimental testing or re-testing of administrative and program content methods flows from this fact.

Moreover, the impulse to start a new type of developmental project usually arises from the coalescence of a conviction on the part of some public agency that such a project is essential to development. Once this conviction becomes strong enough to start the project, the urgency of concern about development, or political pressure to spread the effects of any project widely in the country or region militate against spending three to five years in experimentation alone. Instead, the usual practice is to begin at once

with a rather large program. The nature of the program, including its administrative aspects, is likely to be decided by brief or protracted discussion without actual field trial. But the political pressure to start big can provide an effective stimulus to build experimental variations into different parts of the on-going program, provided sufficient emphasis, coupled with ability to outline a feasible procedure, is brought to bear by someone competent to suggest alternatives and willing to follow through by participating in the "research" part of the total effort.

It is quite possible to design a developmental project in such a way that different administrative devices are used in different regional sectors of a project, or that different staff training procedures are followed, or that different program emphases are followed. In a credit program, for example, some local agents may stay in their local offices to receive applicants while others spend different proportions of their time visiting farmers in their villages; some local offices can be located in district administrative headquarters while others are located near grain markets; some local agents can be provided with bicycles or jeeps while others rely on public transportation; some regional programs may use simplified procedures for small loans while others follow uniform procedures regardless of the size of the loan, etc. Variations like these need not complicate administration unduly provided they are carefully planned.

Despite the obvious opportunities for creative experimentation offered by developmental projects it is discouraging to observe how seldom the opportunity is seized. After all, any decision reached even after protracted and careful consideration of alternative procedures can only be a hypothesis since it is not based on prior testing of alternatives under local conditions. To consign the inevitable future evaluation of the project, formal or informal, to the uncritical testing of any single hypothesis without simultaneous testing of alternatives involves a risk no country bent on development can afford. Impatience at proposals to spend a three to five year preliminary period in small-scale experimentation can be understood even

when such delay of a larger program might be efficient in the long run. But the alternative of building experimental variations into a large action program from the beginning is an alternative that promises substantial returns.

II. Having an experimental component in an action program enhances the training component of the program for members of its staff.

Two different aspects of the staffing problem of developmental projects call for a substantial training component in each project. One is the lack of sufficient numbers of trained personnel. The other is the tendency of personnel to quit growing and fall into a lackadaisical performance (or neglect) of bureaucratic duties. A regular program of continuous in-service training is an essential part of any answer to these problems. There is a substantial difference in the form this training can take between projects which have, and do not have, an experimental approach. Without an experimental approach in a project, in-service training is limited to instruction and pep talks with respect to the standard form of the project. With an experimental component, members of the staff can be let in on, and make substantial contribution to, the experimentation itself. Without the experimental element, criticism by staff members of current procedures smacks of insubordination. In the context of experimentation, the atmosphere can be created that "we are all learners together in this business; what are we learning; how can we improve?" These differences will not occur spontaneously; they must be fostered. But within an experimental atmosphere the possibility is created of genuine professional growth on the part of many members of a staff.

III. An experimental component is more likely than not to make an action program more effective as an action program.

Part of this result, of course, is to be anticipated as the effect of putting what is learned through the experimentation into effect and through abandoning the less effective

techniques. Another part of it comes about through the enhanced staff morale that can result from the staff feeling that it is participating in something of wider significance than the daily performance of routine duties. In the context of bilateral or international technical cooperation, the foreign advisor or participant is in quite a different position depending on whether he must say, "this is the way to do it" or can say "we're in this learning process together; how can we do it better?"

IV. "Line" members of the staff should have an integral part in analyzing the experimentation; this should not be left to a separate "staff" unit within or outside the agency.

Substantial problems often arise, as exemplified later in this paper, when line members of the staff have action implementation duties only, while a separate research staff analyzes the experimental elements of the program. In such circumstances it is difficult to differentiate research staff from inspectors, and line workers are likely to feel that they are the guinea pigs being studied. On the other hand, if line workers provide at least some of the data for evaluation, and participate at appropriate intermediate points in interpreting what is happening, they become part of the process. More than this, their participation in discussing tentative deductions from the data frequently prevents misinterpretations and may considerably expand the relevant data for further analysis.

V. The time devoted by line members of the staff to reporting and participating in analysis of data should be kept modest.

While line members should participate in analysis of the experimentation, this participation must not be allowed to dominate their time-tables. All too frequently, field staffs of action projects are required to spend a major part of their time filling out forms, frequently for purposes only distantly, if at all, related to their field tasks. To have an experimental component in a project does require the keeping of appropriate records and this does require time.

Consequently, the research design of each project needs to be kept sufficiently simple that simple records are adequate. *Experimentation as a way of life for action projects is feasible only to the extent that it does not destroy the essentially action character of the project.*

To meet these needs it is important that the project include a separate staff, largely clerical in function, to receive relatively brief reports from line staff-members and make preliminary summaries and compilations of these. Such a staff, responsible to a research officer, can reduce the paper-work requirements placed on field staff and prepare the materials collected for analysis by the research officer, in frequent consultation with the line staff.

It may be argued that the kind of experimentation I am discussing in this paper does not merit being called "research". This issue does not concern me. I suppose what I am saying is that there is enormous scope for embedding variations with respect to administrative techniques and subject matter emphases in developmental projects, that doing this can both strengthen the action elements of the program and yield important insights through which to improve future operations, and that these objectives can only be achieved if the experimentation does not upset or overshadow the essentially "action" character of the project.

VI. Results of the kind of experimentation discussed above can seldom result in findings of universal applicability.

In fact, the need for this kind of experimentation grows out of the importance of adapting programs and administrative techniques to local circumstances, on the one hand, and out of the greater viability and effectiveness of action programs that are of an experimental nature, on the other.

Hence, the title of my paper: with respect to developmental projects experimentation needs to be a way of life, everywhere and repeatedly; it (experimentation) is not (or should not be) only a preparatory exercise preceding action programs.

TWO PROJECTS COMPARED

While the propositions advanced above rise out of personal experiences in diverse countries, they have resulted primarily from association with two projects that did embody experimental components. One was conducted in India and the other in the Philippines. In both cases, the project sought to compare different approaches to the same task.

The project at Allahabad, in India, was set up to examine two questions about which there was considerable debate in India at the time. First, what is the best initial approach for a rural extension program? Should the program emphasize literacy, or agricultural production, or concentrate on meeting "felt needs," or sponsor projects in which families as families could participate? Second, what background of training is most appropriate for extension workers? Should they be university graduates, or high school graduates, or social service workers, or agricultural "technical school" graduates, or husband-and-wife teams? Fifty extension workers were chosen, 20% having each of the backgrounds of training mentioned above. Four noncontiguous "circles" of one hundred villages each were selected for the program. In each circle one of the initial approaches mentioned above was followed. The personnel in each circle represented all five types of worker-background.

The project at Los Banos, in the Philippines, was really the second stage of an extension program that had already been in operation for three years. In the first stage, a team of four extension workers had worked in four farming communities. One member of the team was an agronomist, one an animal husbandry graduate, one an entomologist, and one a specialist in farm management. Each had general responsibility within his home barrio while simultaneously serving as a subject matter specialist to the other three. Now, in the second stage, the purpose of the experiment was to see what could be learned about (a) the effectiveness of working separately instead of as a team, (b)

the effect of having one worker serve two barrios instead of one, and (c) the effect of mass communication media used alone and in conjunction with the personal efforts of extension workers.

In both projects, the question arose early as to whether it was a research project or an action program. The first would require as vigorous control of activities within the project as might be possible in order to "protect the research design." The second would require a considerable freedom to innovate as circumstances might indicate in order to maximize results. Both projects "resolved" this issue in the same way: both took the position that the project was experimental but that the experiment would not be valid unless, to its rural participant-constituents, it had the appearance of being a straight action program. The entire field staff in each project knew what the objectives of the experiment were, but this was not divulged to the rural participants and each field worker was instructed to make such temporary departures from his assigned program as might be necessary in order to give his farmer-constituents the feeling that he was there to help them as they wanted.

The major difference between the two projects was in the provisions made by each to record the activities of field workers and the response of farmers, and to evaluate the results.

In the Allahabad project each field worker made a daily report of his activities, listing each person he had contacted, the topic discussed, extension methods used, and changed practices observed. This was on a one-page form requiring from five to fifteen minutes to complete, at his village home in the evening. These reports were submitted fortnightly and clerks in the central office transferred the entries to cards for each farmer-participant.

After the project had been under way for several months, each field worker provided personal information about each farmer participant for entry on his card in this master file. Semi-annual reports of the project were compiled from these cards, plus information from weekly reports written

by the administrator and assistant administrator of the project. No "outside" evaluators or investigators went into the project area to make special studies until the third year of the project.

By contrast, in the Los Banos project, a separate "research team" was set up in the beginning. Members of this research team circulated in the project area from the start. Each field worker made a survey of the farms and barrio to which he was assigned as his first task. Members of the research team made their initial visits to the project area in the company of an extension agent but before many weeks had gone by members of the research team were making independent visits to farmers for observation and to collect data.

The rationale for the Los Banos approach was that a separate research staff could be more objective and that they were trained for research whereas the extension workers were not. The rationale for the Allahabad approach was that it was necessary that farmers not feel they were being treated as pawns in an experiment. Obviously, it had to be made quite clear to the field workers in the Allahabad project that the reports they submitted would not be used to evaluate the personal performance of each worker. They had to understand that the purpose of the records was to allow everyone on the staff to learn what had happened and to try to deduce why it happened. This was accomplished, and later field checks indicated a high degree of accuracy in the daily reports submitted by field workers.

It should not be inferred from the juxtaposition in which these two projects are compared above that the Los Banos pattern constituted an explicit repudiation of the Allahabad procedure or that the choice of methods at Allahabad was made with the same alternatives available that were present in Los Banos. The Allahabad experiment started in 1952 and that in Los Banos in 1961. At Allahabad, an effort was made to recruit a sociologist-evaluator when the project started. One was not secured until two years later and illness forced him to withdraw after six months during

which he had worked primarily with the records in the office, making frequent field visits as a "friend of the extension agents" but not collecting any "data". Two investigators did subsequently make independent field studies within the project area, one in the third and one in the fourth year of the project.

By contrast, the College of Agriculture at Los Banos had two highly competent research workers, a rural sociologist and a communications specialist, able and eager to evaluate the project. They were intent to be objective and "scientific", and were simultaneously hurt and sympathetic when they ran into suspicion and some antagonism on the part of extension workers in the project. The researchers felt that they should be in on, if not determine, the design of the project, and that they should collect the field data, not relying on reports by the extension workers, and collect this data from the very beginning of the field operations. On the other hand, some of the key personnel in field operations had been part of the earlier phase of the project when vigorous techniques of evaluation had not been used. They felt they had a good program and were not entirely happy about being subject to evaluation by outsiders. It should be emphasized that there were no "soreheads" among either the field workers or research personnel. All were highly competent, they had respect for each other's competence, and were good personal friends. The differences and tension that arose grew out of the roles they had outlined for themselves, not out of peevishness or obstinacy.

The first problem arose out of the difficulty of explaining to people in the project area who the research workers were. Why were they there? To observe. Were they supervisors? No. Were they assistants to the field workers? No. Then who were they? The field workers could hardly explain the situation, especially since they somewhat resented the presence of the research workers.

Unable to achieve a clearly defined role that was acceptable to the people, several research workers (assistants) became unhappy themselves about their roles. They could not become helpers and still remain objective outsiders. If

they did not help, the rural people saw no reason to cooperate in divulging information.

A second difficulty arose out of the different perspective from which the field workers and the research workers viewed the project. The research workers were from sociology and communications. The field workers were trained in one or another of the agricultural sciences. The latter were interested primarily in changed agricultural practices. The former were interested in group processes and the transmission of information. The field workers were interested in objective results; the research workers in why particular results did or did not occur. The field workers felt the research workers were trying to change the objectives of the experiment. This lack of agreement was traceable partially to lack of cooperation in planning. The extension director was seldom present in meetings planning the activities of the research workers and the research workers were not invited to meetings planning operations. The two chief investigators belonged to different departments and each was a strong person bent on using different investigational techniques.

This second difficulty could have been avoided by a different administrative approach had it been foreseen. But since everyone seemed to be "cooperating" in good faith no one realized the mistakes that were being made until it was too late.

The Allahabad project ran into no such problems. This was primarily because the evaluation was internal. Those working in the evaluation section (really the recording and reporting section) were subordinate to the administrator of the total program. No conflict with field personnel arose because no separate research staff went into the field until near the end of the project. On the other hand, the system of recording activities and reporting results did work, and these records proved amenable to the type of analysis of the two questions with which the project began and that allowed answers to be forthcoming. In addition, these records proved amenable to a type of study not contemplated in the beginning. An additional source of information that was of great value in later evaluations was the

oral, informal reports of each field worker at fortnightly staff conferences. It was in these conferences that the obstacles being encountered were reported and discussed. More often than not suggestions about how to meet these came from other field workers rather than from administrators. But the record of these meetings was among the most valuable data collected within the project.

In the Los Banos project, the chief results of the research (published results to date) were two excellent analyses of the problems encountered in trying to link research to operations.

It might be well to relate one more somewhat similar experience to these two projects. The Etawah Pilot Project, undertaken by the State of Uttar Pradesh in India in 1948, was a demonstration project without any built-in experimental design. Yet its director was eager to have one person who was not a part of the operating staff but who could be a constant observer of village reactions to the program and report these to the leadership of the project. A very competent Indian anthropologist was secured for the assignment. He was known officially, in English, as the project's Rural Life Analyst. He apparently had no difficulty in justifying his presence in the villages. He went first with extension workers as a friend. Later he went alone but carried no notebook; he merely chatted with village people to whom he had become known. He had no role as an evaluator; instead he was a "facilitator" helping the project's personnel to devise strategies to take advantage of observed opportunities and to cope with incipient opposition. But if there had been an experimental design within the project, I can conceive of a person playing a similar but different role of great value to what might be learned from the project.

From these experiences, I derive the following guidelines (or biasses) as a start for discussion:

1. Only by building pre-selected variations into individual operating programs can we hope to get answers about the advantages and disadvantages of different operating procedures.

2. It is important that the experimental features of a project not be general public knowledge in the project area, else this knowledge will prevent the project from being representative of normal conditions.
3. It is a mistake to start an experimental project with a visible, identifiable base-line survey; instead the project should be begun as an action program. Whatever beginning data are deemed necessary should be obtained quietly and unobtrusively at a somewhat later date by the field agents of the action program, not by separate investigators.
4. It is possible, at least in some cultural settings, to achieve accurate reporting of a reasonable amount of program data from action workers in the field, provided:
   a) that field workers are made to feel that it is they who are experimenting and interpreting the results,
   b) that the records they turn in are not used to evaluate their personal performance, and
   c) that the burden of recording is kept light.
5. The records to be kept, and the analytical uses that are to be made of these, must be thought through and decided in the very beginning of the process.
6. There is a definite place for independent evaluative studies by persons outside of a project. But the experiences related in this paper suggest that such studies are best made well after a project has been started and become well established even though they may be part of the planned investigation from the very beginning.

REFERENCES

The two studies of the project in the Philippines referred to in this article are:

Covar, P. R., "Typologies of Action-Research in the College of Agriculture, University of the Philippines," *The Philippine Agriculturist,* 1966; and Castillo, G. T., "Man With Many Faces".

BUDGETARY PROCESS UNDER PERFORMANCE BUDGETING*

A. Premchand

This paper attempts to provide an understanding of the different stages of the budgetary process, so that the requirements at each stage can be better appreciated and the performance budgets prepared accordingly. It first sets out the general stages involved in the budgetary process, briefly considers some of the salient features of the existing budgetary system and finally it makes a detailed examination of the budgetary process under performance budgeting. In considering the budgetary process, due attention has also been paid to the tasks involved in the making of annual plans and their relevance to the budgetary process.

The budgetary process usually comprises the following stages:[1]

(1) determination of policy and objectives;
(2) selection of programmes from among different and competing alternatives;
(3) formulation of a budget;
(4) execution of the budget; and
(5) review of the budget achievement and performance.[2]

*From Premchand, A., *Performance Budgeting.*

[1]See my *Control of Public Expenditure in India* (2nd Edition), 1966, p. 40 et seq.

[2]There have been other ways of looking at the whole process. For example, management of the current activities and control of spending have been generally paid greater attention than planning the objectives and selection of support-

These stages in turn involve, purely from a financial angle, the following important budgetary considerations:

(1) Determination of aggregate amounts of expenditure;
(2) Allocation of the aggregate amounts among the competing demands for obtaining a proper balance of expenditure between various services in order that greater value cannot be obtained for the total expenditure by reducing the money spent on one service and increasing expenditure on another;
(3) Determination of the ceilings of expenditure; and
(4) Achievement of balance within each given service.

In all of these stages various considerations such as variation in expenditures to meet the inflationary or deflationary tendencies in the economy, emphasis on quick-yielding projects, etc. and financial considerations such as ensuring adequate benefits from the proposed outlays, avoiding immobilization of resources, have also an important role to play. To meet these diverse and complex objectives, expenditures are broadly divided into three categories, so that the determination of the relative magnitudes for any given year can be rendered easier. These are:

(1) Regular or maintenance expenditures where major reductions are generally not feasible;
(2) Current expenditures which, to a major extent, depend on the economic climate, e.g. food subsidies, price supports; and
(3) Those outlays which could be modified in the light of desired governmental influence on economic development, e.g. plan outlays, public works expenditures, investment outlays, etc.

All these provide the general budgetary framework within which budgetary determinations are made and

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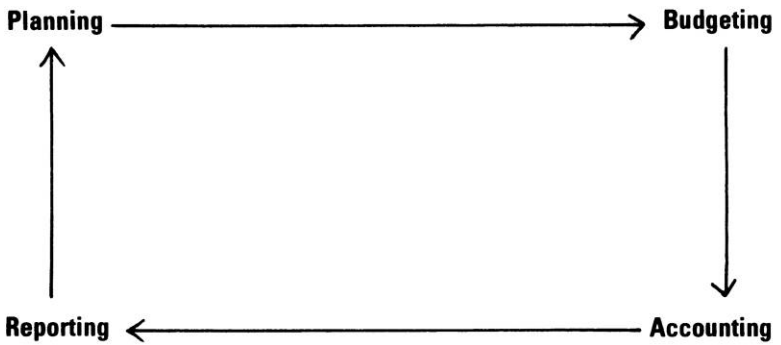
ing schemes. Charles Hitch makes a distinction between substantive planning and fiscal planning. "Fiscal Planning", according to him, "is the planning of future budgets—how much money and how to spend it. Substantive planning is the planning of objectives, ultimate objectives, and intermediate objectives."

these considerations are equally valid both for the conventional budget system and the performance budget system. The main difference between the two is in regard to the manner of determination. In each stage the considerations and the tools available for the determination of funds are somewhat different.

PERFORMANCE BUDGETING

The budgetary process under performance budgeting paves the way for a more effective and better organised system. The aspects of this technique, broadly speaking, consist of four principal phases in a continuous cycle as shown below:



These can be further subdivided and specified as in Diagram I.

The various stages depicted in the diagram form integral parts of a comprehensive budgetary planning system. In undertaking these different tasks each agency does not work as a watertight compartment; on there other hand there is interrelated working of different agencies. The achievement of given objectives implies a close coordinated functioning of several agencies. It is necessary to recognise the interplay of these agencies, as such a recognition is of vital importance in the overall budgetary process. For example, an analysis of the working of the Department of Agriculture (in the states) reveals that there

are numerous agencies at work during the different stages of its operations. This is illustrated in Diagram II. In much the same way, at the centre also there are numerous organisations which have a role in each programme and each one contributes, in the final analysis, to the final achievement of the object of each programme. Performance budgeting helps the assessment of each agency's role and thus contributes to the final achievement. It is essentially a process whereby the programmes and activities of each organisation are converted into organisational work, and financial responsibilities. We may now examine how this is done with reference to each of the stages mentioned in the "Budgetary Process".

EVOLVING GOALS, OBJECTIVES AND PROGRAMMES

Goals

National goals are "statements of highly desirable conditions toward which society should be directed." They may be defined by individuals, private organisations or governmental bodies. But a great many of them demand heavy outlays of energy and resources over extended periods of time, requiring hard choices among broad goals. A framework of such goals is already available in the Five Year Plans and it is generally recognized that with the advent of planning, budgets are formulated within the framework of the objectives of the plan.

Objectives

These are the stated purposes of an organisation. They are generally more limited and more specific than broad goals and are frequently quantitative.

Programmes

These are "time-phased plans for allocating resources and for specifying the successive steps required to achieve stated objectives. They are means to clearly defined ends." These indicate the specific results to be obtained by the planned commitment of funds.

BUDGETARY PROCESS

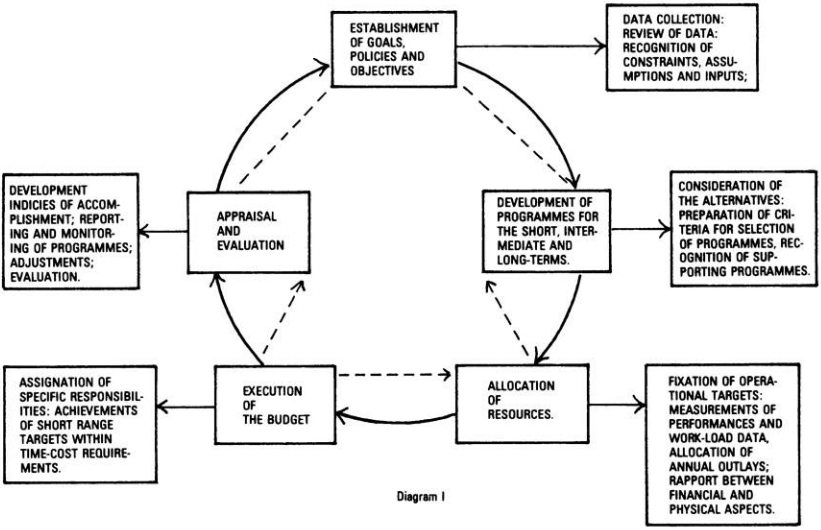


Diagram I

AGRICULTURAL MANAGEMENT

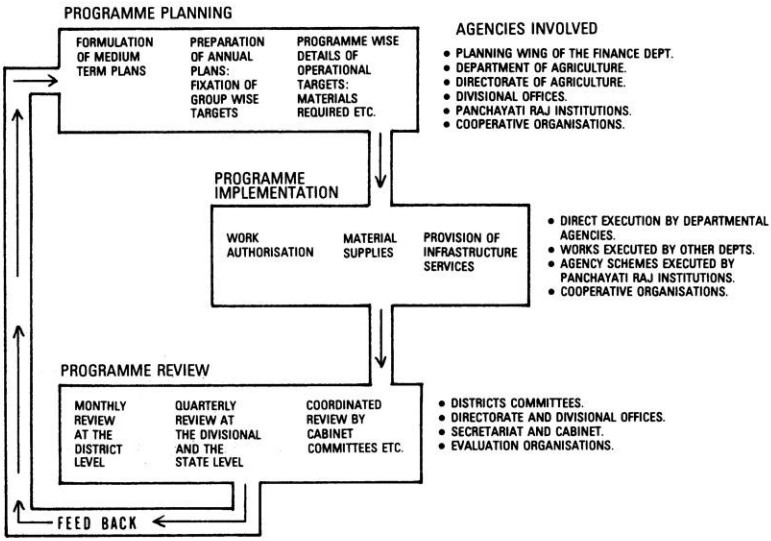


Diagram II

Programme of Action

In formulating the goals, policies and objectives, a considerable amount of collection of data, sifting and analyzing is involved. It would similarly be necessary to make a detailed study of the inputs needed, and the assumptions relating to the availability of those inputs. In these phases, the constraints such as the resources, foreign exchange, skilled manpower would also need to be recognised. All these facets are observable in our planning process.

The important requirement for performance budgeting is a programme of action for any given year with specific indications regarding the tasks, the means of achieving them and the cost of achieving them. In arriving at these certain basic questions need to be answered:

(1) What is to be achieved?
(2) Why is it to be achieved?
(3) How is it to be achieved? And
(4) When is it to be achieved?

These questions are of equal importance even in the existing budgetary process. The essential distinction, however, is that under performance budgeting organisations are compelled to think of their future activities not merely in terms of financial plans but in terms of the results, work assignments and organisational responsibilities.

Another significant aspect needs to be noted here. It is generally stated that in the context of planning for economic growth, planning is a "thinking process" and that budgeting is a "doing" process. Under performance budgeting, since the physical and financial aspects go together and since the programme structure is expected to be the same, it facilitates the functional integration of the "thinking" and "doing" processes.

PROGRAMME DEVELOPMENT

The second stage relates to the formulation of programmes for the achievement of goals and objectives.

Generally a programme is a segment of an important function and represents a homogeneous type of work. These programmes of work need to be developed for meeting the short-term plans (annual), intermediate or medium-term plans (Five Year Plans) and long-term plans (more than a five year period). These programmes involve the formulation of schemes, laying down their targets, measuring the financial costs and benefits and identification of their various factors. In these there are three important steps by which each programme has to be assessed:

Programme Analysis

This covers the self-consistency of the detailed aspects of each and its relevance to the overall framework of action contemplated for a year.

Financial Analysis

This consists of ensuring adequate resources for the programmes chosen.

Economic Analysis

This is concerned with an examination of the impact of the proposed outlays on the economy as a whole and with an assessment of the costs and benefits of each programme. This stage also involves consideration of the alternatives of each programme and a recognition of the role of supporting programmes.

All these are facilitated by the structure of programmes evolved for any organisation. The structuring of the programmes also helps in providing an overall functional view of the programme content, their relative priorities and importances, the amounts assigned to each and the effect of those amounts on the economy. The budget needs to be viewed as a whole. Each proposal needs to be appraised in the context of all the other programmes both complementing it and competing with it. Without such an overall view it would be difficult to make an orderly arrangement of priorities. The grouping of transactions into programmes

permits the consideration of the side effects or spill-overs and a more meaningful reconciliation of the programme outlays with the overall budget objectives. Such a programme classification also serves as the basis for prediction and control. Consider the following two examples:

Example 1: The programmes of the Ministry of Transport and Shipping can be shown thus:

(1) Development and Maintenance of Roads;
(2) Road Transport;
(3) Inland Water Transport;
(4) Shipping;
(5) Shipbuilding;
(6) Lighthouses and Light Ships;
(7) Major Ports;
(8) Minor Ports and Projects;
(9) Secretariat and other Services.

Each of these programmes in turn consists of many activities which are shown in the respective budgets. But these indicate, together with their financial allocations, the broad programmes of the agency.

Example II: Similarly, the programmes and activities of, say, the Department of Agriculture can be shown likewise:

Programmes: I. Agricultural Development
Activities
(a) Policy Formulation;
(b) Agricultural Farms and Improved Seeds;
(c) Extension and Training;
(d) Intensive Agricultural Programmes;
(e) Manures and Fertilisers;
(f) Agricultural Education;
(g) Agricultural Engineering;
(h) Agricultural Experiments and Research;
(i) Agricultural Marketing;
(j) Minor Irrigation;
(k) Plant Protection and Quarantine;

(l) Land Development;
(m) Development of Commercial Crops;
(n) Horticulture.

II. Animal Husbandry
III. Dairy Development and Milk Supply
IV. Forestry
V. Fisheries
VI. Others

If the above type of classification is made and followed both for the plan and budget purposes, it would provide integrated functioning and would facilitate the consideration of both. This type of comprehensive planning is not limited to the central planning groups and the budget officers in the Union Ministry of Finance and the administrative ministries. The merging of planning and budgeting is not something to be done only at the centre in terms of aggregates. Indeed, considering the agency orientation of the proposed system, this type of merging must begin at the grass-roots level in all the agencies of government. Another aspect, however, needs to be noted here. The kind of programme development needed, depending on the organisational structure of each agency, for purposes of inclusion in the document to be submitted to the legislature may be different from the one considered necessary for an examination of the programmes of the lower agencies. In any case the classification will have to be evolved keeping in view the purposes sought to be served and the requirements of the "receiving end". The different classifications so evolved will supplement each other and serve overall management purposes.

Cost-Benefits

A related aspect that needs to be considered is the technique of cost-benefit analysis. This technique, with certain variations, is also known as cost-effectiveness analysis, "systems analysis," "operations research" and quantitative techniques of statistics. After having formu-

lated alternative programmes for each given objective, it is necessary to make an estimation of the costs and the relative benefits of each. The formulation of economically sound and viable projects and programmes is of primary importance in a developing economy where resources are rather limited. While it is true that the desirability of these cannot exclusively be determined by economic criteria alone, it is necessary to undertake an examination of the technical and economic feasibility of each of the programmes, so that the decision-maker can ascertain the nature and objectives of the activity and the relative values placed upon the alternative outcomes. It "also minimises the danger that decisions will be made which merely save money for the body immediately concerned without any guarantee that such money-saving reflects any increase in overall efficiency from a social view." As Prest and Turvey state: "An important advantage of cost-benefit analysis is that it forces those responsible to quantify costs and benefits as far as possible rather than rest content with vague qualitative judgements or personal hunches."

The essential aspect of the whole technique is that it lays down all the costs and the benefits of each programme and activity, and implies an enumeration and evaluation of all of the relevant factors in the situation. In the actual application of this technique, answers have to be found to pertinent questions such as:

(1) Which costs and benefits are to be included?
(2) How are they to be valued?
(3) At what interest rate are they to be discounted?
(4) What are the relevant constraints?

Prest and Turvey have listed out main aspects of these questions which are as follows:

I. Enumeration of costs and benefits
   (a) Definition of a Project
   (b) Externalities
   (c) Secondary Benefits
   (d) Project life

II. Evaluation of costs and benefits
   (a) The relevant prices
   (b) Non-marginal changes
   (c) Market imperfections
   (d) Taxes and controls
   (e) Unemployment
   (f) Collective goods
   (g) Intangibles
III. Choice of interest rate
   (a) The social time preference rate
   (b) The social opportunity cost rate
   (c) Adjustment for certainty
   (d) The need for an interest rate
IV. Constraints
   (a) Physical
   (b) Legal
   (c) Administrative
   (d) Distinctive
   (e) Budgetary

The significant problem in all these is the measurement of the ingredients. Costs are generally benefits foregone depending on the possibility of making alternative use of resources. In measuring them one has to reckon with the defective market mechanism which does not reflect the relative scarcities of the factors of production. Similar issues arise in the evaluation of the primary and secondary benefits particularly when they are to be related to the criteria of national economic profitability. In estimating these, the wide range of objectives represented by governmental activities needs to be taken into consideration and weights attached to the objectives. It would also be essential to evolve parameters (such as shadow prices for foreign exchange, labour, relative weights of national objectives, social rate of discount, etc.), so that all the planning and operating agencies could make use of them. The technique may have some limitations but a beginning needs to be made in this direction. It is also necessary to recognise that the technique is not by any means limited

only to industrial projects. In fact it can be applied to social and developmental areas as well and the need for its application is becoming greater with an increasing proportion of expenditures being devoted in these directions. The employment of the highly sophisticated techniques developed in this respect for all sectors is now being taken up on a modest scale.

The exact stage where this technique(s) can be employed raises a question in our institutional framework. Should this be done only for the new plan outlays and more particularly investment oulays? Or should such an analysis be undertaken even for the normal maintenance outlays? Generally, it is desirable that such an analysis should be undertaken with respect to both the categories, but various constraints come in the way of such an extensive application of the technique. It is also suggested that such an analysis is undertaken as a part of administrative planning, i.e. as an integral part of planning rather than as an integral part of budgetary process. The Working Group on Performance Budgeting stated in this regard:

> . . . while not denying either the merits or the need for such analysis, the Working Group would like to make a distinction between what is basically administrative planning and the purely budgetary process. In the context of our planning, some measurement of investment and programme planning is undertaken in the formulation of a plan and the role of a budget is directed, in the main, to annualising these programmes and providing the requisite funds. The performance budgets as visualized by us comes handy, appropriately at this stage, in building up the requirements for funds and drawing up a work plan for the year. We believe that cost-benefit analysis, investment planning and evaluation are really an integral part of the administrative planning process, which, however, is a necessary adjunct to the formulation and appraisal of programmes and activities in the annual budgetary decision-making.

ALLOCATION OF RESOURCES

In the preceding existing budgeting process, the primary emphasis was on the past financial behavior of each agency (as indicative of its capacity to spend) and on the object-wise expenditure rather than on its performance in terms of its objectives and the programme of action that it has set out for itself for the next year. It is also necessary to recognize that in the absence of a review of the work done, there is not much scope for reviewing what the proposed outlays are and their potential capacity to add to the goods produced or services rendered.

Under performance budgeting, however, each action agency prepares its budget, submits its requirements as per programme classification, indicating what its past activities have been, their costs (we will deal with this aspect in the next section in some detail), the activities to be taken up during the next year, results expected and the pattern of assignment of responsibilities. When it is preparing such a budget, the agency is fully aware of its accountability in terms of achieving the programme targets and the commitments that they involve. It is their commitment to achivement and the awareness of accountability that is the hall mark of performance budgeting. When a review of the budget so prepared is undertaken at a higher level, that level becomes aware of the relative importance of each area within its jurisdiction and would, depending on its priority pattern, allocate resources to subordinate agencies. Because of the resource constraint, the eventual resources that would be handed over to each subordinate agency would be less than what it has initially asked for, but the higher level agency would be imposing that "cut" in full awareness of the implications of the pinch on the programme. It would similarly be possible for the Ministry of Finance to consider the financial requirements of each agency in the same light and allocate funds. In this connection it is necessary to make another distinction. Under the existing system, in view of the emerging criticality of the resources, often "lump sum" cuts on a uniform basis are

imposed after the "new item" statements have been prepared, finalised and approved by the Ministry of Finance.[3] The adjustment process of these "cuts" poses numerous problems for the administrative agencies and often these are adjusted in "other expenditure." In the process, the exact impact of the cut on the programme achievement remains somewhat unidentified in precise terms. Under performance budgeting, however, the programme classification and the rationale behind it indicates a group of choices, with their *inter se* priority already made. Thus it minimises the dislocational effect of lump sum cuts and enables, in any given circumstances, a better identification of the impact of the cuts imposed on programme achievement.

In preparing the budgets, it is necessary to provide the following important data:

(1) Performance during the previous years;
(2) Measurements of efficiency in terms of either historical series, or target and achievement or comparison with similar other units;
(3) Annual outlays for plan programmes. (It must be ensured that all the schemes included in the plan are provided with funds in the budget);
(4) Consistency between financial and physical aspects;
(5) Budget estimates supported by adequate cost data; and
(6) Budget projections for the next few years.

An incidental effect that would emerge from this process needs to be noted here. Performance budgeting permits an evaluation of the administrative arrangements in each administrative agency and a review of the possible improvements that can be introduced.

[3]Referring to a similar experience, the Plowden Committee observed, "we think it unwise even to attempt to make reduction or expansions in public expenditure by a process of equal percentage subtractions or additions all around. Such an attempt will either fail, in that the most urgent programmes will avoid the cut, or if it is successful will almost certainly result in misdirection of resources.

BUDGET EXECUTION

The fourth stage in the process relates to budget execution. The important aim during this stage is to "perform" with a view to fulfilling the tasks. In ensuring this there are certain budgetary and managerial considerations that are to be kept in view. These are:

(1) Communication of the grants to the various subordinate agencies well in time;
(2) Ensuring the initiation of action for implementing the schemes provided for in the budget;
(3) Overseeing the regular flow of expenditures;
(4) Prevention of cost overruns and underspending; and
(5) Time-phased plan for expenditures and work.

Some of these obtain in the existing budgetary process also, but the stress and emphasis is, more often than not, on the financial aspect of it such as the excesses, savings and supplementary grants. The main task under performance budgeting, however, is to watch the physical progress and to ensure that adequate funds are made available. The general experience hitherto has been the emergence of a sort of "project-gap" from the non-implementation of projects and programmes. But with a continuous watch and adequate emphasis on the actual performance and related financial allocation the "project-gap" can be minimised, if not eliminated.

APPRAISAL AND EVALUATION

The final stage is the stage of appraisal and evaluation. One of the important aspects of budget execution is to have a system of progress reporting for the following purposes:

(1) timely implementation of the plan;
(2) to make adjustments in the programmes in the light of the progress achieved and changing conditions; and
(3) for the preparation of the programmes for the ensuing year on a realistic basis.

A review of the progress made needs to be undertaken by the administrative agencies, Ministry of Finance and the Planning Commission. This also requires adequate and well-organised accounts and budget cells in each Ministry. In addition, suitable indices indicative of accomplishment and forms of reporting need to be evolved for the purpose.

EVALUATION

Under the existing system, evaluation of the physical achievement in certain sectors is being undertaken by the Programme Evaluation Organisation and to some extent by the Committee on Plan Projects. Their fields are, however, confined to the plan expenditures. Under performance budgeting, each programme would lend itself to an evaluation by the agency concerned, even before it is undertaken by an outside organisation. The more important aspect is that evaluation should, as far as possible, follow the completion of a programme and the administration should be enabled to formulate its future course of action in the light of the findings.

NETWORKING AND THE MANAGEMENT PROCESS

Kenneth Smith

PERT is an acronym for the Program Evaluation and Review Technique and is a systematized way of planning, statistical estimating and monitoring the elements of a complex program against a common framework of TIME. Since its inception in 1958, it has been widely adopted and adapted in a variety of programs and projects where end objectives can be defined, and there is a great deal of interrelationship and dependency amongst the work elements. The statistical aspect, although useful, has been modified or dropped from use in many PERT applications as being too esoteric.

PERT is nowadays frequently used as a synonym for network-based management systems, and I have used it in this generic sense.

In essence, PERT is a graphic system, a modernized combination of work flow process charts, bar charts and milestone charts, combined with simple mathematics to assist a manager in decision making. The network is the central feature in planning, which also serves as the foundation for progress reporting during implementation.

PERT does not make decisions. It is not a substitute for management. It only provides a basis for decision making. PERT quantifies and integrates knowledge (and uncertainty) from various sources of a project into one common

*Adapted from Smith, Kenneth, "Project Management Systems for Economic Development", Agency for Economic Development, Washington, D.C.

frame of reference for planning, programming and scheduling purposes. PERT helps in establishing management priorities by highlighting certain series of activities which are deemed to be critical in terms of maintaining the overall schedule.

The very process of reviewing the program or project as a single entity and focussing attention on the critical areas enables management to pinpoint problems and decide what corrective action is necessary.

PERT can be used on complete programs or on any segments of a program which requires close monitoring.

When PERT was developed, it was designed to take advantage of the speed and versatility of automatic data processing equipment. Although this is an advantage, it has been widely used without recourse to such sophistication when considering only the time dimension.

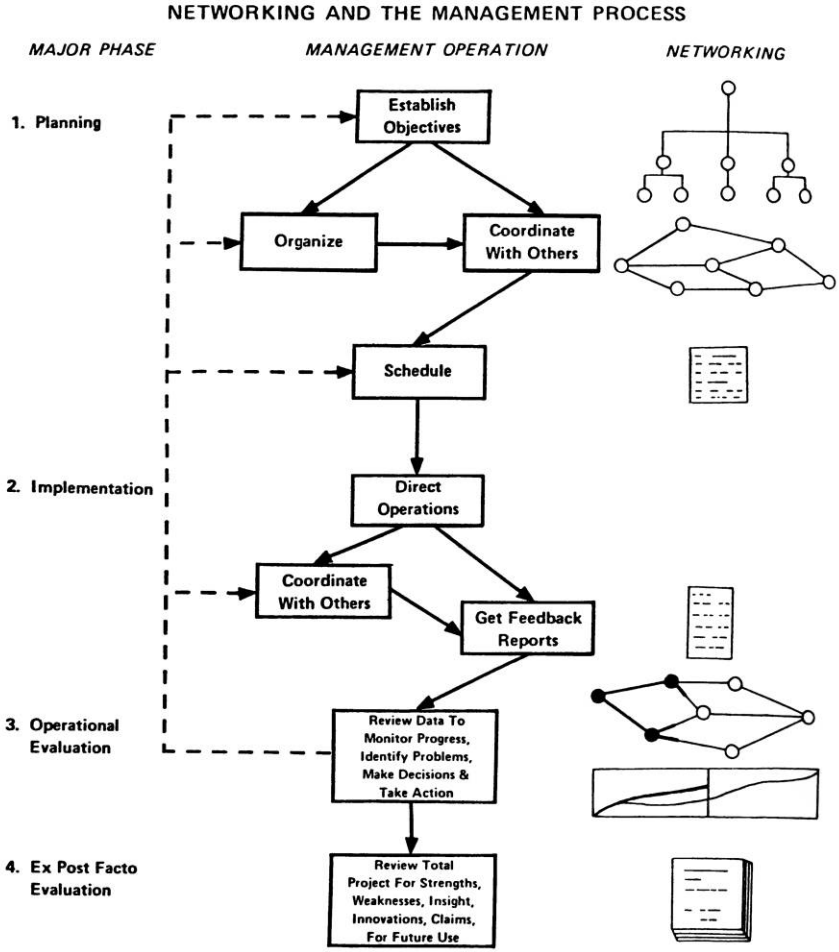
BUILDING THE NETWORK

Start by making a checklist of the project, detailing the major objectives and sub-objectives that are required to successfully attain the project's goals. These can be substantive hardware items, or they may be intangible elements. The essential thing is that they be identified in terms of WHAT is required.

The checklist resembles an organization chart. It does not reflect the physical organization of people or functions within a project, but rather is a means of thinking about the project as a whole. It is in effect, a chart of the project, and the elements essential to its attainment.

At different levels of abstraction, more and more details can be identified for management consideration. The greater the detail this process is carried to, the less likely it is that some essential element will be overlooked. On the other hand, good judgement is required because it is usually not necessary to itemize a project down to the last "horseshoe nail" in this manner in an over-all plan.

As a checklist, this is invaluable in coordinating with others. It ensures that someone is concerned about every-



thing considered essential to the project, using it as a reference in assignment of responsibilities.

Having identified WHAT has to be considered, and in how much detail, the HOW must now be determined. This is a process of reviewing the checklist, consulting with the experts in each area, and developing a special type of flow process chart of the significant activities (or tasks) that must be accomplished in order to attain the end items listed. The chart developed is called a network. (see chart on next page.)

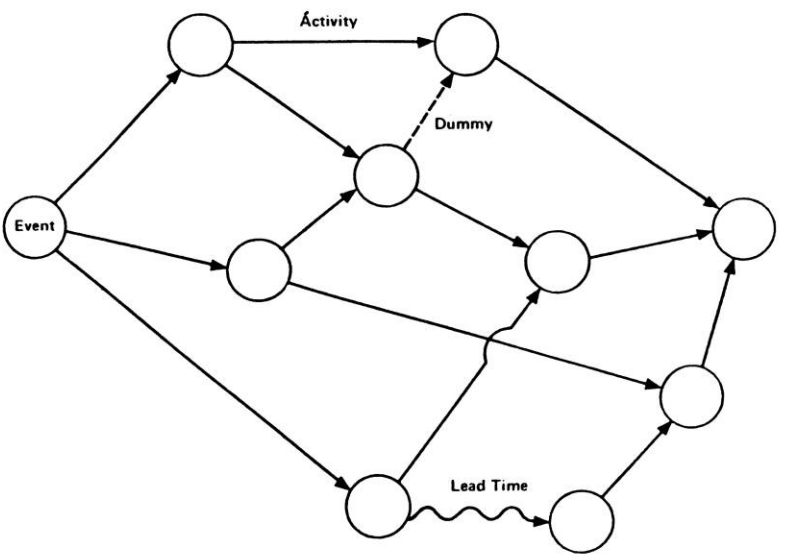
In building the network you must establish what has to

be done before another activity can start, what can follow after an activity has been completed, and which activities can be carried on concurrently.

No times should be considered at this stage. Only the sequencing and dependency of tasks in relation to one another, and significant events or check-points in the project.

The network can be developed from the end objective backwards, from the start forward, or from any intermediate point in either direction. However, when completed, it should be audited, to ensure that nothing significant has been omitted, that all activity flows from left to right, that there are no loops, and that everything relates to the ultimate end objective.

SAMPLE NETWORK



NETWORK DEFINITIONS AND SYMBOLS

A NETWORK is a project plan in graphic form.

A network consists principally of EVENTS and ACTIVITIES.

EVENTS are represented on the network by circles, squares, triangles, etc. and are check points in the project when things can be identified as having specifically oc curred. Events consume neither time nor resources. They usually are indicated as Start, Complete, or Transfer Responsibility Points.

ACTIVITIES are time consuming tasks in the project. They are represented in the network by arrows. The tail of the arrow represents the start of the activity. The head represents its completion. Frequently, activities are not time scaled. That is, the length of the arrow has no meaning. In a non scalar network, calculations are made on the network to determine times. Activities start and end in Events.

DUMMY ACTIVITIES are dotted arrows which indicate logical relationships and interdependencies between different events. They do not represent elapsed time, or activity.

LEAD TIME is indicated by "hairpin curve arrows" where it is a fixed constraint between the two events.

MERGE POINT—where more than one activity terminates in an event.

BURST POINT—where more than one activity originates from an event.

TIME CALCULATIONS

A time estimate is obtained from the individual most familiar with the task, for every activity in the network. After this has been done, tentative scheduled start and completion dates are obtained from the project manager. The network is then computed (usually in weeks and tenths of weeks) to identify the following essential data.

t_e *time estimate for an activity* (a period of time, e.g. 3 weeks)

T_S *Scheduled Time Start* (or Completion) (a point in time, e.g. end of the 20th week)

T_E *Earliest Expected Point in Time* to complete an event

T_L *Latest Allowable Point in Time* to complete an event, and still be on schedule for the T_S

S *Event Slack*—the amount of spare time available to complete an event. Determined as:
$S = T_L - T_E$

S_a *Activity Slack*—the amount of spare time available for completion of an activity. Determined as:—

$S_a = T_L$ (ending event of the activity) $- [T_E$ (beginning of event of the activity) $+ t_e]$

F_f *Free Float*—the amount of spare time available for completion of an activity, assuming that every activity in the network commences at its T_E. Determined as:—

$F_f = T_E$ (end event of the activity) $- [T_E$ (beginning event of the activity) $+ t_e]$

CP *Critical Path.* The longest series of activities in the network from start to finish. The shortest time in which the project can be completed. The series of activities with the least amount of slack.

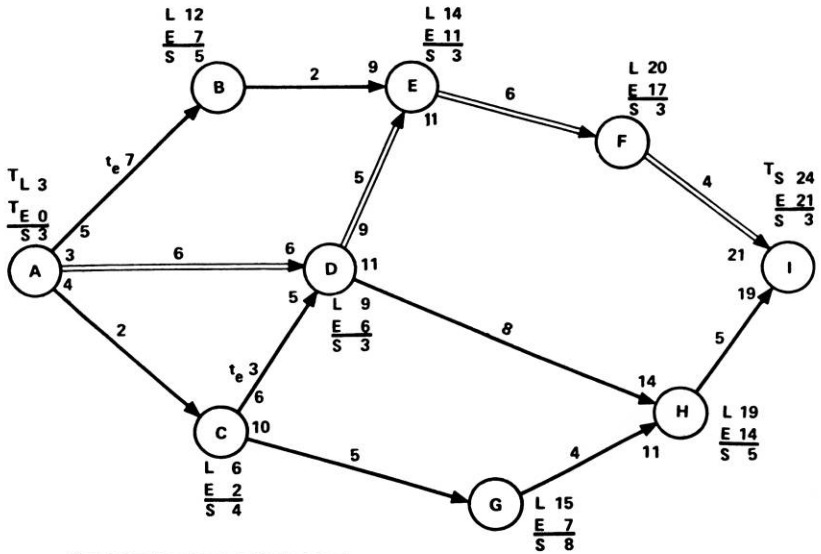
These times can be converted into actual calendar dates once the project start up date has been determined: commit themselves to a specific time period. In these cases, by using three time estimates, a guesstimate can be made for planning purposes as follows:

A t_e is calculated by using the formula

$$t_e = \frac{a + 4m + b}{6}$$

a —*an optimistic time*, assuring that everything goes well, or receives top priority.

NETWORK, SHOWING t_e T_E T_L S AND CP



Activity	Free Float	Activity Slack
C - D	1	4
B - E	2	5
G - H	3	8
H - I	2	5

m—*most likely time,* assuming "normal" difficulties that one is likely to encounter without any priority expediting. The time which the estimator intuitively feel is most likely.

b—*a pessimistic time,* allowing for practically every contingency and minor distress. Discount major disasters and Acts of God.

The resultant t_e is then used as the basis for network calculations as discussed earlier.

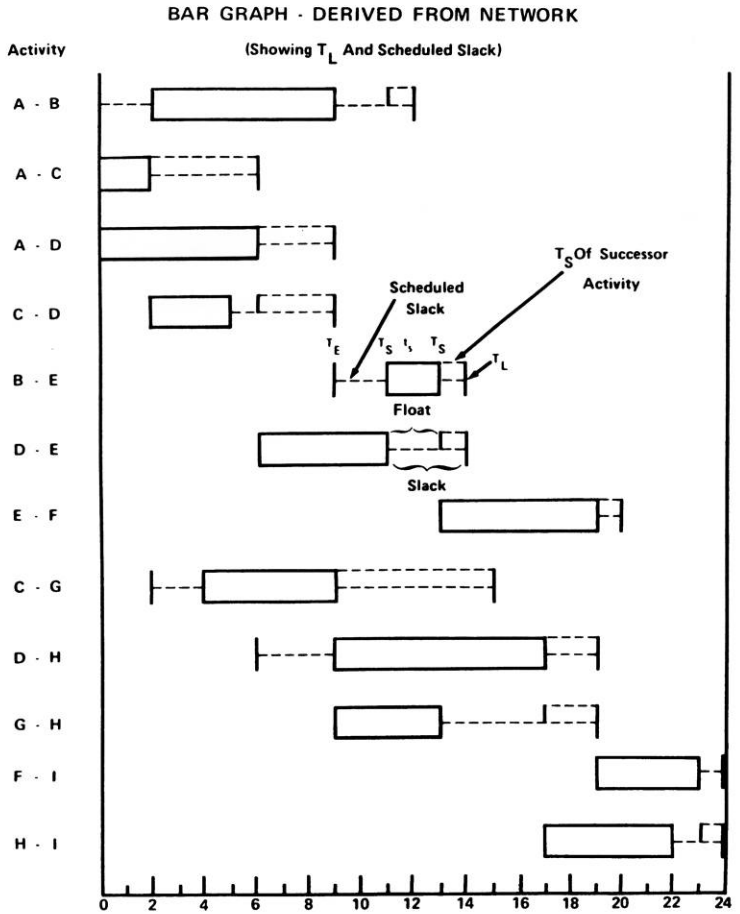
PRESENTATION BY BAR GRAPHS

Bar graphs are: Easy to draw; can be reduced to small scale; easy to comprehend (familiar to management and operating personnel); derived from network, therefore de-

pendencies are implicit; float and slack are shown for each activity; bars can be grouped by functional work areas if desired.

After the network has been calculated, and scheduled, a presentation to management and to line supervisors is often enhanced if the data is presented in the form of the more familiar bar chart.

This can be done quite easily from either a non-scalar or a time scaled network by identifying the various activities in terms of their beginning and ending events, and plotting the activity as scheduled.



The principle advantage of deriving the bar chart from the network instead of proceeding directly to the preparation of a bar chart during the planning stage is that the interdependencies between activities and events is developed in the network and reflected in the bar chart. The impact of these constraints in terms of the critical path, float and slack can be shown quite clearly on the derived bar chart as additional information. Further, activities can be regrouped according to management's desires without cluttering up the picture with dummy activities, as would be necessary in using a network for presentation purposes.

The limitation of this format is the same as that of the time scaled network. It only represents a "still shot" of the project. As time over-takes events, new charts must be developed to present the latest situation, as reflected by the non-linear "model".

REPORTING AND UPDATING

Once the project has been approved and implementation has commenced, management can be kept informed of the state of progress by periodic reports on each activity in progress, and/or by reports from each activity manager as each activity or event is completed.

If periodic reports are made on activities in progress, the activity manager provides a reestimate of activity duration time. For example, after two weeks of on-the-job experience, an activity which was originally estimated at 6 weeks may be reestimated to take seven weeks (i.e. 5 weeks remaining). The impact of this information can be readily calculated—whether it is critical, whether it will affect subsequent downstream activities, or whether it is merely using up float time.

In addition to the mere statement of time changes, the activity manager can discuss the reason for the changes. In effect, this provides the overall manager with a quick status report of the essential that he needs, without having to cull them from several pages of text.

Time estimates in reports are usually expressed in terms

of weeks and tenths of weeks. (.1 being ½ day in a 5 day work week). The time units can of course be adjusted to suit any purpose. Adjustments have to be made for weekends of project calendars. (Some computer programs do this automatically.)

If reporting is manual, the data can be interpreted and typed out as required. If automatic data processing equipment is used, printouts can be made of the data in almost any sequence, and with various combinations of headings.

Changes in the network—additions or deletions of activities and events—can be reported and their impact on the program calculated in the same manner.

Even reports are usually used by top management to monitor progress.

Activity reports are more useful at intermediate and operating levels of management.

"PERT"—A PLANNING TOOL

Institute For Extension Personnel Development,
Michigan State University

Did you ever estimate a job would take 10 days only to find it take 30? Or long for a way to help you keep track in coordinating a group of people in planning some complex affair?

Worse yet, did you ever put on a field day or program only to find out you'd forgotten something in planning? You may have failed to send out advance press releases soon enough to get full mileage from them. Or you may have failed to get a commitment from some speaker until it was too late.

These things happen. The Defense Department faces similar problems every day—thorny problems of coordination that might cost millions of dollars should things fail to mesh. To avoid some of these problems, the Department has adopted a planning procedure called PERT (Program Evaluation and Review Technique) that might have some application to Extension.

The procedure looks rather formidable but it's not bad once you get the hang of it. We applied the technique to planning a hypothetical beef cattle meeting (see the attached example), and the entire procedure took only 2-3 hours. We'd probably go faster next time. And going through the procedure should have saved us time and effort had we gone on to actually putting on the meeting.

The procedure yields an overall estimate of how long it will take to reach some objective. We found in our example

that we should be able to put on our meeting within about 47 days after plans began.

Perhaps more important than the overall time estimate, however, is what you "put into" the model. PERT forces you to remember and estimate certain things which could help reduce confusion and incomplete planning. Whether or not you use PERT, following its decision steps in planning an event should prove valuable. You must:

1. Decide what has to be done before the event goes on.
2. Decide which things must be done *before* which other things can be done.
3. Estimate how long it will take to get each thing done, taking into account barriers or problems that could crop up.

The first step includes listing such items as choosing speakers, getting commitment from them, seeing about an auditorium, etc.

The second step involves deciding the other in which all tasks or activities have to be done. For example, there is no point worrying about ordering publications for distribution at the meeting until you know what publications you want.

Paying attention to time order helps you find bottlenecks in time to avoid them. For example, without using the PERT approach you may find the secretary at your county office has not ordered extra publications to hand out at the meeting. Further checking may show that she couldn't—no one had asked the invited specialists what publications they'd need!

The third step means estimating the minimum, the maximum, and then your best single estimate of just how long each activity will take. At best, for example, you may figure you can line up all the speakers in 5 days—or 15 days at worst. Maybe your best estimate of what really will happen, once you've thought about what problems might arise, is 12 days. So you have to allow, in your planning, enough time at the proper stage for that 12 days.

Thus PERT helps you think through what needs to be done, when, and who will do it. A PERT diagram is useful

in planning committee meetings for checking progress in planning, for locating jobs not done, and of discovering blocks to getting tasks completed.

While it's interesting, and can help materially in planning an event, PERT is no panacea. Here are some limitations to keep in mind:

FIRST, it's nothing more than a logical model—a way to manipulate symbols. Your conclusions are no better than the estimates you plug in to begin with.

SECOND, neat, thorough planning, helps, but it's no guarantee of educational success. A field day may come off without a mechanical hitch, but it still may be a flop unless visitors have the *motivation* and *ability to understand and use* what's said. PERT does little to help you assess such intangibles.

THIRD, the model uses only information you can assess in advance. Too much attention to rigid, clearly-spelled-out advance planning may lead to rigidity, to inability to "play by ear" or to "roll with the punch."

The attached pages show you how to work through an example.

USE OF "PERT" IN PLANNING A BEEF CATTLE MANAGEMENT MEETING

A Hypothetical Example

To get some idea of how PERT might work, we applied it to planning a hypothetical three-hour county beef management meeting.

There are six basic steps, divided into three stages. For some purposes you may want to follow all three stages. For others, one or two stages may be sufficient. Arrows in the left margin indicate the breaks between stages.

PERT model taken from: Phillips, Gerald M., " 'PERT' as a Logical Adjunct to the Discussion Process," *The J. of Communication*, 15(2): pp. 89-99, June 1965.

Prepared: Louis-Philippe Albert, Hugh M. Culbertson, and Mason E. Miller.

Steps:

Step 1: Stipulate a final event or goal. Our goal here is the holding of a three-hour (one evening) beef management meeting. We decided to have a planning committee organize the event.

Step 2: List events that must happen before the final event can occur. Make sure no major steps or events are left out. Take care to express each item as an "event" (single occurrence at one point in time), not a series of events.

Step 3: List all needed activities as you think of them. Then number these activities in their sequence of occurrence. The ordering is based on necessity, not personal preference. Following is our list of events:

Order of Events	Name of Activity	Necessarily preceded by event no.
1	Workshop planning meeting adjourns	0
3	Speakers selected	2
4	Speakers invited	3
2	Specific topics selected	1
5	Speakers accept	4
8	Request for school auditorium made	7
7	No. of people in attendance estimated	6
9	Request for school auditorium granted	8
10	Arrangements with school janitor made	9
11	Publicity items and meeting reminder postcard written	9-2-5
12	Publicity items sent to mass media	11
19	Arrival of Speakers	5
6	Key farmers contacted (to estimate attendance)	5
16	Mail meeting reminder	11

	postcards	
13	Publications to be handed out selected	2
14	Publications to be handed out approved by speakers	5-13
15	Publications to be handed out ordered	14
18	Publications to be handed out received	17
17	Memo sent to janitor on post-meeting clean-up	10
20	Final event—meeting in full swing	19-18-17-16-12

NOTE: THIS IS THE END OF THE FIRST STAGE. At this point, the procedure gives you a detailed list of things to do in sequence—something you'd never get if you relied on memory or proceed haphazardly.

Step 4: Fit the event chart together into a PERT diagram (see p. 165). This can tell you several interesting things:

If two lines cross, two activities interfere.

If lines form a closed loop, going around in a circle, you are wasting effort. You're carrying on some activities for no useful reason (that is, these activities aren't getting you any closer to your goal).

If some lines do not connect with any others, if they reach a "dead end" short of the goal, you've either erred in planning or scheduled some unnecessary activity.

Step 5: In step 3, you developed a list of events, each leading you a step closer to the goal (the actual meeting). Now you must estimate the time needed to complete each link in the chain, to get

from an EARLIER EVENT (for example, deciding on speakers—#3) to some LATER EVENT (for example, inviting the speakers—#4) that:
a) Depends on the earlier one.
b) Is one step further toward the goal.
For each such "link", you must come up with three time estimates:
The best you could possibly do (a).
The worst you could expect to do if things "went wrong" (b)
Your most likely time estimate (m), which normally lies between the other two.

NOTE: THIS COVERS THE SECOND STAGE. Step 5 to this point has helped you estimate as precisely as possible each step along the way. It has also helped you to carefully consider possible barriers, since such barriers might alter your time estimates.

If you wish to go on, you must compute two more figures for each step or link in your plan: t_e, standing for "time estimate," and the statistical term "variance" which indicates how uncertain you are about your time estimates because of potential barriers.

$$t_e = \frac{a + 4m + b}{6} \qquad \text{Variance} = (b - a/6)^2$$

in which t_e = time estimate for a link
a = the shortest time in which you estimate it can be done
b = the longest time it might take
m = the most probable time it will take

Computation of these figures will produce a table something like the following which we did for our meeting example:

Between these events	These Activities must take place	Time in days a	m	b	t_e	Variance
Publications						
1- 2	Committee appointed to select topics					
	Topics selected	5	8	14	8.5	2.25
2-13	List of available publications checked					
	Publications to be handed out selected	1	2	3	2	.1
13-14	List of suggested handout publications sent to speakers					
	List received, checked and returned					
	Checked list received by County Agent	5	6	8	6.2	.25
14-15	Hand out publications ordered					
	Orders received at bulletin office	2	3	4	3	.1
15-18	Bulletin order filled, mailed, received and stored at County agent's office	6	10	15	10.1	2.3
18-20	Bulletins to be handed out are boxed up					
	Boxes taken to school auditorium	0	.2	.4	.2	.004
Speakers						
2- 3	Speakers selected by county agent					
	Alternative speakers listed	4	2	8	3.3	4.4
3- 4	Letters written to prospective speakers					
	Letters received	4	6	12	6.6	1.76
4- 5	Speakers checked to see if time is clear on their schedules					
	Speakers cleared with bosses					
	Speakers' letters of acceptance received by county agent	3	8	15	8.3	4
5-19	Speakers' trip and accommodation planned					

Between these events	These Activities must take place	Time in days a	m	b	t_e	Variance
	Instructions on where and when to come received by speakers					
	Talks prepared					
	Speakers arrive at county office	15	17	18	17	.25
19-	Speakers greeted by county agent					
	Speakers escorted into school auditorium	.1	.2	.3	.2	.001
Meeting Arrangements						
5- 6	Key farmers contacted by county agent to see if they will attend and how many others they think might attend	4	6	7	5.8	.25
6- 7	Key farmers' estimates assessed					
	Attendance estimated in light of this assessment	1	1.5	2	1.5	.3
7- 8	Decision reached that school auditorium would be a good place for the meeting					
	Appointment set with school superintendent					
	Meeting with school superintendent	1	2	3	2	.1
8- 9	School superintendent consults agenda					
	School board president contacted					
	County agent telephoned, okaying auditorium use	2	3	4	3	.1
9-10	Appointment set with school janitor					
	Arrangements for chairs, lighting, etc. made with janitor's help	.5	1	2	1.1	.63
10-17	Memo offering help in post-meeting clean-up written and mailed to janitor	2	3	4	3	.1
17-20	Memo received by janitor					
	Janitor phoned agent, accepting post-meeting plans and help	.5	1	1.5	1	.003

Between these events	These Activities must take place	Time in days a	m	b	t_e	Variance
Publicity						
2-11	Publicity committee appointed					
	Mass media campaign laid out by committee	25	30	35	30	2.5
5-11	Publicity items written by county agent	10	12	15	12.2	.64
9-11	Time and place included in publicity material	.2	.5	1	.5	.02
11-12	Key media people contacted personally about coverage					
	Publicity releases mailed to mass media	1	2	3	2	.1
12-20	Publicity releases received by mass media					
	Media requests for more information filled					
	Publicity used by mass media	4	6	8	6	.4
Meeting Reminders						
11-16	Meeting reminder postcards typewritten					
	Meeting reminder postcards mailed	2	3	4	3	.1
16-20	Meeting reminder postcards received by farmers	2.4	4.4	6.4	4.4	.4

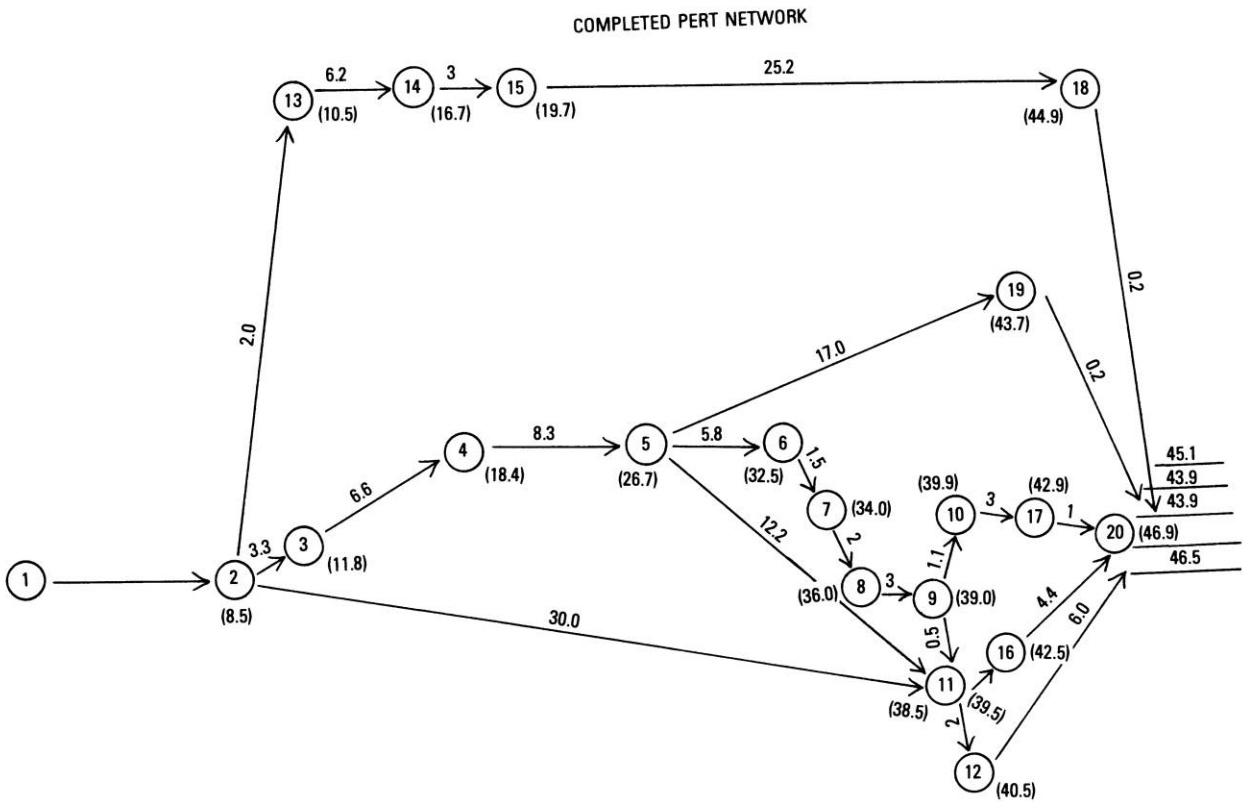
Note that the activities above are statements of *events* at one point in time, not *processes* covering a span of time.

As you look at the diagram note that:

The figure on top of each line is the "te" corresponding to that link.

te = 8.5 days between events 1 and 2.

The figure in parentheses beside each event represents the total time needed to reach that point in the sequence. We arrive at the figure 11.8 (beside event no. 3) by summing the two "links" (8.5 and 3.3) needed to reach event no. 3.


COMPLETED PERT NETWORK
1
2
(8.5)
3
(11.8)
4
(18.4)
5
(26.7)
6
(32.5)
7
(34.0)
8
(36.0)
9
(39.0)
10
(39.9)
11
(38.5)
12
(40.5)
13
(10.5)
14
(16.7)
15
(19.7)
16
(42.5)
17
(42.9)
18
(44.9)
19
(43.7)
20
(46.9)
2.0
3.3
6.6
8.3
5.8
1.5
2
12.2
3
1.1
0.5
2
(39.5)
4.4
6.0
1
17.0
0.2
0.2
30.0
6.2
3
25.2
45.1
43.9
43.9
46.5

The path 1-2-3-4-5-6-7-8-9-11-16-20 is the "critical path", since it takes longer (46.9 days altogether) than any of the other 4 paths to the final event no. 20.

Time is expressed along the horizontal axis. Time is not proportional to length within the diagram (for example, on the upper path, note that link 2-13 covering only 2 days, appears longer than link 13-14, covering 6.2 days).

The diagram clearly shows that certain events (especially nos. 5, 9, and 11) are especially crucial in that several event sequences depend on them. A foul-up on these events would really cause problems.

Step 6: From the PERT diagram, (p. 181) determine the *"longest path"* to your goal in the network diagram. That gives you the chain of events that is going to take you the most time to get done! In the example, this is the sequence of events (1-2-3-4-5-6-7-8-9-11-16-20). Your "best estimates" (te) of time required for each link in this chain of events total to 46.9 days. Let's call this TE (Total time estimate).

Now you are ready for the actual statistical analysis (if you're still with it!!). In brief, you:

a) Sum the variance totals (last column in our meeting example) for all links in the *"longest path"*. Let's call this sum VT (variance total).

b) Decide how many days you'd like these processes to cover. With our evening meeting, we hoped we could get the entire planning and preparation processes done starting 46 days before the actual event. Let TS below be 46, then.

c) Solve the following equation (here using the figures from our example):

$$Z = \frac{T_S - T_E}{V_T} = \frac{46 - 46.9}{13.68} = -.24$$

d) Go to a normal distribution table in a standard statistics book. You will find the area to the left of Z = .24 is about 40% of the total area under the normal curve. You conclude you have a 40% chance (somewhat less than 50-50) of completing the job in 46 days or less. Not good?

Let's assume you want to figure your chances of finishing in 47 days or less. Here Z = .027, and your chances of finishing amount to 51%. The odds are slightly on your side.

Finally, let T = 49 days. Here Z = .58. Your chance of finishing add up to 72%. We ought to make it for sure! So—we plan to start the entire preparation process not later than 49 days before the event.

One final warning about looking at the PERT diagram. You must complete all five paths to reach your goal. The paths are not alternative routes.

NOTE: Our notation is slightly different from that in the Phillips article (see citation on abstract) which is our source of information about PERT. Changes were made when needed to improve comprehensibility.

SELF-DEVELOPMENT CHECK-LIST FOR ADMINISTRATORS, MANAGERS AND EXECUTIVES*

Edmund N. Fulker

This checklist is meant for your personal use in assessing and planning for your continued growth and effectiveness as an administrator, manager or executive.

The check-list is based on a set of key knowledges, abilities and skills which contribute to the making of effective supervisors, managers, administrators and executives in government as well as in business and industry.

1. Self-analysis of training and development needs:

Take a good hard, honest look at yourself and your previous experiences and training in supervision, management and administration. Be as objective as possible as you answer each item. You have no one to fool but yourself, and nothing to gain unless you are candid in your responses. Once you have completed the check-list, decide what you will do during the coming year to further your growth and development. Write down what you intend doing and set target dates for their accomplishment.

2. Feed-back on how others see you and your training needs:

You stand to gain a great deal more by filling out the checklist yourself, *plus* asking your boss or someone you respect as an administrator, manager or executive to fill out independently *another copy* of the checklist on how he sees you and assesses your experiences, knowledge,

*Graduate School Press, USDA, Washington, D.C.

abilities and skills as a manager, administrator or executive.

If you are like most people, you fail to see yourself exactly as others see you. To an administrator, manager, or executive who must get his work done with and through people, self-insight and sensitivity to how others react to his leadership is vital to his effectiveness.

If you have asked someone else to fill out a checklist as he sees you, be sure to *follow through.* Compare your answers with his and look for where you and he differ. These areas of difference may well offer the greatest prospects for your future development as an administrator, manager or executive.

A boss and a subordinate manager who both fill out a questionnaire on the subordinate manager can easily use the checklists and model as a focal point for discussion of managerial performance and the subordinates' priority training needs at this stage of his development.

Level A Substantive Knowledge, Abilities and Skills

(Check only one—a, b, c, d or e)

	[a] I am doing quite well.	[b] I can do more by on-the job training and experience.	[c] I should do more thru self-study, self-effort, reading, etc.	[d] I need some formal group group training.	[e] Does not apply
1.	In the substantive or subject matter field in which I am functioning as an administrator, supervisor, manager or executive.	☐	☐	☐	☐ ☐

Level B Technical Managerial Knowledge, Abilities and Skills

2.	Writing letters, memos, reports	☐	☐	☐	☐	☐
3.	Speaking before groups	☐	☐	☐	☐	☐
4.	Leading conferences and conducting meetings	☐	☐	☐	☐	☐
5.	Habits of planning my work and use of my time	☐	☐	☐	☐	☐

	[a]	[b]	[c]	[d]	[e]
6. Scheduling my work and the work of others	☐	☐	☐	☐	☐
7. Organizing my unit, section or group for optimum effectiveness	☐	☐	☐	☐	☐
8. *Developing* and effectively using budgets to get results.	☐	☐	☐	☐	☐
9. *Controlling* following-up and keeping work under control.	☐	☐	☐	☐	☐
10. *Measuring* and evaluating the effectiveness of work plans and unit accomplishments towards agreed-upon goals & objectives	☐	☐	☐	☐	☐
11. *Delegating* significant areas of responsibility for results to others.	☐	☐	☐	☐	☐
12. *Reaching decisions* systematically and through involvement of those who will be required to implement and carry out the decisions.	☐	☐	☐	☐	☐
13. *Selecting* and *placing* workers where they will optimize their contributions to the organization and at the same time achieve satisfaction of their important needs.	☐	☐	☐	☐	☐
14. *Coordinating*—Keeping other units and individuals informed about progress and potential problems before emergencies, antagonisms, and ineffectiveness develop.	☐	☐	☐	☐	☐
15. *Integrating*—Serving as the linking pin or go-between in fusing the efforts of individuals and my unit with efforts of others in the organization.	☐	☐	☐	☐	☐
16. *Information Systems*—Knowledge of, familiarity with, and systematic use of data input and output needed on a timely basis to manage my unit effectively.	☐	☐	☐	☐	☐
17. *Quantitative*—Knowledge of and familiarity with, current concepts of math, statistics, cost benefit analysis, automatic data processing, (PERT), etc.	☐	☐	☐	☐	☐
18. *Methods Improvement*—Knowledge of, and familiarity with, time and motion, surveys, work layouts, etc.	☐	☐	☐	☐	☐
Level C Human Relations, Knowledges, Abilities and Skills					
19. Self-Insight and Self-Knowledge	☐	☐	☐	☐	☐
20. Interpersonal Sensitivity (awareness of how you affect others and how they make you feel and react)	☐	☐	☐	☐	☐

	[a]	[b]	[c]	[d]		[e]	
21. Group Process and Leadership	☐	☐	☐	☐	☐		
22. Motivating, Training and Bringing about change	☐	☐	☐	☐	☐		
23. Inter-group Relationships	☐	☐	☐	☐	☐		
24. Diagnostic and Group Problem Solving, Confrontation and Conflict Resolution	☐	☐	☐	☐	☐		
25. High Standards and Ethics, and setting a good example	☐	☐	☐	☐	☐		
26. Effective listening	☐	☐	☐	☐	☐		
27. Efficient Reading	☐	☐	☐	☐	☐		
28. Interviewing	☐	☐	☐	☐	☐		
Level D Conceptual Knowledges, Abilities and Skills							
29. Broad Perspective—Liberal Education	☐	☐	☐	☐	☐		
30. Generalist viewpoint, National, International Perspective	☐	☐	☐	☐	☐		
31. Political, Social, Economic, Knowledge and Sensitivity	☐	☐	☐	☐	☐		
32. Systems Concept and Approach	☐	☐	☐	☐	☐		
33. Ability to see the Big Picture, Future Oriented	☐	☐	☐	☐	☐		

MY SELF-DEVELOPMENT PLAN IN ADMINISTRATION AND MANAGEMENT FOR THE COMING YEAR

Self-development activities in which I plan to engage:
(Books to be read; professional, civic activities, on-the-job training and experience; committee assignments, etc.)

Activities	To be completed no later than	Date actually completed
1.	_____ (date)	_____ (date)
2.	_____ (date)	_____ (date)
3.	_____ (date)	_____ (date)
Formal group Training I plan to complete:		
1.	_____ (date)	_____ (date)
2.	_____ (date)	_____ (date)
3.	_____ (date)	_____ (date)

DETERMINING THE WORK PROGRAM

Donald Green and David Brown

Introduction

Now we come to grips with priorities, timing, and determining the content for the Association's programs. (The Associations referred to in this paper are the Farmers' Associations of Taiwan.)

Five elements must be considered in the formulation of a work program:

1. The *desired changes* shown by the association's goals, targets or objectives.
2. The *time period* set for securing the changes.
3. The specific *activities and tasks* that will be used to bring about the desired changes.
4. The *resources* that are available for use and
5. The *constraints, uncertainties, inter-relationships* and *unique* potentials in the Association's task environment.

Formulating the Association's work program involves analyzing the Association's needs and the resources it has available to meet them, a process that leads to judgments about the most productive actions to take and their likely results. These judgments have to be translated into operational plans—the activities and tasks to which you commit yourself, your staff, your supporting resources, as well as the attention of your Association's members and the agricultural community.

Many factors that influence the outcome of a work program are beyond full control of the Farmers' Associations' managers—weather, prices, human reaction, and human and financial resources, for example. In designing a work program, therefore, a manager must accept the fact that some of his judgments will prove inaccurate. *Secondly,* he must continuously seek ways to improve his knowledge about the problems faced by the Association and the effects of its program. *Thirdly,* the manager must recognize that the success of his work program depends on responses by others—his staff, supporting organizations, and the membership. Finally, he needs to be prepared to revise his program as circumstances change and he secures better information.

Six Key Questions

You and your staff must find answers to six questions as you develop your work program:

What? Where? Who? How? When? With Whom?

What will be done? What activities must you and your staff undertake? How specifically must you state them? To which ones will you give most emphasis? Are any complications likely to arise and how can they be avoided or minimized?

Where will it be done? Will there be a need for change in location of any of the work.

Who will do the work? Which staff members are most capable for particular activities? Are any new staff needed? Will special training be required?

How will it be done? What methods have worked best in particular program activities? Are more effective methods available? Do new activities need new methods? What are the best ways to organize to get the job done?

When will it be done? Each component of your work program and the supporting activities must be timed properly and in the right sequence. Which tasks must be done before others can be started? How much time is required to get ready for a particular task? Are there crop season dates or legal requirements that make it necessary to do certain

things by specific dates? Is it better to try for major accomplishment the first year or build more slowly for longer run progress?

With whom will the work be done? Who are the people to whom you will give attention? The most capable farmers? The most influential? The most wealthy? The ones with the largest size of business? Young people with a future potential? Do some need intensive contacts? Can you use local leaders to carry part of the program?

ASSESSING PROGRAM PROGRESS AND RESULTS

David W. Brown

What progress are we making? Could we be doing things better? Have some changes taken place that will make it wise to modify our program?

For these and other reasons it is desirable from time to time for the program manager and his staff to "evaluate" their undertakings. Evaluation can be a very elaborate exercise, involving special surveys and specialized research procedures. But it need not be so. Much can be learned through very informal efforts to examine what is happening at critical stages of program execution. This may entail little more than candid discussions at staff meetings, or time taken to review staff reports, or field trips to see firsthand how things are going.

Even if program evaluation is handled on a very modest, informal basis, it is important to consciously think about the purposes for which progress is being assessed. Otherwise, time may be wasted in assembling information which is not useful, and facts that are needed may be overlooked. One needs to ask: Am I mainly concerned with *inventorying* the changes that have taken place—for example, the number of farmers who have adapted the new practice we are promoting? Or am I more interested in *explaining why* a project has or has not gone well? Do I need to evaluate *all* aspects of our program, or only a *certain phase?*

It is important to consider carefully what *measures of program progress* are appropriate. Increases in local grain

yields may or may not have been brought about entirely by your program; exceptionally good weather, or efforts by other agencies, may have been a contributing factor too.

A manager might consider a number of ways to improve efforts to evaluate program success. Some of these are:

- More field visits.
- Encouraging staff to keep diaries to record their observations; ideas for improvement, etc.
- Using boards of directors or special farmer panels as sources of constructive criticism.
- Improved staff reports to include information especially relevant to future program improvement.
- Use of census information and published statistics.
- Special surveys, perhaps drawing on the help of professors and students at nearby universities.
- Informal staff meetings, where participants are encouraged to give their candid appraisals.

At the heart of effective evaluation is *attitude*—readiness to review your program in a constructively critical light . . . to seek facts and the honest opinions of others, even though their comments may not all be favorable . . . to make appropriate changes in programs in response to these observations, facts, and suggestions.

DECIDING WHAT TO DO YOURSELF

David W. Brown

A program manager cannot do everything himself. Many tasks and responsibilities have to be passed along to staff aides and technicians in his organization.

Often the choice about what to assign to others is obvious. For example—

- Have secretaries type letters
- Depending on staff agronomists to determine and work out the details of insect control recommendations
- Relying on staff accountants to determine how best to record expenses

In each of these cases the specialist concerned is better at doing the task than the manager (unless he happens to have had previous background in one of these specialties).

There are other instances where the manager may be able to do things better than any of his staff but he simply does not have time to handle everything directly himself—for example, all the details of designing and implementing new projects, or the need to maintain good public relations with various clientele groups. The manager has to decide which responsibilities to delegate to others.

A useful concept for guiding this decision is the *comparative advantage* principle. You, the manager, may be *somewhat* better than any of your staff at conducting

farmer extension meetings. But you may be *far* better than any of your staff at selling new proposals to other agencies. So overall program productivity may well be greatest if you concentrate especially on relations with other agencies. (This isn't necessarily the case. Sometimes there may be persons in an organization other than the manager who are relatively better at handling inter-agency relationships.)

Who in an organization is best to handle a certain task does not necessarily follow specialty lines, or seniority, or formal job descriptions. Individuals may have unique personal characteristics that make them unusually appropriate for certain needs. For example, different persons may have:

- Special public speaking ability
- Close contacts with certain political groups
- Unusual artistic ability
- An ethnic background or language ability that enables him to gain unusual rapport with certain clientele groups
- Unusual ability to expedite logistical details
- Personal friendships with key people in other agencies
- Previous experience with a technical problem now being encountered
- High esteem in the eyes of fellow workers

The effective manager will take these personal traits into account when assigning responsibilities, rather than depending entirely on the formal organizational structure. And he will be sensitive to such latent comparative advantages not only among his administrative and technical colleagues, but among "lower level" aides, clerks and field workers as well.

The extent to which a program manager can wisely delegate major decision-making or program leadership responsibilities will depend on several counteracting factors:

- Time pressures on the manager; the extent to which

he is unable to give all aspects of the program sufficient attention
- Needs to reserve the manager's time for special problems or long-range planning
- Availability of staff members who have potentials for making sound decisions, taking initiative, and assuming responsibility
- Consequences to the program if decisions are made, or actions taken, in less than ideal fashion
- The impetus to staff performance by their feeling that you have enough confidence in them to let them do some things without close guidance

In deciding how much to delegate to others, the manager needs to weigh his "opportunity cost"—by giving others more responsibility, will the gains to the program more than offset the possible risks of mistakes being made?

MAINTAINING MORALE

John L. Fischer

The Ministries of Agriculture and other rurally related operating ministries in the LDCs often suffer from low morale problems among employees. Low morale is closely associated with managerial inadequacies, especially the supervisory aspects; therefore, the topic is given special consideration in this section of the course. Two key questions are: (1) What causes low morale? and (2) What can middle level management do about it?

Morale is a very difficult term to define. Fortunately, most of us know what morale means without being able to articulate a definition. In general, morale is a reflection of employees' *attitudes and feelings* toward their jobs and their organization. When morale is low employees do not on their initiative work hard, nor are they loyal to the organization. They do not respond very well to supervision. Organizations in which morale is low are notoriously inefficient, and rarely achieve their goals.

Some of the reasons that are given the most often in the LDCs for low morale in agricultural agencies are not verified by careful thought and study. For example, low salaries and lack of money are often cited as the major causes of low morale, as are adversity and "bad breaks". While most agricultural agencies pay low salaries, having inadequate budgets, face adverse conditions and don't "get the breaks," none of these can be positively identified as crucial causes of low morale. If we compare morale among

agencies operating under similar conditions, we will find case after case where two organizations or agencies of the same government are operating side by side, and there will be higher morale in the one with lower salaries and operating on the more stringent budget. The only logical conclusion is that money and morale are not *necessarily* positively related. Insofar as adversity and bad-breaks are concerned, during times of stress good management can use them to rally the support of employees for the organization, thus they can be factors related to raising morale. Lack of money, low salaries, etc. contribute to a morale problem, but to blame them alone is probably scapegoating by management. Low morale is seldom attributable to exogeneous forces or conditions.

The crucial question remains, "What causes low morale?" First, and most important, low morale is rarely, if ever, caused by only one condition. It is rather a product of many conditions and in any given situation both positive and negative forces will be at work. Whether morale is high or low depends upon the intensity of the forces and how they interact with one another.

One of the key relationships determining morale level is organizational accomplishment in relation to expectations. Morale among employees will tend to be high when they believe their organization is performing as well as they believe they, and others such as the public, have a *right* to expect.

Morale is inevitably related to moral considerations. Note that above the term "*right* to expect" was used. "*Right*" and "*wrong*" are words invoking moral judgments. When employees believe justice is not being done in their organization, they will become disgruntled and dissatisfied. Their attitudes will soon affect their productivity. When productivity drops, they likely will become more discouraged and disgruntled, and a vicious circle of cause and effect will have set in. Severe internal bickering will almost always develop, often over who is to blame for the situation.

Morality is the key issue. The word morale comes from

the same root word as moral. Productivity can be low and morale remain high where employees do not make a moral issue of the problem, i.e., do not view it in terms of right and wrong. Also, it is interesting to note that whether the employees' view of what is right or wrong is correct or not does not matter. What they *believe* and how they *feel* determines morale.

Couldn't management solve a low morale problem among employees by lowering their expectations? This is a logical question in light of the above discussion, and the answer, which may be a surprise to some is "Yes"! However, to take this approach means management is accepting lower productivity as a norm, and this is self-defeating if employees are not already working to capacity. So rarely will employees be working to capacity, this approach does not merit further discussion.

Morale has been found to be very closely related to whether employees are playing the roles they think they should be playing, or not. When employees are not used for what they have been trained to do, or more specifically to do what they believe they have a right to be doing, morale will plummet. Properly prepared job descriptions which lead to getting people into jobs for which they are qualified and good understanding between supervisors and supervisees are measures management can use to maintain morale.

Whether it is a cause or an effect is debatable, but employees' *confidence* in (a) their ability to do the job, and (b) the ability of their organization to get the job done, are central issues in most morale problems. Lack of evidence may be the result of improper training, assignments being made on arbitrary or other non-rational bases, poor communications, or for any number of reasons. Also, a history of failure and low performance on the part of the organization begets lack of evidence, which leads to even lower performance, hence the vicious circle discussed earlier is initiated.

Morale is known to be related to whether employees feel they are accorded proper respect and are appreciated.

When what they and the people with whom they interact differ in their evaluation of what is proper, morale is likely to be especially low. Some ministries of agriculture face severe morale problems because of their government's preoccupation with industrial development, and the lack of a proper appreciation for the contribution agriculturalists make. Agriculturalists feel forgotten and ignored. Morale will naturally be low when this is the case.

When employees lack respect for their supervisors and other organization leaders, morale is inevitably low. Employees most commonly lack respect for their supervisor (management) when they feel they cannot trust him. Their lack of trust may be either because they believe he is incompetent, or unfair. Management seldom loses respect by making a few honest mistakes. Employees know that managers are human, and that it is human to err occasionally. For management to try to hide, cover up or deny mistakes will inevitably lead to loss of respect, hence lower morale.

Morale has been found to be more related to employees' benefits concerning the soundness of the decision-making process, than to whether specific managers make sound decisions or not. What this means is that a decision-making error by management will not lower morale if employees maintain their confidence in the system.

Morale is inevitably low when management does not establish a workable feedback system. Each employee knows more about some part, even though it may only be a tiny part, of the operation of his organization than anyone else. He inevitably believes he has something to say which would help management improve the organization's operations. If he is not provided the opportunity to be heard, the logical conclusion for him is that management is either indifferent about improving the organization or it lacks confidence in him. In either case, he will be disgruntled and his morale will be low.

Morale can never be high when employees feel their work is not very important. The tendency for some insecure managers to try to make themselves look relatively

good (and important) by downgrading those under and around them has disastrous effects on morale. In a properly managed organization, every employee has a place. Each individual is important, and it behooves management to let every employee know so.

In summary, the level of morale in an organization is a result of the interaction of a complex set of forces. Generally, morale is a reflection of attitudes which hinge on moral judgements on the part of employees. As long as employees believe: (a) management is trying to do the *right* thing, (b) the system for decision-making is fair and equitable, and (c) those at the top are working diligently in the organization's interests, morale will likely be high. High morale generally means high productivity, and the organizational achievement will be up to employee expectations. There are few countervailing forces in morale problems. High morale tends to beget higher morale, and low morale begets even lower morale! Morale problems seldom, if ever, "solve themselves". Active intervention by management is required.

SECTION IV

THE TASK ENVIRONMENT

Garland P. Wood

Each organization has a task and pursues that task in the environment of the surrounding culture, the technical requirements of the task and the organization's clients. The task environment consists of conditions that are supposed to be affected by the applications of technology through management. W.J. Siffin in his paper *An Introduction to the Idea of the Task Environment* maintains that an effective program must sustain a proper balance among three things *Management, Technology,* and the *Task Environment.*

The task environment in his analogy is the third leg of the stool and is important for two reasons. It includes the circumstances that justify the program and it contains those features that will affect the outcomes of the program effort. The readings in this section will focus on the task environment of agricultural organizations.

The man with the hoe offers little hope to those nations looking to agriculture to give them a better life through increased production. In addition to the intricate problems of achieving a sizeable increased agricultural production there are the further challenges of processing, storage, markets, transportation, rural electrification, extension ser-

vices and research. There are but a few of the "battles" that must be planned and fought according to W. David Hopper in his paper *The Essentials for Payoff in Agriculture.* The key element, he says, is a system that is flexible, self correcting of imbalances, and capable of rapidly adapting resources to the ebb and flow, the leads and lags of change.

The third article in this section is a case study of the task environment in Bangladesh. John W. Thomas writing under the title *The Choice of Technology in Developing Countries; The Case of Irrigation Tubewells in East Pakistan* clearly presents the rationale for the choice of a proven, simplified technology that yields higher economic returns, is more labor intensive and has a greater potential for the creation of a domestic industry (low cost wells). but medium and high cost wells were chosen by the Government of Bangladesh and by donor agencies. Thomas leaves it up to the reader to answer the question why.

The final article in this section is by Akhter Hameed Khan *The Comilla Projects—a personal account.* The writer briefly outlines the national political constraints, the intervening bureaucracy, and the economic, social and cultural limitations at the local level. Then he describes a process of experimentation to achieve results within these limitations.

AN INTRODUCTION TO THE IDEA OF THE "TASK ENVIRONMENT"

William Siffin

The "task environment" is one of the important things we must understand and deal with, in the management of programs.

A program is one kind of an action system. An action system is a set of interdependent, inter-acting parts that work together to some purpose. If one doesn't carry the analogy too far, it is useful to think of a program as a kind of action system that resembles a three-legged stool.

There are, of course, some differences as well as similarities between a stool and a program. A stool is a static structure and a program is supposed to be dynamic. But both stools and programs are supposed to produce some utilities, or products. A stool furnishes support for sitting, and programs presumably furnish outputs of various kinds.

To achieve worthwhile outputs, a program has to take account of, and maintain a proper balance among, three things. These things are three legs upon which an effective program rests. One is *Management;* the second is *Technology;* and the third one bears the label *Task Environment.* These three things interact. They are interdependent.

This is why, in order to talk about management, we must also talk about technology and task environment. Our purpose is not to examine management because of its intrinsic interest. We are really concerned with the place of

management in a program, or a system of action in the stool, not just the one leg. The job of management is to harness skills, knowledge, and other resources, to serve purposes that will create benefits or utilities for people outside the organization. Therefore, management viewed as a self-contained set of rules and processes is not a very meaningful subject. We must consider management as one element of an action system that is related to the other member parts of that system—technology and task environment.

From this view, *management* consists of the arrangements for *deciding* what to do, how to do it, why to do it; for *controlling* the action to see that the decisions are implemented; and for *evaluating* the results to see that they are consistent with the purposes of the program.

Technology is a broad label for the various kinds of expert skills, knowledge, tools, and other resources that can be brought together (organized) in certain combinations to produce certain kinds of effects. Some people prefer to define technology as "systematic knowledge about relationships between causes and effects." Whatever definition is used, the point that matters about technology is that it consists of *instruments of action* which, when appropriately used, can produce certain kinds of results—results that can be predicted ahead of time if the rules for applying the technology are properly followed. In the field of agriculture, there is a large amount of technological knowledge of many kinds, and there is a wide variety of technical or technological tools and materials—chemicals, for example, whose effects under specified conditions are known ahead of time. One way to view the task of management is as the effective selection and use of technology to serve intended purposes.

The use of technology involves many possible problems. One of them consists of making choices about the most appropriate technologies. Another concerns the sometimes very complicated efforts to establish technological competence and to get it to work. This brings us to the subject of task environments.

The *task environment* in the most elemental sense consists of the "situation" or situations that are supposed to be affected by the applications of technology through management. For any program, one may ask: "What is the task environment of this program?" The same question can be put in other ways: "What are the features of this situation that are important—that need to be changed in order to improve the situation and that will affect the way in which our program works?" The task environment, in short, is important for two reasons. It includes the situational circumstances that justify the program, making it necessary or at least desirable. And it contains features that will affect the outcomes of the program effort.

An obvious example of the first aspect of task environment is a situation in which many small farmers are engaged in producing maize at very low levels of productivity, but with an adequate soil, a sufficient amount of water, and a reasonably suitable climate. In this situation, it appears that maize is probably the most suitable crop, but social, economic, and humanitarian factors indicate that productivity needs to be increased. Also, it seems that considerable increases in productivity would be economically beneficial. From other field of technology comes evidence that combinations of changes in inputs and farm management practices would probably bring about such increases. Such task environment characteristics as these provide an important part of the basis for deciding what to do—what kind of program to establish or apply. Without knowledge of such factors, it is not possible to make management decisions about the proper use of technology, assuming that the object of the program is to help the farmers in this task environment.

In the U.S., there are old stories about relief efforts undertaken during the Great Depression of the 1930's by well-motivated people in the nation's capital. Knowing that there were desperate shortages of clothing in some parts of the country, these people arranged for shipments of clothing. But for various reasons, some of the heavy winter clothing went to the warm southern states and some

of the light summer clothing went to the northern states. This may have resulted from the fact that relief administrators were ignorant of relevant task environment characteristics. In any case, for a while, the action programs were not geared to the task environment. (The legs of the stool didn't match up.) If this sounds like an extreme and esoteric case, which it may be, there are hundreds of others in which programs failed because the people who designed them and ran them applied technologies that were unsuited to the task environment, or failed to understand the task environment in some other way.

In analyzing task environments, the first question to be asked is: What are the program needs and opportunities? The second question is: What features of the situation are likely to have particularly important effects on the program (including beneficial effects as well as adverse ones)?

For example, if the farm management practices in the situation are closely tied to deep religious beliefs, this may affect the way a productivity program will work and the way in which it might best be designed. If the success of a program appears to require changes in attitudes and beliefs as well as in specific knowledge and behavior, then it may be important to know something about the community structure, in order to design a program strategy that makes use of the leadership and influence processes that exist. Again, changes in farm enterprises are frequently dependent upon changed access to inputs—types of inputs, quantities, and scheduling. If this is the case, then the task environment includes the sources, or prospective sources, of those inputs. It may also include such things as transport, storage and credit arrangements. If credit arrangements are involved, then it will be important to know the kind of credit system that is most likely to work in the given situation.

These comments are only illustrative. Hopefully, they are also suggestive. One thing they should suggest is the rather obvious point that a responsibility of management is to create and maintain an effective relationship between technology or tools of the program, on the one hand; and

the task environment where those tools must work, on the other. The relationship between tools and task environment works both ways. Tools, or methods, must be fitted to the task environment, but they must also be chosen on the basis of judgment about ways of changing characteristics of the task environment.

In the final analysis, the important single question about the task environment—what is there out there that matters in terms of the program—becomes a whole series of questions: What are the needs that can become objectives of our project effort? What are the resources in the situation that can be developed or changed to meet needs? What are the impediments to doing this? What are the strong points that can be used?

About one thing that is really no question: Programs that are not designed to fit their task environments will fail. If the ultimate responsibility of management is to achieve worthwhile program results, then the process of managing programs must include arrangements for describing and analyzing task environments, so that technology can be properly used. Only when this occurs is a program like a well-designed stool.

PRINCIPLES OF ORGANIZATION FOR EFFECTIVE PROGRAM MANAGEMENT

W.J. Siffin

First, let us agree that this is an impossible topic, as well as one that is customary in seminars of this kind. It is customary because it is widely recognized that organization and management are key factors in shaping and executing agricultural policy. It is impossible for a number of reasons. One is simply that there is nowhere in the world a body of knowledge that can tell you precisely how to organize so that a program will be effectively managed. If there were such a body of knowledge, it is most unlikely that it could be presented in the time assigned to the subject. If it could be, you wouldn't be here; I wouldn't be here; and the whole world and the problems that we have within it would be very different from what they are.

So let us change the topic to "Three Factors that Underlie Strategies for Effective Program Organization and Management."

Partly to justify the change in topic, let me explain why it is not possible to talk seriously and generally about "principles of organization for effective program management." The two chief reasons are these:

First, the word "principles" has a number of different meanings. There is no complete agreement on the concept of "principles" as it applies to organization and management.

The word "principles" stands for four different kinds of

things—(a) moral principles or idealized standards of conduct, (b) general rules that are built into some closed system of carefully specified activity, (c) "laws" or descriptions of the regularity observed in natural phenomena, and (d) pragmatic "rules of thumb" that people develop on the basis of experience and use in trying to define and solve their problems. Where do so-called "management principles", or "principles of organization" fit among these four types? To explore this question, let us consider each type briefly.

a. *Moral or ideal principles.* Examples of these are the Ten Commandments, and the codes or principles of personal conduct that we were taught when we were growing up. The essential quality of these principles is that they tell us what we *ought* to do because it is right or just or moral. These are "self-justifying principles." They are not justified by the results that are guaranteed if one follows the principles. Now, some of the so-called principles of organization and management resemble moral or ideal principles—we are instructed to follow them because they are inherently "good", without any clearcut evidence about the results that we can expect from doing so.

b. *Principles that take the form of general operating rules in closed systems.* We find such principles in a wide variety of fields—ranging from arithmetic to accounting, as well as bridge, soccer, and music. The principles in these cases are *general rules*—rules that are "true", or valid, by definition. They are determinate, specific, objective statements of what must be done. These principles are binding, simply because when they are violated, the system doesn't work (it ceases to be). Systems of activity built on such principles are important tools *for* organization and management—take for example, accounting. But they are not principles *of* organization and management.

c. Then there are *scientific principles*—general laws or theories derived from the study of nature. They are descriptions of directly or indirectly observed or posited empirical consistency or regularity. Unlike the principles of accounting or arithmetic, these principles are based on

observation rather than on definition. They are regarded in science as always being "contingent"—thought to be true for the time being, but subject to refinement or replacement.

In some places such principles and the subject-matter that is described by them—science—is regarded with something like reverence. This helps explain the quest of some people for "scientific" principles of organization and management. But it is rather clear that the phenomena that concern us here—human organization and management—are in some ways very different from the natural phenomena described by clear-cut scientific principles. And one must guard against pseudo-scientists who offer to attack our important and difficult problems of organization and management by the use of science. What they are actually offering is sometimes only "magic"—that probably will not work.

d. In practice, most principles of organization and management fit in the fourth category—they are *pragmatic rules of thumb,* outgrowths of experience and thinking about experience. You are all familiar with shorthand statements of principles of this sort. For example, there is one that says: "Authority must be commensurate with responsibility"—an important sounding principle whose precise meaning is hard to determine. Then there is the old Biblical statement—"No man can serve two masters" which is also sometimes regarded as a sound management principle. It usually gets put in more fancy language, however, and comes out sounding something like this: "Relationship of supervision and subordination must be clearly specified and never left obscure or ambiguous." At this point I would only ask you: how good, how sound a principle is this? I am prepared to argue that this principle is more of a simplism that anything else, a proverb, a rule of thumb that makes no sense at all under certain important circumstances—like most of our so-called principles of organization and management. And like most of those principles, it won't prove very helpful in trying to deal

with really important problems of organization and management—the problems that exist at the upper levels in organizations, where programs are shaped and organizations are directed.

Now, where does this leave us? Basically, it brings us to a need for something more useful, more promising, and less deceptive than the usual "principles". These we have called "*Factors*"—an admittedly vague and general word. Its chief value is simply that it is an alternative to the word "principles".

The reasons for abandoning the principles and retreating to something less precise are two: First, we really do need to get beyond the conventional principles of organization and management, even if only to understand them and to make sensible use of them. These principles are at best limited tools. Wisely and carefully used, some of them are thoroughly valuable. So are a surgeon's tools, or a dentist's. But they are not self-operating. They're not always even reliable. Our problem, therefore, is one of developing skills and judgment, that we may know when to cut, when to sew, when to drill, and when to fill.

In the second place, there is a store of general knowledge from which we can draw—knowledge that will more than anything else help us *understand* our situations. If we assume that our aim is rational action to advance important purposes, then knowledge that can contribute to understanding is much more to be sought than memorized rules offered as recipes for action. At the heart of it all, the reason for this is simple: organizing and managing things is, in the final analysis, a *particular, specific,* and partly *unique* activity. If you agree with me on this point, then you will also agree that there cannot be a full set of general rules or principles that will tell you what to do. The best you can expect is some guides to diagnosis. Such guides, combined with your own experience and intelligence—and a bit of luck, perhaps—increase the likelihood that the patient will live, or that the program will be adequately organized and managed.

The Task Environment

What are the key factors that we must understand and analyze? None is more important than the task environment. If there were any "first principle" of organization and management, it would go something like this: "The organization must be designed to fit the relevant characteristics of its task environment." This even sounds like a principle; you can call it one if you want, although you had better be a bit careful, because this is really a pious, empty statement and one that raises questions rather than answering them. The key questions, of course, are: what is the task environment, and what are the most important characteristics of it?

In the simplest terms, the task environment is the setting in which the program exists. The most important characteristics of that setting are particular to that situation. At the same time, they probably fall into some rough class of situations, so they are not totally unique. For instance, the chief characteristics of the agricultural situation can be described and they can be classified—the resource situation, the production pattern or situation, the information situation, the marketing and transport infrastructure situation, etc. The problems are two: to decide which of the many characteristics of the agricultural environment are important, and to find out what needs to be known about them. (One good example of a task environment analysis, in my judgment, was the survey undertaken by CIMMYT of the Puebla area at the beginning of its effort to set up its program of expanded agricultural productivity.)

You may feel that this talk about the task environment as *the* key factor in organizing and managing is just another label for a very old and very elemental idea. And you may be right. But I am sure that you are also familiar with disasters that have occurred when organizations have been established that didn't fit the characteristics of their task environments. We could all probably cite efforts to transplant North American style organizations to Latin American situations, efforts that failed to include adjustments to take account of the different task environment.

If you agree with my comments about task environment, the next critical question is: how does one analyze a task environment, and how does one then design an organization to fit it, and also to serve the intended goals? There are useful answers to this question. Some of them become quite technical; but the basic idea is not technical. And the basic idea is vital, for it is differences in task environments that require differences in the way we go about designing and operating our programs—as well as setting program goals in the first place.

Organizational Flexibility

A second key factor concerns the organization itself. It might be called *organizational flexibility,* and it has important implications. If we consider the organization as a tool or instrument, we shall be wise to recognize that it is an imperfect one, operating with imperfect knowledge, and—often—to serve goals that are not entirely clear. From this it follows that (a) mistakes will occur; (b) goals will tend to change; and (c) continuing adjustments will need to be made in the way the machinery—the organization—works.

Now if you went to the literature and examined the so-called "principles of organization", you would find that many of them completely ignore these tendencies. A lot of the principles are based on the model of organization as an engine—as a machine that is designed and built to do something, which then either works or doesn't work. This is a false model—a misleading image of complex human organization—and one that causes a lot of trouble when efforts are made to apply it.

The key implications of this factor are found in the knowledge that does tell us quite a bit about the ways in which organizations *actually* tend to function—about how decisions get made, how power shifts, how information arrangements can be designed to affect capacities for control and things of that sort. If you accept this "flexibility factor", you will abandon simple "principles" about "chain of

command", hierarchy, the avoidance of duplication, and "authority commensurate with responsibility". And you will accept a very slippery principle like "redundancy"—the idea that duplication and overlap of functions can be valuable—and try to figure out how to put it to work. In short, if you view the organization as an imperfect tool that must be flexible and accommodating, you will lay the foundation for a more powerful understanding of how organizations work than you can ever get from conventional principles. And you can use this knowledge in designing organizational arrangements to fit a given task environment.

Indeterminate Decisions

Finally, let me offer a third "factor"—one that is as old as the hills, although that doesn't mean it is well understood.

Management decision-making is predictive. It involves predictions about (a) the outcomes that will result from (b) interventions that will be made in (c) situations that are not entirely understood at the outset and (d) that are subject to the effects of influences that may not be capable of being anticipated, let alone calculated. A key problem of management, then, is to deal with uncertainty; and there will never be developed a set of principles for doing away with uncertainty, so long as humans are as they are and the world is as it is.

If these remarks have accomplished anything at all, it has been to honor and acknowledge what you already know—that there aren't any neat principles that have a lot of power to solve your most important problems. Beyond that, perhaps they have offered you three labels—labels for the three factors that matter more than anything else to the effective organization and management of your programs:

1.) The task environment;
2.) Organizational flexibility; and
3.) Indeterminate decisions.

THE ESSENTIALS FOR PAYOFF IN AGRICULTURE*

W. David Hopper

If past public investments to promote agricultural growth have yielded little more than disappointment, the cause lies not in agriculture; it is to be found in a basic misunderstanding by investment planners of the nature and course of agricultural modernization. The strategy for development was wrong, and instead of learning from mistakes, the planners allowed the easy assumption that agriculture itself was inherently at fault to become an almost universally accepted dogma of revealed truth.

The strategies of the past have not worked because they were confused. But the confusion of goals that has characterized purposive activity for agricultural development in the past cannot persist if hunger is to be overcome. There must be a clear separation of the goal of growth from the goals of social development and political participation. These goals are not necessarily incompatible, but their joint pursuit in unitary action programs *is* incompatible with the development of an effective strategy for abundance. To conquer hunger is a large task. To ensure social equity and opportunity is another large task. Each aim must be held separately and pursued by separate action. Where there are complementarities they should be exploited. But conflict in program content must be re-

*Condensed from "Investment in Agriculture: The Essentials for Payoff," *Strategy for the Conquest of Hunger*, New York: The Rockefeller Foundation, 1968, pp. 104-110 and 112-113.

solved quickly at the political level with a full recognition that if the pursuit of production is made subordinate to other aims, the dismal record of the past will not be altered.

All of this seems dreadfully obvious. Yet, in every developing country I have visited, agricultural policy is a strange schizophrenic creature that serves many masters. The goal of cheap food for consumption is incompatible with the goal of incentives for production. The goal of an efficient grain-processing industry is incompatible with the goal of preserving and protecting wasteful small scale mills. The desire to save foreign exchange and hold currency to overvalued exchange rates is likely to be incompatible with the need to increase the supply and lower the farm price of modern inputs. The insulation of inefficient and public-or-private-sector enterprises form competition is incompatible with the oft-proclaimed aim of providing farmers with quality inputs and maximum incentives to move to higher levels of production. Policies to discourage the development of mechanized agriculture because of its assumed impact on rural labor-force employment are incompatible with the need for careful timing and precision in farm operations in areas where growing conditions and the availability of water would permit the harvest of two or three crops per year. And so on; the list is long and depressing. It frequently leads to the conclusion that, protestations to the contrary, many countries have accepted increased food production as a political objective so hedged by reservations and so conditioned by objectives of higher priority that it is impotent as a focus for action.

A Strategy for Food Production

A clear political objective is necessary to the initiation of action. But the action plan itself—that is, the strategy for attaining the political objective—is the substance of our concern here. If increased food production is accepted as the goal, then the grand strategy must focus national action on the development of an agriculture based on the application of modern science and technology to all its aspects.

The plan of action now falls into categories more or less familiar to us all. The tactics of implementation will take on the flavor of the circumstances peculiar to each nation. But it is possible, from the experience now at hand, to speak meaningfully about the general components of strategic action that are crucial to the course of agricultural development.

Agricultural growth begins in areas having a minimal infrastructure of roads and markets, enough water for crop production either from irrigation or assured rainfall, a variety of seed that is responsive to fertilizer, and fertilizer; in combination, these inputs, as well as land and tillage, must produce a crop that yields substantially more profit for the cultivator than he could earn from following traditional practices and using traditional inputs. The rate at which the adoption of new practices spreads directly reflects the farmers' possibilities for enhanced profit. Government plans for agricultural development must embrace action to maintain this profit incentive, as well as action to assure an expanding supply of new production requisites and technology from private and public sources. If either the production supply-line fails, or the incentives lag, the growth of output will slacken and eventually stagnate.

Once a program has been initiated, many simultaneous and sequential needs are created if it is to be sustained. The protection of plants against pests and diseases is often the next order of concern following the use of improved varieties and fertilizer. Mechanized harvesting and threshing may be necessary to handle increased production properly. Existing irrigation facilities are seldom capable of supporting a pattern of high-yield agriculture, and almost never one that is based on multiple annual crops. Processing, storage, markets, transportation, rural electrification, extension services, research, are but a few of the "battles" that must be planned and fought; and plans, like the development process itself, must grow and elaborate to embrace eventually the full spectrum of appurtenances of a modern agriculture, an agriculture that fully reflects the application of science and technology.

Investment in Agriculture—A Strategy of Action

The course of development sketched above suggests that unless minimum modern infrastructure inputs—roads, some level of market facilities, and enough water for substantially higher-yield crop production—are available cultivators cannot take advantage of improved farm technology. We might call these *a package of minimal services.* Without it, seed of responsive varieties and fertilizer are of no avail. Where it exists, an action plan must focus on the package brought to the farm. It must include fertilizer *and* seed of a fertilizer-responsive variety; until recently the latter input was almost consistently missed. But neither package can evoke a change unless there is also a package of economic incentives that provide the farmer with a return much beyond what we could earn from following traditional methods. This is a crucial point. Too often programs for development have been built on changed practices that offer relatively small improvements over the returns in traditional farming. An increase of 10 or 20 percent in yield over a traditional return of a ton or two per hectare can hardly be distinguished from the change in yield resulting from normal weather variation; if converted to cash the increase is often insufficient to cover the costs of the new practices, and certainly not enough to evoke much enthusiasm. Double or triple the yield, and the cultivator response is very different. At later stages of development, when yields are much higher, percentage differences of this magnitude assume a different character. A 20 percent increase on a six-ton yield will buy a lot more inputs and evoke much greater enthusiasm for further innovation on the part of cultivators than a similar jump over the yields associated with traditional methods.

I have not included in my list of initial packages either agricultural extension or farm credit. Both of these inputs seem unnecessary in the early stages. Farm experiences with new varieties and fertilizer quickly spreads from neighbor to neighbor. The practices involved are relatively simple and the decision to adopt them is a matter of private

choice. Indigenous credit sources such as friends, relatives, and money lenders, seem able to provide cultivators with the necessary purchasing power to buy new seeds and plant nutrients. Assuming adequate incentives, the size of the increased plant yield that results from using the new package is more than sufficient to cover both the high costs of indigenous rural credit and the sharply increased risks of a large investment in purchased inputs. Experience in India and Pakistan suggests that within one season many farmers can move from the position of requiring credit to that of financing their own purchased production needs.

These packages look rather simple, but this appearance is deceptive. I can think of countries that are investing in large agricultural credit programs, in spite of the fact that, because the package of basic services is lacking, they are unable to get seed and fertilizer to farmers. In fact, it is not clear what the credit is intended to buy; I fear it will be an investment in social welfare and not in expanded output. I can think of others that have built or are building fertilizer-consumption programs either without assured water or without responsive seed, or without both. Still others are pressing programs of change without seed *or* fertilizer *or* incentives.

Nested in the package of basic services are several other packages; a pattern of organized transport, a system of receiving marketed farm produce and supplying production requisites, an administration for controlling water distribution and the maintenance of irrigation works, and so on. Indeed, if each of these nested packages were dissected, the basic package would eventually involve a descriptive analysis of the national economy, its government, and its social and economic institutions.

The package of practices—responsive seed and fertilizer—is, likewise, composed of nested packages. Responsive seed is a product of research; fertilizer, of chemical engineering. Each, in turn, rests on a foundation of human enterprise and skill, and on an allocation of investment resources. Again the lines can be traced to the structure and dynamics of national culture.

A Look Beyond

Once begun, if agricultural change is to continue, an ever-growing amount of investment funds will be required to give substance to programs and resource allocations focused on production. The land area equipped with at least the minimal set of services must be expanded. Where farmers have already begun a drive for higher production, new high-yielding plants must be protected from pests and diseases. Agronomic practices will need to be improved, and so will water management, especially in irrigated areas, because higher yields mean denser plant population per unit of ground area, and greater loss of soil moisture through transpiration.

National strategies for agriculture can begin with imported materials, even imported seed, but before long they must be geared to absorb a steady increase of domestic resources. Of crucial importance among the claimants for investment is agricultural research. The key to the agricultural revolution that is spreading in many countries is the introduction of nutrient-responsive varieties developed through research. But this research, for the most part, has taken place only at a few centers. No country can afford to rely on extra-mural research to sustain the momentum of its changing agriculture. Investments in domestic research must be forthcoming in growing amounts to meet the needs of the expanding agriculture. As new varietal materials spread and as fertilizer use increases and farming practices change, the ecological conditions under which crops are grown will change and give rise to new sets of problems. An altered virulence of plant pathogens will pose new disease threats. A change in the structure and chemistry of the regional soils will, in turn, give rise to further alterations in farm practices. Research in agronomy, in water requirements, in the use of insecticides and weed killers, and in related subjects will assume an ever-growing importance as farmers become increasingly sophisticated and skilled in scientific agriculture.

More sophisticated farmers will generate a demand for

farm advisory services of increasing competency. Part of this demand can and will be met by private agencies handling farm supplies, and some by government extension services that link the research stations to the cultivator. Such services require investments in agricultural education and a thoughtful development of extension administration. Before they are built, however, local research must have found something worthwhile to extend. A monumental amount of money has been squandered over the past two decades in trying to create extension services designed to induce agricultural change, but whose agents had little or nothing in the way of improved technology to extend to cultivators. Assuming that incentives to innovate exist, it is seldom that highly productive technologies will lie unused for what only of an extension advisory service. Such a service can accelerate the rate of diffusion of new practices and can lower the costs of learning which the farmer must pay to master new techniques; but it will only be as good as the research behind it, and only as effective in assisting farmers as its staff is well-trained and able to communicate this research.

Some improvement practices such as pest control or water distribution depend greatly on the degree of agreement for concerted action that can be obtained among neighboring farmers for their effectiveness. Scale economies of this kind can be seized either through government action that brings protective measures to a wide area and collects a levy from those benefited, or by the formation of some type of farmer association to facilitate group decision. But country after country has tried to build farmer institutions with little or no economic reason for farmer participation other than, perhaps, cheap credit (which too quickly became diverted to consumption, because there was nothing productive to purchase, and almost as frequently became overdue bad debt) or inputs secured through the institution's government-granted monopoly rights to items such as fertilizer (which, when wanted, had a tendency to turn the organization into a private body controlled by the few who held political

power, and who skimmed off the monopoly rent for personal purposes) or subsidies (which were, on most occasions, diverted to personal gain). The succesful building of farmer organizations must await the development of farmer demand that arises from perceived benefits of collective action.

In time, often a very short time, cultivators become aware of opportunities for multiple cropping and strive to increase yield per hectare per year rather than per crop. Research provides short-duration varieties and the agronomic and protective practices that will make multiple cropping possible and profitable. But then, investments in improved water control—individual field control of irrigation and drainage—are often required. These can either be made through public works projects in canal-irrigated areas, or directly by farmers in personal irrigation facilities such as low lift pumps, small tubewells, etc. The precision and timing needed for a multiple-crop agriculture will encourage, if not necessitate, cultivator investment in mechanical power and improved implements, either directly, or as a purchaser of custom services. Other inputs—selected fertilizer, pesticides and extension services reflecting greater scientific sophistication in agriculture—will be required as well.

To underpin the emergence of a truly modern farm sector, large investments will be needed in the industrial base supporting agriculture. To handle the increased volume of outputs and inputs, a country's markets, processing plants, storage facilities, transportation, sales and service facilities, electric power, and other services will all lay claim to the pool of investible resources. This is the stage of efflorescence of an agriculture based on the application of science and technology. It is a stage that will see agriculture break traditional patterns of cereal production and meet rising consumer demands for fruits and vegetables, meats and livestock products. Again the leverage will come from research. Crop varieties for processing, breeds for specialized production, pasture grasses and foreages, livestock management techniques, horticultural cropping

methods, specialized processing and storage techniques, must flow to farmers and agricultural businesses as the products of research endeavors. With these will come investments in extension, rural credit institutions, an expansion of farmer organizations, and the full range of service facilities that are necessary for modern rural progress.

The vast literature on economic planning, which has found so many adherents in developing nations, contains the seemingly attractive promise that with care, government power, and a computer, it is possible to exercise a close central control over the course of total national development, including the promotion of agriculture. With this promise for justification, some developing countries have striven to establish a detailed central management to promote agricultural development. Without exception, they have failed.

The reasons are not difficult to find. The key element in initiating and maintaining the upward movement of farm output is the creation of a method for assuring that the several components of rural growth act together in a system that is flexible, self-correcting of imbalances, and capable of rapidly adapting its use of resources so as to follow closely the ebb and flow, the leads and lags of change. Governments are notoriously poor at bringing flexible response to rapidly developing opportunities. Private investors, properly encouraged and left to function with a minimum of impediments, do it well. This would argue that the most productive role for government activity would be to require sustained investments over long periods of time, investments that will produce a swelling flow of incentives designed to attract private savings to agriculture. In addition to the usual list, which includes education, research, and infrastructure development, these basic investments would also include measures to promote and ensure competitive business conditions in rural areas (not excluding competition from and between farmer cooperatives or associations), to regulate markets, and to enforce standards and grades for farm produce and input

supplies. This would leave to private investors (including individual farmers and farmer organizations) those opportunities requiring venture capital capable of moving among allocation alternatives quickly and easily in response to changing circumstances of the market foces of supply and demand. Under this dichotomy of investment sources, the overall strategy of resource allocation would still be a public responsibility, but the public policy would now be directed toward establishing a climate for private participation in rural development and toward strengthening the incentives for continued private investment, by allocating public resources to programs and institutions that would generate the stream of technology and establish the conditions needed for enduring growth.

THE CHOICE OF TECHNOLOGY IN DEVELOPING COUNTRIES: THE CASE OF IRRIGATION TUBEWELLS IN EAST PAKISTAN*

John W. Thomas

Development analysts have often suggested that the developing countries share one advantage which the high income nations did not enjoy; they have a whole range of technologies from simple to complex, from low to high cost, from labor to capital intensive, from which they can select those best suited to their needs. In practice, however, this implied a freedom of choice which may be seriously constrained by a variety of factors which impinge upon the decision-making process. This paper examines the question of the choice of technology in the case of irrigation tubewells in East Pakistan.

By the late 1960's, the government of East Pakistan, foreign aid donors, and those knowledgable about the area were agreed that high priority should be placed on the installation of irrigation tubewells in order to provide an impetus to agricultural growth. The government established in 1969 a target of 20,000 tubewells to be installed in the period 1970-75. It budgeted a generous Rs. 1,400 million ($274 million) or Rs. 70,000 ($14,750) per well. To meet this target, more than half the funds would have to

*Based on a draft of a longer paper with the same title which was presented at the Torremolinos Conference of the Development Advisory Service of Harvard University, September 11-17, 1972. The name East Pakistan is used here because the decisions being analyzed took place in 1969-1970, before Bangladesh declared its independence.

come from external sources. There remained, however, important decisions concerning the type of well and the method of installation. The choice of tubewell technology would determine the number of wells that could be financed, their location, and the way in which the benefits would be distributed throughout the country. Thus, it would have significant social as well as economic consequences.

There was a wide range of technical options for well installation and operation in East Pakistan. Important alternatives affecting cost fell into five general categories: 1) drilling technique, 2) power source and type of engine, 3) type of pump, 4) screen material, and 5) drilling method. Although these alternatives provided more than 250 possible well designs, in practice they were used in combinations that allowed them to be categorized as high—(over Rs. 100,000 per well), medium—(Rs. 50,000-100,000), and low—(under Rs. 50,000) cost wells. Although there was some overlapping, in practice these categories provided a relatively accurate description, e.g., if the most expensive drilling technique was used, the lowest cost engines or screen materials were not, and vice versa.

At the time the initial choices of tubewell technology were being made, planners, agricultural sector administrators, and aid donors had the experience of two pilot tubewell projects in East Pakistan, representing widely different technologies.

In Thakurgaon, in the northwestern part of the country, a tubewell field was constructed and operated under the auspices of the Water and Power Development Authority. The feasibility study, choice of well design, and construction were done by German engineers. Three hundred and eighty 4 cusec (cubic feet per second) wells were installed, and an electric generating plant was constructed to provide the power. The wells, which were sunk by power drilling rigs, utilized steel screens and turbine pumps, all from West Germany. The cost of these wells was very high, approximately Rs. 260,000 ($54,750) per well, and the area irrigated per well was very low. The combination of high

cost, poor well location resulting from little knowledge of local farm practices, and failure to organize farmers for irrigated agriculture, meant that agricultural benefits from the project were minimal.

The other pilot project was in Comilla, where wells were sunk by the Kotwali Thana Central Cooperative Association, which adapted for local conditions two low-cost, labor-intensive techniques for installing wells—percussion and jet drilling. The 211 diesel-powered wells, of 2-cusec output, utilized locally fabricated brass screens. The cost was Rs. 23,700 ($5,000) per well. Nevertheless, they proved highly profitable from both a private and a social perspective and were, in fact, the only type of tubewell proven successful in East Pakistan.

It is important to note the very high benefits to tubewell irrigation in East Pakistan. The farmers' annual benefits were estimated at Rs. 38,000 or enough to repay the investment in a low-cost well in six years. Thus, there was good economic justification for all but the high-cost alternative. Calculation of internal rates of return to public and/or private investors in tubewells using social prices produced a similar result: low-cost wells are justified; medium-cost wells are less attractive but justified; high-cost wells are unjustified.

In an economy like that of East Pakistan, which had a labor surplus and shortage of capital, the creation of new employment opportunites and the conservation of capital must be high priorities. The low-cost drilling techniques create far more jobs—as much as 34,000 man years of employment for the proposed 20,000 wells—while requiring only a fraction of the capital investment needed for higher cost technology. Moreover, skilled manpower was scarce in East Pakistan, and the low-cost drilling techniques would train more than 7,000 Bengali technicians and provide another one-half million laborers with at least a brief introduction to simple technology.

Organization of demand for water has in the past proven to be a crucial cause of the failure of previous irrigation projects in East Pakistan. While it is difficult to quantify

such a variable, it may well be that farmer participation in the installation of a well would produce more understanding of the function of the well and interest in the benefits it could provide. This process of familiarization plus a demonstration of effect causes a slowly accelerating demand for water which offsets the initial incapacity of wells of low-cost technology to install wells quickly. Indeed, the installation of wells at a high rate in the early years may not be desirable. An early lag in demand may well fit with the time needed to develop capacity for installation of wells by a low cost technique.

The equipment needed for drilling the low-cost wells is relatively light and portable, which means that it can be used in virtually all areas of the country. On the other hand, the mobility of the heavy, truck-borne rigs needed for the higher cost drilling techniques is severely limited by the lack of roads and bridges in the countryside. If the wells can be dug in any part of the countryside, they will provide a broader distribution of employment, training, and financial benefits to rural areas. They will also create the potential for rural small repair and manufacturing industry. Low-cost rigs can actually be constructed and maintained domestically.

On balance, the arguments for the low-cost wells over medium and high cost appeared impressive. With low-cost wells, economic return was higher, the employment and training effects were greater, the components of the wells held greater potential for the creation of domestic industry, and they would have provided a broader distribution of the benefits of well irrigation. This evidence, plus the fact that low-cost wells were the only ones proven in actual operation in East Pakistan, suggests that the low-cost wells represented the logical tubewell technology for the country.

The Government of East Pakistan requested various foreign aid donors (including the World Bank, the British General Electric Corporation, and the government of Yugoslavia) to fund 1,000 low-cost, 8,000 medium-cost and 2,000 high-cost wells. In response, commitments were

made to finance 9,000 medium-cost and 900 high-cost wells. All of these were to be foreign drilled and installed. The East Pakistan government concurred in this strong donor preference for medium- and high-cost wells, as did the Government of Bangladesh after independence, which strongly suggests that considerations other than those examined above are paramount in the decisions of governments and aid givers as to the appropriate technologies for developing countries.

Some of the factors thus effecting choices are economic in nature. Due to price distortions, in East Pakistan the market cost of imported high speed diesels was less than that of the locally produced low speed engines, despite the fact that the latter cost only 75 percent as much to produce. Also, the Rupee was overvalued, which meant that imported equipment could be obtained for as little as half its true cost to the economy. If wage rates exceed the opportunity cost of labor, as they did in East Pakistan in 1970, labor-intensive methods become less attractive, especially when the factor of management problems with labor crews is added. Nevertheless, despite these economic distortions, the low-cost tubewell technology yielded a better economic return. Other factors must have been involved in the choice of technology.

THE COMILLA PROJECT—A PERSONAL ACCOUNT*

Akter Hameed Khan

When in 1953 I was appointed the director of the Rural Development Academy, I was not a novice. I had lived intimately with three conceptions of rural uplift. I had been a member of the Indian Civil Service where I learnt the art of Imperial administration. Subsequently I had resigned imperial service and joined a nationalist institution where I absorbed Gandhian views of morals, economics and education. In the nineteen-fifties I was a practitioner of what was then the cosmopolitan cult of community development. Besides close familiarity with the Imperial, the Gandhian, and the Cosmopolitan conceptions, I had a nodding acquaintance with the Russian and Chinese conceptions.

By 1958 I was a middle aged man whose knowledge was large, but whose courage was small. In my own eyes, I was a non-hero because I had abandoned youthful aspirations to be either a revolutionary or a recluse. I had realized that my legs were too weak to climb those heights. Perhaps I might have been an executive boss or an important second fiddle. But inhibited by my adolescent dreams I spurned such mundane glories. What I considered worthy was beyond my reach; what was within my reach seemed worthless. Thus, oscillating between the unattainable and the insignificant, I became an uncertain dabbler. An inner

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conflict made me a cynical idealist. Outwardly I might pose as a teacher; inwardly, I was a permanent pupil.

Disillusion of Rural Work

Both as an administrator under the Empire, and as a village development director under Pakistan, I had suffered a peculiar disillusion. Rural work like missionary work was indeed soul-satisfying; but its scope was strictly limited. Like philanthropy, it seemed a palliative. It skirted basic issues. Its professions of high intent were not sincere. Evidently, it was marginal to the political, economic and administrative framework of the Empire of Pakistan. Several times, urged by a desire for social action, I had accepted rural assignments. But finding the purposes shady, the discipline dictatorial, and the planning dogmatic, I had returned to the academic cloister. And thus I was passing my days when the offer to be the first director of a Rural Development Academy once again tempted me.

A Rural Research Institute

The Academy was designed for training and research. It was staffed not by technicians, but by social scientists—economists, sociologists, psychologists, statisticians, public administrators and educationists. I was assured by my employers that within the steel frame I would have some flexibility, that I would not have to bow down before too many omniscient bosses. What specially attracted me was the emphasis on research placed by the Michigan State University advisors. Previously, as V-AID director, I had strongly felt the need for much fact searching and heart searching. To that end I had attached one project area to each of the three V-AID institutes. But, for bureaucratic reasons, collaboration between theory and practice was unpalatable both to the instructors and the executors. It was discontinued as soon as I left. At last at the Academy I could try my hand at what I had vainly advised the institutes to do.

Threefold Research

So the Academy adopted, as a laboratory, the administrative unit in which it was located—the thana of Comilla. We, the instructors, began to study our area with unparalleled thoroughness. We went around as observers with the thana officers, and wrote reports, month after month, to determine what the departments could or could not do. This we called observational research. We investigated various economic and social conditions, e.g., land ownership, credit, crop production and marketing, the diffusion process, cottage industries, rural schools, illiteracy, status of women, attitude towards birth control, etc. We called it survey research. Proceeding further in the quest of better procedures or stronger institutions, we established several experimental projects. Our reformative efforts we called action research. It became our chief distinction. Over the years the Academy not only acquired minute knowledge of the land and the people of comilla thana, but also built up several administrative and institutional models. As East Bengal (now Bangladesh) was remarkably homogenous, some models were found suitable for replication. We envisaged that our pilot projects, energised by the Academy's research, would provide demonstration for training and guidance for practice for the entire province.

Circumscribed Limits

We were not unaware that our search for improvement must be narrowly circumscribed. Ours was a three-legged race. We were the servants of a conservative government whose political, economic or administrative orientation we could scarcely change. In spite of pious professions, rural development was a very minor concern of our government. It was obsessed with industrial, urban and military development. It desired greater agricultural production chiefly because it wanted cheap food for the cities and raw material for industries and exports. Under Imperial rule our villages had been impoverished as producers of cheap food and fibre and consumers of manufactured

goods. Our government, dominated by urban and industrial interests, followed a well recognized method of transferring wealth from the rural to the urban sector when, for instance, it controlled grain prices while giving tariff protection, subsidised foreign exchange, and tax holidays to industries. The rural majority, viz. peasants and labourers, had little organization and few spokesmen. They were not in a position to influence the planning or administrative machinery in their favour. While the urban push and pull was immediate and irresistible, the possibilities of rural revolt seemed remote. Our President sometimes expressed paternal sentiments about "the villagers"; but he was doing nothing more than reverting to the tradition of Imperial Viceroys, who had similiarly proclaimed themselves the protectors of the poor.

A Dismal Environment

Restraining my garrulity, I shall now briefly indicate the highlights of a decade of learning and doing. What we learnt was staggering. In comparison with the enormous problems our ameliorative efforts were indeed puny. Our environment was dismal. A hundred and fifty thousand persons were crammed in our hundred square miles. Pressure on the land was extreme; an average family holding was less than two acres. Productivity was low. Notwithstanding a fertile soil, abundant rainfall and perennial warmth, our farmers harvested ony one-third as much from an acre as the Japanese. During the monsoon floods were frequent; during the dry season irrigation was uncommon. There were few secondary roads. Government services were either non existent or shadowy. Local institutions had withered under Imperial rule and new ones had not grown.

Chaotic Economic Conflict

A chaotic economic conflict raged in this dismal environment. Although the ancient aristocratic landlords and merchant-bankers had disappeared, harmony had not been established between the three main classes left in the villages: The large proprietors (approximately 10%), pos-

sesing surplus land and capital, were in a very privileged position. They leased land or loaned money (both in great demand) at exorbitant rates. Their affluence brought them social and political leadership. They were closely united with the prospering city middle class. They used the savings accumulated from leasing and lending for the professional advancement of their children and for investment in trade and urban housing. Manifestly, the new rural upper class was even more urban-oriented than its predecessors—the landlords and merchant bankers of the Empire. The peasant proprietors constituted a 70% majority. Most of them lived at the subsistence level. In order to supplement their scant capacity, they rented land and borrowed money or food from their affluent neighbors. Rent, interest and trade squeezed the peassants like a lemon and brought juicy profits to landlords, moneylenders and traders, mostly large proprietors. At the bottom of the heap struggled those who had neither land nor capital, an ever increasing number. Scarcity made land and capital very costly; abundance made labour very cheap. In the busy season the labourers received the lowest possible wages; in the slack season they were laid off. Their survival was a miracle of human endurance.

Improving Rural Administration

The Academy's first concern was to improve the quality and scope of rural administration. In this field the Empire had left a poor legacy. The Imperial symbol was the Police Station. We erected a new symbol—the Thana Training and Development Centre. Offices of the so-called nation building departments—Agriculture, Animal Husbandry, Fishery, Health, Education, etc.—were housed together in a spacious building. For intensive planning and coordination a local government council was created at the Thana level and also located at the Centre. Chairmen of the next lower tier, the Union Councils, and the departmental officers were the constituent members. The assumptions were that the people should be mobilized through their

elected leaders; that the officers should coordinate departmental activities with each other as well as with the councillors. The Thana Centre was to be the focus not only of planning and coordination but also of training. Special meeting halls and classrooms were added and officers were encouraged to teach. The Thana Centre assumed that a good job requires a good tool.

Drainage and Roads Program

The foremost task for the Thana Council was the construction of a drainage and roads network. Nothing had been more obvious in our investigations than the need for better drainage and more roads. Protection from flooding and connection with the markets were insistent demands in our area. Floods caused loss and inhibited investment. Absence of roads restricted trade and hurt the isolated rural people both as producers and as consumers. Adequate drainage could greatly reduce flooding. The government engineers were, however, too busy with big roads and big dams to pay any attention to the innumerable and scattered roads and drains demanded by the villagers. The Academy's research helped in designing a Works Program which could fulfill this need. The Thana Council, through the Union Councils, utilised local knowledge and energy to prepare two comprehensive plans, one for drainage and the other for roads. By previous standards the estimated costs at first appeared astronomical. The network for our hundred square miles required several million rupees. But the task seemed less formidable as each year a portion was completed efficiently by village project committees without engaging profit-seeking contractors. By a lucky chance, at this time our government had PL480 counterpart funds, some of which, under the terms of the grant, were earmarked for non-urban use. Therefore a rural works project could be launched. Otherwise, it would have been surely trampled down in the resource scramble. The urban crowd resented funding of dirt roads and drains. They said that good money was going down the drain. They thought it

would have been more useful to build hospitals and factories.

Objectives of the Works Programs

The works program built the essential infrastructure. It laid the foundation for rural progress. By fulfilling popular expectations and by promoting popular participation it gave an unprecedented vitality to the self-government bodies. And it brought gainful employment to large numbers of landless labourers during the dry winter months—the slack farming season. It resolved the tragic paradox of thousands of sturdy men sitting idle while essential work remained undone. There was, on the one hand, in our over-crowded villages, an army of the unemployed and, on the other hand, a crying need for earthwork. Here was a program to put them together as a key is put in a lock. It grappled simultaneously with two great problems. But it was by no means a panacea for the misery of the landless. Nor was it, as I have recently heard, an attempt at redistribution of incomes. As far as the earth diggers were concerned it was indeed a palliative because it created, in a depressed wage market, a sizeable demand for labour. It saved many of them from the dry season semi-starvation or enabled them to bargain with the landowners for slightly higher wages. But it could neither furnish full employment nor lessen the disparity between owners of land and hired hands. In fact, better drainage, link roads and irrigation substantially enhanced the value of land and its rent. The unearned increment of the landowners was a hundred times more than the wages earned by the labourers. Even an elementary student of economics should know that would be so as long as ownership is not transformed. I did not tout the works program as quick socialism.

The Irrigation Works Program

Emboldened by insights gained in constructing roads and drains, the Academy evolved an irrigation works program. It was an elaborate affair. Its several components

(formation of groups, operation of lift pumps and tube wells, field channels and distribution of water, maintenance of machines, training of drivers and managers) required prolonged testing. But when, after several years, it began to function in Comilla thana, its rapid duplication in other thanas, like the duplication of the previous program, became practicable. Its objective was to mobilize village groups to find and use surface or ground water wherever it was available. Again, the government engineers had not cared to do that. Like their flood and road brothers, the irrigation engineers had confined themselves to big projects and ignored the vast potential of small and scattered ones. Decentralized planning and action become possible when a mechanical workshop (for pumps and wells) was added to the Thana Centre and irrigation staff was posted to train and assist village groups. Within a comparatively short time, with few costly constructions, and with low capital expenditures, several hundred thousand acres were irrigated. The acreage could be doubled or trebled if more groups could be mobilized to dig more channels, sink more wells, and reconstruct the monsoon drainage network in such a way that it could store and distribute water in the winter. Irrigation perceptibly increased both production and farm employment. This was the most hopeful program we could devise for the landless labourers as it was by far the most profitable for the landowners. Like the roads and drainage program, the irrigation program aroused popular enthusiasm. Even the supercilious urbanites were pleased if they saw the new crops and gave us a pat on the back.

The Cooperative Project

The Academy's most ambitious action research was the Cooperative Project. This was an attempt to organize the peasant proprietors for production as well as for protection. We had found that the peasants formed a 70% majority. They also owned 70% of the land and leased a good portion of the remaining 30% from the large proprietors. The peasant producers, therefore, were the real agriculturalists.

Mainly from them came the marketable surplus. The large proprietors found money lending and trading more lucrative than farming. One day, after the advent of good drainage, irrigation, high yielding varieties, market roads, tractors, etc., they will dismiss their lessees and themselves farm commercially. In 1959 that metamorphosis had not yet taken place. In order to accomplish our assignment to raise rice yields, we concentrated on the primary agriculturalists, the peasant cultivators. For many reasons we chose cooperative grouping as the instrument for teaching them modern practices and management. In our opinion the cooperative was the best vehicle for extension as well as for supplies and services. At the same time we thought, rather behind the back of our government, that these cooperatives should also protect the peasant members from the prevailing system of money lending and trading. It did not seem feasible to do anything, at this stage, about lease rates or other tenure matters.

Peasant Producers Unions

In my opinion the protective aspect of the Comilla cooperatives was most significant. The peasant producers were distressfully short of capital. Outbidding each other they bought credit at exorbitant rates. Thus the creditors preempted a good part of the peasants' income. Then as traders they again fleeced the peasants. Our cattle had little flesh on their bones because their intestines were full of worms. Our peasants were emaciated for similar reasons. A cooperative could organise them for self-protection. It could give them solidarity. United as a group they need no longer remain helpless individuals overawed by powerful bullies. The Cooperative could teach how to acquire capital. We laid great emphasis on thrift and savings. We kept on repeating like a litany, "You are being crushed by the power of capital. The same power will redeem you if you learn to possess and control it. Therefore, every week, everyone of you must make a small deposit, however small. Gradually your cooperative will accumulate a substantial amount. It will also get cheap loans for you. Ultimate-

ly, through your cooperative, you will become your own financier." Evidently we were teaching them the principles of capitalism—thrift, saving and investment. We were not surprised when our penny capitalists responded to the call of cooperative capitalism. They understood the fundamentals. Neither were we surprised when the bigger capitalists—the large proprietors, money lenders and traders tried to capture this potentially dangerous movement. Initially we worked quietly around them, suggesting *not* that they should be excluded from the new cooperatives, but that they should not be allowed to dominate, as they had dominated the old cooperatives. It was no easy job. We saw that the struggle would be long and bitter. The rural elite, hand in glove with the urban elite, wielded great economic and political power. It was going to use that power to defend its privileged position. The ordeal of the Comilla Cooperatives had scarcely begun.

Cooperative Management

The productive capacity of the peasants could be quickly increased by cooperation, and their farming methods modernised. Irrigation, for instance, was almost impossible without much collective action. A two-cusec lift pump or tube well served one hundred acres cultivated by fifty or more owners. The installation of the machine, the construction of field channels, the distribution of water, the collection of costs, all depended on consensus. Individually a two-acre farmer could neither buy nor operate a pump or a tractor. The cooperative could introduce joint management. There was no intention of putting an end to private possession. On the other hand we cherished the qualities of family farming. We admired the Japanese family farmers more than the dispossessed commune workers. We hoped that our peasants retaining their little plots, would secure better services and inputs as members of a cooperative. To that end each group appointed a manager and held weekly meetings to arrange common affairs. The village cooperatives were supported by a

Thana Association located at the Training and Development Centre. It supplied credit, machines and other services to member societies. It operated on a fairly large scale. Above all it was a forum and a school. Every week the village managers assembled here to learn from experts, to compare notes, to make deposits, or borrow loans or hire machines, or purchase fertilizer and seeds. The managers themselves were peasants. We expected that they would be the cadres who would organize their compatriots. The Thana Council and the Thana Cooperative Association, working side by side, grew into vigorous institutions. Through their combined efforts a mass mobilization began to take place. The works program developed the land while the cooperatives developed the agriculturists and agriculture.

Agricultural Extension

With the establishment of the Thana Training Centre and the formation of village cooperatives, the Academy evolved a new pattern of extension education. Each cooperative selected from among its members a "model" farmer. These model farmers came for a whole day every week to study the Centre's demonstration farm, to be coached by the Centre's experts, and receive oral and written instructions about current operations. What they learnt the model farmers practised in their plots and taught to the other members, to whom they reported regularly in weekly meetings. Thus every cooperative village got a trustworthy extension agent whose already considerable skill was constantly upgraded by the thana experts. Through this continuing teacher-student relationship a handful of experts were able to extend their knowledge to two hundred and fifty villages, without asking for a regiment of half-baked, half-hearted, low level government workers. The same technique of running a continuous weekly or fortnightly or monthly training conference was employed for managers, accountants, union councillors, teachers, youth leaders, women organizers, or midwives. In a densely populated area, with short physical distances, it

was not an inconvenient arrangement. The participants were stimulated by their weekly visit which brought them in contact with experts and colleagues. It was an antidote to the creeping lassitude and boredom of village homes. It was also a preventive against bureaucratic withdrawal and nonchalance. Our extension technique was the result of a thorough study of the diffusion process. In the light of our research we discarded the orthodox notions of an outsider, a missionary, or a guide-philosopher-friend, or a multi-purpose worker, or an agricultural assistant, coming to convert or rescue or reclaim the village. Instead we found that it was more fruitful to rotate village representatives between the nascent urban Centre and their rural habitations. For the mental improvement of our villagers we imitated the early Danish Folk Schools, as we imitated the early German credit union for the economic improvement of our peasants. We were fond of stealing antique ideas.

Other Projects

Besides the major models described above the Academy had many other research projects. We tried to introduce an agricultural bias in rural schools through 4H type youth clubs. To prevent and reduce illiteracy we trained the village Imams (Moslem religious scholars) to run pre-primary schools in the morning and adult schools at night. We imparted rudimentary training of their art to the unlettered, despised and destitute old women who were performing, often fatally, the functions of midwives. Because they had easy access to the otherwise segregated Moslem women, these so-called midwives proved to be excellent family planning agents. We started a women's program aimed at raising their status from well-guarded subordinates to well-informed participants in economic and health activities. We searched diligently for ways of popularising birth control among our conservative rural clientele. We organised non-farm groups—artisans, rickshaw pullers, butchers, bus conductors, etc., on cooperative lines. By 1970 our cooperative federations were endeavouring to combine credit with marketing, and setting up modern

plants for cold storage, milk processing, rice milling, poultry raising, etc. Of course much remained to be learnt, but much had been lernt. Cooperative action and continuous training was the hub of our programs. We saw in such cooperation and such education the vision of a future society in which the small folks would be a little less helpless, a little less ignorant, a little more self-reliant, a little more secure. I can only hope that this vision may survive till it is replaced by better prospects.

Wider Application

I was often asked whether what had been learnt in Comilla could be practiced elsewhere. As far as East Bengal (now Bangladesh) was concerned our answer was generally yes, except that we disliked haste and hurry. For other countries our only recommendation was that it would be worthwhile to establish a research institution and let it get involved, like the Academy, in an administrative unit around it. Let it observe and survey, and working patiently with the people and the government officers, build improved models on the real ground. In course of time, these models, if viable, may be replicated widely. That seemed to us an approach capable of wider application. We can, and of course we should, study what has proved successful in other countries. But we cannot just copy neatly. We must do our own searching and testing in our own country.

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