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The reader is led through the process of reviewing nutrition planning: The report deals with general planning literature -- its definitions, classifications, and lessons -- and looks at national nutrition planning efforts in seven case studies. Specific nutrition interventions such as the applied nutrition program and the nutrition rehabilitation center are described, revealing a focus more on community than national interventions; other forms of nutrition programs are included. The conclusion of this study is that nutrition planning will be more successful if it is explicitly designed to be a "learning process" in which each planning activity is seen as a step in a learning sequence.

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**A CRITICAL REVIEW OF NUTRITION PLANNING MODELS AND EXPERIENCE**

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**December, 1974**

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"Extension of Methods for Incorporating Nutrition into Planning".**



## FOREWORD AND ACKNOWLEDGEMENTS

This report has been written in the first person, as a personal preference, but also to indicate when the views are my own. A considerable amount of literature is reviewed and quoted, and confusions are easy to make. There is, however, one major exception -- Chapter 4 on Specific Nutrition Interventions: Unplanned and Evaluated. That chapter was largely researched and authored by Joel Elias, who brought great energy and wit to this massive undertaking.

There are a great many individuals who made significant contributions to the study. Harold L. Rice of U.S.A.I.D. was responsible for many fruitful discussions and contacts, and indeed, was my primary intellectual mentor for much of the study. Bill Drake, Jim Pines, Donald Schon, and Dean Wilson all made forceful impressions on my thinking during the course of the study. In addition, I received valuable input from many of the authors mentioned in the references.

During the course of the study I was involved in a number of other activities which influenced my thinking. My experiences with the Papago Indians of Arizona in 1972 and 1973 provided considerable insight into community level planning. A consultancy in Thailand during the summer of 1974 provided numerous insights into national planning. The preparation, presentation and defense of material for the teaching of courses in World Food Systems; Nutrition Planning; Indirect Effects of Social Intervention; and Analytic Techniques served to sharpen and order my thinking.

In addition to Joel Elias, there were a number of individuals who, in a staff capacity, provided direct assistance on the project in many helpful ways. They include: Robin Crickman, Kip Eckroad, Veronica Elliott, Kathy Jones, Suzanne Kaplan, and June Thomas.

Barton R. Burkhalter  
Ann Arbor, Michigan  
December, 1974



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## CHAPTER 1

### INTRODUCTION AND CONCLUSION

#### A. A CHALLENGE

A friend who is both poet and committed antagonist to "planning" was appalled to discover that I was investigating the application of planning to the malnourished. "Not on such an important problem," he urged. He had a point. In fact, two issues emerged in our discussion which serve to define the direction of this investigation.

1. This investigation aims to be useful to persons who are in positions to do something about malnutrition. Results reported here may influence actions taken in behalf of or perpetrated upon the malnourished. Therefore, there is a responsibility to be explicit and to avoid conclusions which ultimately lead into deeper problems.

2. Does planning work? Is there evidence that planning, as it has been practiced, achieves its stated goals? This is a legitimate question, one that can be put to the empirical test. But its answer will not quiet my friend, for he questions whether the practice of planning increases the general well-being. He fears there is a negative correlation between the practice of planning and well-being, just as there probably existed a negative correlation between health care and health before the turn of the century.

(Permit a digression. Consider Asok Mitra's now famous comparison of the planning process to elephant love-making, in light of the issue just raised. The year to "learn the way about it", the pain and hazard at the moment of love-making, and the eighteen month wait for the result all seem a small price upon the arrival of the baby elephant. But if there is no result, or an unexpected disaster,



the comparison is less delightful. If planning is sterile or contains deformed genes, then the analogy invites very uncomfortable comparisons.)

## B. HISTORY OF THE PROJECT

The original discussions leading to this study were held between Dr. Harold Rice, of the Office of Nutrition, U.S.A.I.D., and myself in the early winter of 1972-73. U.S.A.I.D. had embarked upon a program of fostering nutrition planning efforts in developing countries, and a number of nutrition and agricultural planning studies were underway. These studies used different methodologies, particularly in their approach to modeling the complex of relationships governing food production and nutrition. At the time we discussed issues such as: How much data to collect? What kind of mathematical modeling techniques were most appropriate? How important was a computer? What was the relationship between the model results and policy recommendations? How costly were the various approaches?

These discussions led to a proposal from Community Systems Foundation in February, 1973, which was subsequently approved in modified form in late June, 1973 by U.S.A.I.D. The original scope of the work called for: (1) the identification of modeling techniques used in nutrition planning; (2) the development of a classification for these modeling techniques; (3) an evaluation of the different classes of techniques based on costs, purported benefits, and constraints. The original scope of work recognized that it would be difficult to evaluate the techniques in terms of actual benefits, because the applications were very recent.

The study was to be undertaken primarily by myself on a one-third time basis over a one-year duration. The final report was to be disseminated to key persons involved in nutrition planning, particularly those involved with the development and use of modeling techniques in nutrition planning. However, after the final report had been submitted to U.S.A.I.D. but prior to that dissemination, it was



to be reviewed by several key persons in the field, possibly in a workshop format, and the results of that review would be incorporated in a revised report.

### IDENTIFYING THE LITERATURE

Work began in late July, with an extensive literature search. Libraries and bibliographies were reviewed, and during the first few months, personal and telephone interviews were held with over fifty knowledgeable persons in order to identify relevant documents. Since much of the best work proved to be recent and therefore not yet in published form, the interviews proved to be the most fruitful method. Meanwhile, I undertook the laborious first reading of the documents obtained. Much of it, of course, proved interesting but not directly relevant to the study.

Several conclusions were drawn during this period. First it was clear that the literature was very fugitive indeed -- numerous memos, working documents, and unpublished papers, located in different places, were often necessary to describe a single project. The standard published sources did not contain much. Second, the original assumption was supported that little had been done yet in the way of actual implementation and evaluation. Third, it became clear that the models were of two fundamental types: (1) models of the causal relationships relating to food and nutrition; and (2) models of the process of planning, which generally was in the form of a sequence of steps, one of which was modeling of the first type.

During this period we also began a review of the general planning literature in order to place nutrition planning models in a broader framework. We looked over a broad sweep of work, including national development planning, urban planning, social welfare and health planning, organizational development work, as well as the various approaches from the systems sciences such as simulation, operations research, and cost-benefit analysis. An article by Friedmann and



Hudson, which was published during this effort (see References for Chapter 2), provided considerable guidance to us in structuring this literature according to the major traditions of planning.

Our review of the general planning literature made it very clear that the most important issues confronting the planning field had to do with process models. Techniques for modeling causal relationships in the environment were clearly of secondary importance. In view of the fact that there was very little evidence available on the success or failure of the various nutrition planning efforts, we concluded that our focus should shift more to the process models being used in the nutrition planning efforts.

It also became clear that the classifications developed in the general planning literature could be adapted to the nutrition planning work.

Finally, we undertook systematic searches of various collections and journals in search of specific nutrition intervention efforts which would contribute to our understanding of planning. A systematic search of the 1200 diffusion studies used by Rogers and Shoemaker (1971 - see References for Chapter 2) produced almost nothing. A systematic search of certain journals and other special collections was more fruitful and is reported in Chapter 4.

#### MAJOR STUDIES REVIEWED

During the winter of 1973-74, meetings were held with persons involved in most of the major studies. Considerable information was gained on the details of the projects: methodological issues, problems of implementation, actual involvement of local decision-makers and staff, and costs. One of the major conclusions of those interviews was the extreme difficulty of estimating the real costs of those efforts with any clarity beyond the crude estimates already well-known and obvious. In his recent and



ground-breaking work on gaming simulation as a method of communicating complex phenomena, Duke (Duke, R.D., Gaming: The Future's Language, Sage Publications, John Wiley and Sons, New York, 1974) tells the reasons why estimating real costs is so elusive:

"the definition of what constitutes cost must be carefully considered. For example, in the construction of METRO-APEX the funds available were \$170,000 from HUD. It was, however, agreed that the project would 'piggyback' on top of a large 701 study being conducted simultaneously in the Tri-County Regional Planning Commission of Lansing, Michigan for which funds in excess of a million dollars were being spent....Furthermore, simulation models were borrowed (with permission) from other communities. Attempts to unravel the true cost...must also include student efforts which are often heroic and unpaid.... It is often to the advantage of the commentator to over or underinflate the cost in order to prove some point about the utility of games" (p. 48).

These interviews also reinforced the earlier conclusion that the issues around the process models were of more fundamental importance than the other issues.

During most of the summer of 1974, May to September, I was in Thailand working on the initial phases of a program based on the U.S.A.I.D. nutrition planning strategy (see Chapter 3). Meanwhile, others were continuing to seek and summarize the literature on specific nutrition interventions. The study was also extended until December.

Upon my return, the work was pulled together, summarized and organized into the final report. Numerous lessons had emerged from our work, some of which caused the final report to take a very different shape from what was originally conceived. We abandoned our preconceived notions and followed the data to its logical conclusions. The many failures of planning, and the recent focus on the planning process, caused us to shift attention more seriously to those fundamental issues and away from the cost-effectiveness of specific modeling



techniques. The availability of experiential data in other areas of planning and the urgency of its message coupled with the lack of results in nutrition planning led us much more deeply into the general planning literature than we had originally intended. But the result, I believe, is of fundamental importance to the field of nutrition planning, one which serves as both a direction and a warning.

### GUIDE FOR THE READER

The format for the remainder of the report is very simple. The remainder of this chapter presents the major conclusion of the study. Chapter 2 deals with the general planning literature, Chapter 3 with National Nutrition Planning efforts, and Chapter 4 with specific Nutrition Interventions. The general planning literature is extensive, so we have attempted to review only the major works which are based on actual experience. Chapter 3 provides a description of seven case studies of national nutrition planning, and in addition, a brief review of some of the other relevant literature. We attempted to be reasonably comprehensive in identifying this literature, but we have continued to identify additional published documents up to the day of this writing. We are convinced, for example, that there are other good efforts at national nutrition planning which are not included here. Some we know of but for which documentation is lacking. Nevertheless, we think the collection here represents a good beginning for assembling this literature. Chapter 4 on specific interventions was problematic: the literature is large and widespread. We chose to focus more on community interventions than on national interventions, particularly those which were evaluated and could teach us something about planning. Our goal here was to draw conclusions on planning and evaluation from a representative state-of-the-art report on community level nutrition interventions. It was not always clear whether a report should be included here or in Chapter 3. For example, the ANP project in Lesotho and the community nutrition project in Dona



Elena, Puerto Rico were both national efforts. However, we have somewhat arbitrarily included them in Chapter 4.

### C. CONCLUSIONS: PLANNING AS A LEARNING PROCESS

Great debates rage over relatively minor matters. Among planners, one of the great issues of the informal early morning debates is "to list or not to list priorities, and if listed, to what length". Some believe in long lists of recommendations, with the most important at the top. They argue that long lists are impressive; that if the conclusions can be drawn they should be because of their interconnectedness and because it simply throws away information otherwise. Others argue vehemently against the lists. Generally they are the pragmaticists who don't like to read lists in the first place. They argue for the creation of a logical context in which one or two central points emerge, possibly accompanied by a helpful hint or two. They cannot imagine who would ever use a lengthy list.

#### MAJOR CONCLUSION - A LEARNING PROCESS

The same issue and arguments apply here, of course. What are the lessons about nutrition planning which emerge from this review of general planning, national nutrition planning, and evaluated nutrition interventions? Should all of the lessons which we have seen be listed along with some indication of their reliability, or should the conclusions be more focused? In the face of assorted opposition from colleagues, I have decided to take the radical action of drawing only one major conclusion from the study, namely:

Nutrition planning will be more successful if it is explicitly designed to be a learning process, in which each activity is perceived as a discrete step in a learning sequence. As such, each activity should grow out of past theory, and in turn contribute factual data which can modify the theory and future actions.



Many of the lessons which emerged from our review support and illuminate this conclusion. The experience in the literature makes clear, for example, that it is preferable to achieve a small success right away than a bigger one later. Further, the point is made that a planner always enters into the midst of an on-going system, which has agencies in motion and projects underway, and the planning process must start not at some theoretical beginning point but with the on-going projects and agencies.

A major lesson of the general planning literature is that planning is a process which involves people and organizations, and that planning which expressly recognizes this does better. The literature clearly indicates that the implementors of programs should help to plan them. Individuals and organizations must learn in order for the process to improve.

The general planning literature frequently points to planning that is frustrated by lack of data, ignorance of local complexities, the inability to anticipate side-effects of interventions, and increasing uncertainty about the future brought on by the loss of the stable state. Decentralization is called for. Adaptive capability is called for.

A major author laments the divergence of theory and action: a condition which he believes is responsible for our ineffective social planning in the Western world. Confusion and controversy exist on the proper role and nature of models in planning. In governments, the budget fixes decisions, and in its incrementation provides a cumulative record, a kind of model of government activities which guides from year to year -- it is thought by many to be the key point of intervention for planners. But in village studies, no cumulative record appears to exist outside the minds of the implementors, and action proceeds with little theory or evaluation. Modelers of the planning process invariably



call for some kind of feedback, some kind of evaluation -- sometimes just an arrow on a flow diagram, drawn in as if an afterthought, but rarely explored and elaborated in the same depth as the survey to define the problem or the technique to analyze the data. All of these conclusions point to a learning process which integrates theory and action, in which models become the cumulative record, and in which feedback from the last experience generates "feed forth" to the next action.

### THREE EXAMPLES OF NUTRITION PLANNING

One of the major case studies of this paper, the Bihar Famine, suggests that crisis experience can be an important aspect of a learning process. As commitment grew, quick action was possible, mistakes were tolerated, many people learned, organizations altered, and new communication links established, success was achieved. In the aftermath, people continued their commitment, new theories were developed -- both within India and in the international community, and India had a cadre of knowledgeable professionals for dispersion throughout the country. In the face of increasingly scarce resources per capita, it appears that crises will occur more frequently in the future and should be both planned for and learned from.

Other nutrition planning approaches from our case studies also demonstrate characteristics of a learning process. The U.S.A.I.D. Nutrition Planning Strategy is probably the best example. It undertakes research to improve its understanding of the causes of malnutrition and the processes of planning which can improve the situation, it disseminates this knowledge in various ways, it moves into numerous countries under various conditions with a planning methodology that aims at fast results, and it reviews its experiences via workshops, publications, etc., with a wide band of individuals. Most of the elements of a learning process are there, although not always at the individual country level. The case study on the Agricultural Sector Simulation in Nigeria, Venezuela, and Korea



also demonstrates some elements of a learning process. Although the initial entry was slow and costly, things picked up considerably when the system was applied to Korea. Time and costs lowered, more local staff were involved in quick studies, frequent discussions were held with decision-makers.

### THE DEVELOPMENT OF NUTRITION PLANNING

Let us step back to review briefly the current state of nutrition planning. By doing so, it will be clear that the development of nutrition planning, and the lessons that come from it, follow the patterns found elsewhere in planning. Therefore, the most recent lessons from the general planning literature, such as the move towards planning as a learning process, apply also to nutrition planning.

Consider the present context. Nutrition planning is still in its infancy: there are some efforts at national nutrition planning, but as yet few projects have been implemented as a result and there has been almost no evaluation of its success in meeting nutrition goals. Specific nutrition interventions, although widespread, have rarely been planned or evaluated in a careful way. Thus, little learning has occurred. The most successful interventions, on the other hand, have demonstrated a capacity to improve.

The most recent efforts at national nutrition planning have espoused the principles of the rationalist planning school for their guidelines: e.g., quantification, predictive models, decision-making, rational human behavior. The nutrition area has proven to be both challenging and frustrating to the systems planner of the rationalist tradition: challenging because performance can be quantified and the causal network is highly interrelated, but frustrating because of the complexity of that causal network which goes deep into the local customs and byways of each culture.



But the practice of nutrition planning has differed from the theory; the practice resembles more closely that of the development planners of the empiricist tradition of planning. In fact, the concluding remarks in most of the reports of the major national nutrition planning efforts espouse lessons that concur with the lessons espoused by the development planners. They have found that the practice of planning means focusing on the motivation and training of local staff, implementation issues, the role and context of the planner himself, and the passage of relentless time without action. Moreover, they realize that major historical events (e.g., wars, famine) may occur which invalidate predictive models and disrupt the planning process. In short, they discover that the practice of planning differs significantly from the espoused theory. We have noted many of the same lessons emerging from the literature on specific nutrition interventions, and have hypothesized the problem there lies with the gap between theory and action.

Sometimes, in his frustration, the initial response of the nutrition systems planner has been to collect more data, develop larger models, and apply more sophisticated techniques, in hopes that this will allow him to cut through the maze and deal in an orderly way with the national interconnections and the local variations. However, the best nutrition planning efforts have recognized that such models, be they simple or complex, are part of a larger context, in fact are themselves a sub-process within the larger planning process, and as such, must fulfill a variety of functions: they socialize, they communicate, they train, they intimidate, and they predict. (The ability to predict is ultimately crucial, but must be evaluated within the larger issue of whether the prediction leads to a better world.)

Thus, national nutritional planning is still struggling to create a practice and a theory which are mutually supportive. By contrast, most of the reported specific nutrition interventions seem to be an



uncomfortable admixture of "espoused" theory and a gut intuition which often seems to replace the theory altogether. In the literature concerning specific nutrition interventions there are almost no references made to plans or the planning process, and there are equally few reports which even attempt evaluation of the interventions made. With few exceptions, the literature conveys a sense of overwhelming failure. While there are many specific lessons yet to be learned, at present it would seem that they are most likely to come from the national nutrition planning tradition.

#### RELATIONSHIP TO OTHER PLANNING EXPERIENCE

The above developments are not unique to the field of nutrition planning; they have been experienced generally in the field of planning: the dominance of the espoused theory of the rationalist tradition, which has often proved unsuccessful and led to a gulf between the practice and the theory of planning. In addition, of course, there has been an increasing emphasis on planning as a process, and on planning as an intervention in itself.

Recent work is suggesting that planning is best viewed as a learning process. People and organizations learn, and do it best by doing things and carefully noting the results. Theories and models also play an important role in this view, for they are the cumulative record. The current predictive ability is less important than the rate of improvement. Small projects should lead to larger efforts, and better theories.

The conclusion here is that nutrition planning should follow this lead.



## CHAPTER 2

### WHAT IS PLANNING: DEFINITIONS, CLASSIFICATIONS AND LESSONS

#### A. DEFINITIONS OF PLANNING

Strip the idea of planning to its bare bones, and I think one finds a skeleton characterized by the exhortation: "Look before you leap!"

It implies:

- . a future action (the leap),
- . a conceptualization about that action and its consequences (the looking),
- . a time order which places the conceptualization before the action, and
- . a purpose (to reach the other side in safety).

Let that be our beginning definition of planning. Our subsequent exploration of other definitions, of classifications schemes, of the ways planning has been practiced and their success, can serve to bring our skeleton definition to life.

Numerous authors, of course, have taken their turn at a definition of planning. Hall (1962), in his work on systems engineering, says "by definition, a plan is a projected course of action; thus planning means determining what shall be done".

Friedmann (1973) takes quite an opposite view: "Planning refers to the application of a scientific and technical intelligence to organized actions". He focuses on the "linkages between thought and action" and would fuse "action and planning into a single operation". "An action will include deliberation and choice as pervasive, on-going activities, but these are not to be identified as distinctive phases prior to action: they are inseparably a part of it." Thus, whereas for Hall planning is purely a conception about an action, for Friedmann conception and action are fused; a specific time order is not required as in our "Look before you leap!" definition.

Michael (1973) defines long-range-social planning by its requirements, that is, the steps which must be accomplished in order to have done it.



1. Conjecture about future settings for which the working out of the plan over time is relevant and desirable.
2. Analysis leading to goal setting.
3. Evaluation of the costs and benefits of alternative plans for goal seeking.
4. Tracing out of the consequences for the chosen plan of pertinent circumstances outside the plan's direct operating environment.
5. Laying out and carrying out sequential chains of actions that define the plan.
6. Evaluation of how the plan is working out on the basis of environmental feedback that permits recycling of the above steps.

Michael says "Carrying out bits and pieces of the list is not of itself long-range social planning". Implicit in Michael's definition is not only doing long-range social planning, but doing it well. In addition, Michael's definition begins to lay out the structure of the planning process as he sees it; it moves towards an explicit definition that classifies by style and tradition.

#### **PLANNING THEORY: ON ITS APPLICATION TO NUTRITION**

Make two distinctions. First distinguish theories of the process of planning from models of the phenomena which the planning process is attempting to influence. Hightower (1969) distinguished: "between theories of the planning process - procedural theories - and theories concerning phenomena with which planning is concerned". Thus, in nutrition planning we may develop models of the food production distribution system which are something quite different from the conceptual-action processes of our planning.

Second, distinguish theories of the planning process from theories used in planning. Bolan (1974) reports that Faludi (1973) makes the distinction between "theory of planning" and "theory in planning". For example, in nutrition planning we may use theory on matrix manipulation in an input-output analysis which helps us gain greater insight into a model of a food production-distribution system, but this is not a theory of the planning process itself.



The distinctions are important, because we are moving towards a general theory of the planning process. The classifications of planning which follow certainly do not constitute such a general theory, but they begin to stake out the major contours of such a theory. At issue is the generalization of our knowledge about the planning process, and its applicability to specific contexts. I contend that although a general theory does not yet exist, some lessons have emerged from the reported experience with planning that are generalizable. In other words, these are lessons which apply to nutrition planning even though they have not yet been learned in the context of planning for improved nutrition. In view of the paucity of successful or even evaluated efforts at nutrition planning, this transfer of knowledge from other planning contexts is vital.

## B. TOWARDS A TYPOLOGY OF PLANNING

I have always found it exceedingly boring to read classification schemes. The literature seems to abound with them. At the most readable end of the readability spectrum are the one-bit classification schemes; for example a classification of planning approaches into "good" and "bad". At the other end are the great heirarchical systems which order the world's knowledge. I am most interested in the schemes which, like the one-bit system above, are normative; which provide information about which kind of planning works best in which situation.

Although boring, classification schemes can be very valuable: they help to order our experience, point out gaps in our knowledge, and finally lay the theory for action.

Several schemes which classify approaches to planning are presented here. They tend to be of two types: traditions of planning or descriptions of the structure of the planning process. I have attempted to put them in a rough order with the tradition schemes first and the structure-oriented schemes later. Some are widely regarded and major efforts, such as Bolan (1974), Friedmann(1973), and Friedmann and Hudson (1974). while others are included because of an interesting and



unusual aspect, such as Mills and Kelly's (undated) recognition of development strategies involving several generations. Each of the authors comes from some particular corner of the field and thus tend to have biases in favor of that corner, but their favorite corners are usually obvious. For example, Hall's (1962) book is entitled A Methodology for Systems Engineering, Friedmann (1974) identifies his prior work (1973) as part of the New Humanist school of Philosophical Synthesis, and the linguistic cues of Chin and Benne (1969) place them in the organizational development tradition.

Most useful, I think, is the grouping of planning traditions by Friedmann and Hudson (1974). They bring some order to the major contributors to planning theory. Their classification and terminology provide the baseline for this paper.

**FRIEDMANN AND HUDSON - MAJOR TRADITIONS**

In a recent and brilliant article, Friedmann and Hudson (1974) summarize the major traditions of planning theory. However, they focus on "planning theory as presently taught in American universities", and therefore tend to exclude "traditions of planning that have worked under other ideologies", such as socialism, Shaker and Owenite communities and black separatism. It is interesting to note that the choice of categories and assignment of major authors to those categories was not done according to some theoretical criteria, but "was largely dictated by patterns of cross-referencing within each field".

MAJOR TRADITIONS OF PLANNING THEORY Friedmann and Hudson (1974)
<ol style="list-style-type: none"> <li>1. Philosophical Synthesis</li> <li>2. Rationalism - Systems Theory</li> <li>3. Organization Development</li> <li>4. Empiricism           <ol style="list-style-type: none"> <li>a. Studies of National Planning</li> <li>b. Studies of Urban Planning</li> </ol> </li> </ol>

COMMUNITY SYSTEMS FOUNDATION



Table 1, "A Synoptic Guide to Major Traditions in Planning Theory", is taken directly from the Friedmann-Hudson article. As they state "the essential information we intend to convey is summarized in Table 1 and the bibliography".

The Philosophical Synthesis Tradition is distinguished by two features: "first its concern with the larger historical context", and second, "its tendency to assume explicit value positions". The major authors take an interdisciplinary approach, "reaching into whatever areas of knowledge seem to be necessary for achieving an integrated view of planning as a social process". "The metaphor which seemed most felicitous to them was that of society as a self-organizing or learning system."

The Rational Tradition focuses on rational decision-making, and has dominated the field of planning to the point where, until recently, "planning came to be identified almost exclusively with decision-making". "One of the basic assumptions of the rationalist school is that decisions precede an action." Man is viewed as a utility maximizer who relates to other men in purely instrumental terms. As the early applications of pure rationalism and their ambitious systems models failed, the tradition began to adapt. March and Simon (1959) advocated searching for a satisfactory rather than optimal solution, Lindblom advocated incremental decision-making, and work on policy-analysis superceded decision-making.

The Organization Development Tradition "burst upon the scene in the mid-fifties" in direct contradiction to the working hypotheses of the rationalist school. Its proponents saw it as "primarily a method for inducing organizational change" rather than "an intellectual process of efficiently adapting means to given ends". Its focus on implementation leads to a view of the planner as "change agent". "The emphasis in planned organizational change implies a central preoccupation with innovation, the role of 'change-agents', and the web of interpersonal relationships of which organizations are constructed." This tradition is congruent with the confessions of some foreign development planners



"in rare moments of candor", is an anathema to rationalists who abhor such a "'messy' mixture of scientific ethos and normative enthusiasm", and is supported by the New Humanists of the Philosophical Synthesis Tradition.

The Tradition of Empiricism focuses on the "functioning of large-scale political and economic systems". "Far less normative than the other tradition, its emphasis has been on the measurement of system behavior as it actually exists." Friedmann and Hudson point to the surprising "paucity of carefully constructed empirical studies of planning" to be found in the two mainstreams of the empirical tradition: national development planning and studies of U.S. urban politics. (I would add social welfare and health planning as a third mainstream to the empirical tradition.)

Friedmann and Hudson conclude by noting that although there is considerable coherence within the several traditions, there is very little cross-fertilization among the traditions which might lead to a unified planning theory. They suggest that the generation and practicing of such a unified theory is most likely to occur in societies facing major social crises and upheaval -- thus it appears to have occurred in China but is unlikely to occur in contemporary America.

**T A B L E 1**

A Synoptic Guide to Major Traditions in Planning Theory  
 copied from: Friedmann and Hudson, AIP Journal, Jan. 1974

	Philosophical Synthesis	Rationalism Systems Theory	Organization Development	Empiricism	
				Studies of National Planning	Studies of Urban Planning
1935	Karl Mannheim (planning as social reconstruction)  The Great Debate F. v. Hayek and Barbara Wootton Karl Popper		Chester Barnard		
1945			Hawthorne Studies		
		Decision Making Herbert Simon	Kurt Lewin	Oliver Franks Bela Gold Philip Selznik	
1950	Robert Dahl and Charles Lindblom (economizing and control as social processes)	Kenneth Arrow Jan Tinbergen		Ely Devons Herman Somers	
1955		James March and Herbert Simon	Ronald Lippitt Jeanne Watson, and Bruce Westley		Martin Meyerson and Edward Banfield
1960		George Miller, Eugene Galanter, and Karl Pribram  Jan Tinbergen	W. Bennis, K. Benne, and R. Chin (eds)  Chris Argyris	P. J. D. Wiles Everett Hagen Albert Hirschman Aaron W. Hasckv	Edward Banfield W. H. Brown and C. E. Gilbert
1965	Amitai Etzioni (planning as societal guidance)	Charles Lindblom Policy Science	Chris Argyris	Bertram Gross John Friedmann Albert Waterston B. Akzin and Y. Dror	Alan Altshuler
		Olaf Helmer R. Bauer (ed) David Novick (ed) R. Bauer and K. Gergen (eds) C. W. Churchman Erich Jantsch (ed)	Warren Bennis Paul Lawrence and Jay Lorsch  Rensis Likert Garth Jones Edgar Schein	Bertram Gross Albert Hirschman Stephen Cohen	James Wilson Francine Rabinovitz Stephan Thernstrom
1970	The New Humanism Charles Hampden-Turner (psycho-social development) Edgar Dunn (experimental evolution) Donald Schon (learning systems) John Friedmann (transactive planning)	Harold D. Lasswell Yehezkel Dror C. W. Churchman		Guy Benevise  Mike Faber and Dudley Seers (eds)	Robert Fried



### KAHN - DOMAINS OF SOCIAL PLANNING

Kahn (1969) has written a searching examination of the theoretical underpinnings of social planning and then bolstered it with a companion volume of case studies (Kahn, 1969). It focuses on problems of social welfare and for that reason I believe it could fit as a third stream to the Empiricist Tradition as discussed by Friedmann and Hudson (1974). Kahn discusses social planning in terms of the context or "domain" in which it occurs. The classification given here is as summarized by Michael (1973).

DOMAINS OF SOCIAL PLANNING Kahn (1969)	
1.	Agency
2.	Multi-Agency
3.	Community
4.	National and Regional
	a. Intervention Systems
	b. Social-Trend Planning
	c. Monetary and other "Non-Social" Policy

At the level of the agency, or organization, administrative planning is performed. At the next level, multi-agency planning, the geographic domain is really the community but the focus is on coordinating individual cases across agencies. "The objective is the creation of a coordinated service system" throughout the community. Moving on to the next domain, community planning focuses on the introduction of social components into community projects. "This category includes social planning in New Towns, social aspects of public housing planning, community social facilities in renewal areas, relocation, the Model Cities program." At the national level, Kahn identifies three domains: intervention systems which engage in a more or less coherent thrust at some aspect of a problem, social-trend planning which may contain several intervention systems aimed at some problem such as poverty or malnutrition, and finally over-arching policies.



## WATERSTON - LARGE-SCALE PLANNING PRACTICE

In his monumental work on development planning, Waterston (1969) identifies four traditions of large-scale planning.

TRADITIONS OF LARGE-SCALE PLANNING PRACTICE Waterston (1969)
1. Wartime Planning
2. Town and Country Planning
3. Anticyclical Planning
4. Development Planning
a. National
b. Regional
c. Multinational Regional

Wartime Planning has tended to succeed, according to Waterston, largely because of "the clarity and unity of the planning objective, i.e., winning the war". In Great Britain and the United States during World War II he notes that detailed government controls "extended over a wide range of economic activity", and that "governments were not prepared to let the market operate freely to bring forth the output required to meet the emergency" largely because of the commitment of political leaders and populace.

Recent developments in Town and Country Planning in the industrialized world are noted. Few lessons of experience are noted, but the close link between physical and economic planning is observed.

Anticyclical Planning is the kind of economic planning carried out by most western industrialized countries. It aims to achieve "a level of effective demand which allows the fullest utilization to be made of capital stocks, labor force and other resources" commensurate with the prevailing social framework. It may at times attempt to stimulate growth and at other times "insure that the growth rate does not



expand so much that it jeopardizes economic stability through inflation or balance of payments difficulties", but "it lets the private sector determine the direction of growth". The techniques used in anticyclical planning were greatly influenced by Keynesian theory, which stimulated many complex economic and mathematical models.

Development Planning is defined to include "social and cultural change as well as economic growth". It is practiced in less developed countries where incomes are low, resources are underemployed, balance of payments are a problem, land ownership systems are often unproductive, taxation is inequitable, distribution of income is lopsided, government machinery is weak, information channels are few, and the price system is askew. Thus, development planning aims to change institutional structures. Waterston restricts his definition to government sponsored planning at the national level. He notes that national plans may include regional plans, and may also involve multinational regional planning, for example with respect to a river basin or as part of a larger trade arrangement.

#### BERRY - HISTORY AND MODES OF PLANNING

In the last chapter of his impressive work on urbanization, Berry (1973) broadens his focus with a review of the history of national planning. This historical review provides two perspectives on planning: the national context in which it is practiced, and the "mode" of practice.

HISTORY AND MODES OF NATIONAL PLANNING Berry (1973)
1. National Context
a. Competitive Free Enterprise Systems
b. Comprehensive Development Programs
c. The Third World
d. Redistributive Welfare System
e. Socialist States
2. (See Next Page)



HISTORY AND MODES OF NATIONAL PLANNING  
(Continued)

2. Modes of Planning
  - a. Problem-Solving
  - b. Regulation of Trends
  - c. Developmental Leadership
  - d. Goal-Oriented Planning

Competitive Free-Enterprise Systems refer to United States, Canada and Australia, where the instruments of government action are used to protect the central institutions of the market. Comprehensive Development Programs are best illustrated by France, where negotiations with major bodies enables concerted purpose and action at the national level. By the Third World, Berry refers to countries where colonialism has been replaced by one-party governments or military dictatorships. Berry makes only brief comments about the Redistributive Welfare States of Western Europe or the Socialist States (in which he apparently groups China with the U.S.S.R. and nations of Eastern Europe).

The Problem-Solving mode of planning reacts to past and present problems; its concern is the present and the preservation of present mainstream values. It analyzes problems, designs interventions, and allocates resources accordingly. The other three modes are future oriented. The Regulation of Trends mode is the future-oriented version of the problem-solving mode. It involves devising regulatory mechanisms to modify unwanted trends. Development Leadership predicts the future "to seek out new growth opportunities", rather than identify future problems. The opportunities pursued are those "most favorably ranked in terms of returns arrayed against feasibility and risk". Finally, Goal-Oriented Planning attempts to create a desired future rather than respond to a predicted future. Berry believes this mode of planning is possible only when a society can "acquire sufficient control and coercive power to ensure that inputs will produce desired outputs."



## FRIEDMANN - CLASSIFICATION BY POWER

In his major theoretical work, Friedmann (1973) divides the practice of planning into two forms -- Allocative and Innovative -- and then proposes that the style of allocative planning (if it is successful) depends upon the nature of the power distribution in the system in which it is practiced.

CLASSIFICATION BY POWER Friedmann (1973)
1. Innovative Planning
2. Allocative Planning
a. Command Planning - Strongly Centralized
b. Policy Planning - Weakly Centralized
c. Corporate Planning - Fragmented
d. Participant Planning - Dispersed

Allocative Planning is "concerned with actions that affect the distribution of limited resources among competing users". It seeks to maintain the system. Four characteristics usually found in allocative planning include: 1) comprehensive with respect to objectives, alternatives, and future forecasting, 2) system-wide balances, 3) functional rationality, and 4) quantitative analysis.

The styles of allocative planning depend upon the distribution of power in the society. A strongly centralized society tends to plans with compulsory targets. Weakly centralized societies tend to develop policies that are implemented through a variety of rules and inducements. In a fragmented society plans take the form of processes brought about by negotiation among major corporate power groups. A dispersed society relies on participant planning focused on process and voluntary compliance.

Innovative Planning seeks to induce major changes in the performance of a system, through mobilizing institutional resources and through " a

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fusion of plan-making with plan-implementing activities during the course of action itself". It focuses on institutional development which will "create wholly new categories of activity, usually large in scale". Innovative planning, which is competitive and risk-taking, is "likely to run into the opposition of central (allocative) planning". But Friedmann thinks that innovative planning has fared considerably better than allocative planning because of its ability to "get the country moving" (with its entrepreneurial focus) and "to build up the new structures without which the country would fall into chaos". Naturally most countries practice both allocative and innovative planning, but "innovative planning -- being change-oriented -- generally predominates".

#### CHIN AND BENNE - STRATEGIES FOR CHANGE

Chin and Benne (1969) classify strategies for planned change from their organizational development tradition. They believe that all changes should be accomplished through processes "based on behavioral knowledge of change and must utilize people technologies based on such knowledge".

STRATEGIES FOR CHANGE Chin and Benne (1969)	
1.	Empirical-Rational
a.	Basic Research and Education
b.	Personnel Reform
c.	Use of Systems Analysts
d.	Applied Research and Diffusion
e.	Utopian Thinking
f.	Linguistic
2.	Normative-Re-Educative
a.	Increase System Capability
b.	Foster Human Growth
3.	Power-Coercive
a.	Non-Violence
b.	Political Institutions
c.	Power Elite

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Underlying the Empirical-Rational strategy is an assumption that "men are guided by reason and that they will utilize some rational calculus of self-interest in determining needed changes in behavior". "Ignorance and superstition" are the enemies. The most fundamental approach involves scientific investigation to extend knowledge and general education to disseminate it. But other approaches are used as well. One is to get "the right person in the right position" either through sweeping reform or scientific selection. Others include staff analysts, applied research and diffusion systems such as the agriculture extension operations, understanding through linguistic rigor, and even the vision of utopian designs which can focus and motivate planning activities to achieve them.

The Normative-Re-Educative strategies see men as "inherently active, in quest of impulse and need satisfaction". "Classification and reconstruction of values is of pivoted importance" in effecting change. Learning, and therefore re-education, is required. Two general approaches are used: one focuses on the system, using "a cooperative, action-research model"; the other focuses on the individual, who are seen to be capable of creative, life-affirming choices and actions if thwarting conditions are removed and supporting ones developed.

Power Coercive strategies emphasize political and economic sanctions, but also use moral power, guilt and shame. Approaches include non-violent actions, working through the legitimacy of political institutions, and influencing power of political institutions, and influencing power elites to alter decisions and actions or by building countervailing power against established power.

#### **MILLS AND KELLY - APPROACHES TO DEVELOPMENT**

Mills and Kelly (undated) define development as "the process by which a system evolves from one level to a higher level such that more groups within the society are able to share in the growth process". They then identify three general approaches to development.



APPROACHES TO DEVELOPMENT Mills and Kelly
1. Socio-Economic
2. Economic
3. Psycho-Generational

The Socio-Economic approach attempts to effect change by changing the basic beliefs of people towards technologies via mass media and other diffusion processes. Technology is made available and the participation of organizations and individuals is sought. The Economic approach is less participatory, relying largely on governmental monetary policy. It generally involves "experts" to analyze and evaluate alternative courses of action and the overall success, usually in terms of economic indicators.

The Psycho-Generational approach aims at achieving significant change over several generations. Environmental or socio-political changes create imbalances, particularly in the role of individuals, which then create personality changes in succeeding generations. These personality changes result in innovation and development. Mills and Kelly note that this approach leaves a great deal unexplained, such as "the process by which new social organizations are formed or how the economy changes". The approach seems a bit far-fetched, but contains the interesting focus on long-term multi-generation development, an issue not explicitly dealt with in most other places.

#### **BOLAN - THE PLANNING THEORY TERRAIN**

In a recent paper on the state of planning theory, Bolan (1974) develops a classification scheme which draws on the work of most of his predecessors.

THE PLANNING THEORY TERRAIN  
Bolan (1974)

1. Cognitive Framework
  - a. Understanding the Past and Present
  - b. Imagining the Future
  - c. Imagining How to Achieve the Future
2. Social Framework
  - a. Objective - Things and Relations
  - b. Cultural - Ideas and Norms
  - c. Psychological - Behavior and Stimuli
  - d. Institutional - Control and Order

Rather than group major traditions of planning, Bolan's scheme suggests dimensions for describing a planning activity. Thus, there are various ways of understanding the past and present, of imagining the future, and imagining how to achieve the future, and various frameworks for dealing with things and relations, ideas and norms, behavior and stimuli, and control and order. Bolan's Table entitled "Outline of Mapping Categories for Planning Theory Domain" which includes the kinds of knowledge which is used in each of its planning categories is probably the best summary of his work, and so it is recreated here.

Bolan believes that knowledge is reasonably well advanced in Ways of Understanding the Past and Present and Imagining How to Achieve the Future and in the Objective Framework of Things and Relations and the Institutional Framework of Control and Order, but that current knowledge is low in Ways of Imagining the Future and in the Cultural and Psychological Frameworks. He believes that the "New Humanists" (1974) are exploring these knowledge gaps. Their major concerns are: loss of the stable state, a static social science with highly objectified products, and the need for humanistic institutions.

OUTLINE OF MAPPING CATEGORIES FOR PLANNING THEORY DOMAIN  
 copied from Bolan (1974)

TIME- COGNITIVE PERSPECTIVE	SOCIAL FRAMEWORK PERSPEC- TIVE	OBJECTIVE FRAMEWORK OF THINGS AND RELATIONS (Opportunity/Problem Focus: Functional Rationality)	CULTURAL FRAMEWORK OF IDEAS AND NORMS (Value/Normative Focus: Substantive Rationality)	PSYCHOLOGICAL FRAME- WORK OF BEHAVIOR & BEHAVIORAL STIMULI	INSTITUTIONAL FRAMEWORK OF CONTROL AND ORDER
WAYS OF UNDERSTANDING PAST AND PRESENT		Basic Physical & Social Sciences Architecture Engineering Economics Demography Geography Sociology	History Ethics Jurisprudence Theology Culture Fashion	Personality Dev't. Conditioning Transactional Analysis Small Group Behav'r. Organizational Behav'r. Political Behavior Environmental Psy- chology Ethology & Ecology	Political Theory Administrative Institutional Structure Judicial Precedent Administrative Rules & Regulations.
WAYS OF IMAGINING THE FUTURE		Straight-Line Extrapolation Incremental-Marginal Analysis Predictive Modeling Systems Theory Game Theory Decision Theory	Utopian Constructs Master Planning Futurists	Behavior Modifica- tion Market Research Political Research Behavioral Technology	Organizational Development Allocative Planning Innovative Planning Scientific Mgt. Temporary Society
WAYS OF ACHIEVING THE FUTURE		Persuasion by Force of Reason and Rationality	Ideological Indoctrination Ideological Revolution	Communication & Diffusion Stra- tegies Education & Learn- ing Strategies Participation & Exchange Strategies	Coercion Regulation & Rule Making Power Elite Strategies Institutional Change Strategies Conflict Strategies



## HALL - PROBLEM-SOLVING MODELS

Hall (1962), in his classic text on systems methodology, presents three models of problem-solving. Although presented primarily with corporate planning in mind, these models provide a reasonable summary of what systems planners of the early 1960's thought ought to happen in planning.

PROBLEM-SOLVING MODELS Hall (1962)	
1.	Dewey's Model
2.	Large-Scale Systems Model
a.	Define Problem
b.	Select Objectives
c.	Synthesize Systems
d.	Analyze Systems
e.	Select Best Alternatives
f.	Plan for Action
3.	Adaptive Model

Dewey's Model, as interpreted by Hall, is roughly: "an individual who has a problem finds himself in an indeterminant situation, starts and inquiry..., tries to define the problem..., then gets ideas that may solve the problem" and finally evaluates the ideas. Things do not always occur in the sequence, so one may leap from one step back to any previous step.

The Large-Scale Systems Model contains the six steps listed, which imply several distinctions not made in the Dewey Model: Problem Definition from Objective Selection, Idea Evaluation includes both deducing logical consequences (Analyze Systems) and place values on the consequences (Select Best Alternatives). The Large-Scale System Model also explicitly recognizes one must plan for action.



The Adaptive Model, which Hall favors, recognizes that objectives may not be reachable for a variety of reasons, including the discovery that the plans laid are not good enough. When this happens, better alternatives must be found or the objectives compromised. Doing this creates a hierarchy of feedback loops through the six steps of the Large-Scale Systems Model, which creates an adaptive problem-solving model according to Hall.

### RAY - THE STRUCTURE OF PLANNING

In his forthcoming book, Ray proposes a comprehensive theory of the structure of the planning process.

STRUCTURE OF PLANNING Ray (Undated)
1. Functions
a. Diagnosis
b. Prognosis
c. Interest Articulation
d. Leverage Identification
e. Identify Broad Strategic Options
f. Interest Aggregation by mobilizing and coalescing constituencies
g. Policy Negotiation
h. Plan Generation
i. Start-Up Process
j. Program Management
k. Program Monitoring and Evaluation
l. Program Change
2. Types of Persons Involved
3. Type of heuristics and decision-rules used.

Each of the Functions is described in more detail. For example, Plan Generation includes: goals officially invoked for legitimization, actual operational objectives, available resources (money, people, laws), alternative actions, preferred administrative structure, allocation of resources. The Types of Persons involved extend from the more technical



to the more political: technocrats, staff to management, administrator/bureaucrat, designers, consultants, advocate planners, community organizers, political staff, politician/statesmen. Ray describes a planning process in terms of the types of persons and decision-rules used for each function.

### C. LESSONS OF PLANNING EXPERIENCE

Although the planning literature is large, diverse, and often contradictory, and certainly there is not yet anything approaching a unified theory of planning, there is nevertheless a set of lessons which emerge from the planning literature. These lessons represent, in very general terms, the current state of the art of planning. They contain the known principles of "good" planning which apply to a broad spectrum of planning activities.

In order to summarize these lessons here, I have relied on the major works from several planning traditions. Friedmann and Hudson (1974) identified the major authors of four major traditions of planning: Philosophical Synthesis, Rational Planning, Organizational Development, and the Empirical Tradition, where the Empiricists have included both National Development Planning and Urban Planning. I have reviewed these works as well as work from Social Welfare and Health Planning, and work on technology and planned change in diverse cultures, which I would view as other streams of the Empiricist tradition.

The lessons summarized here come primarily from case studies and other work which is clearly based on experiential data. Thus, in the National Development Planning literature I have relied heavily on Faber and Seers (1972), Gross (1967), Hirschman (1967), Stolper (1966), and Waterston (1969); and from other streams of the Empiricist tradition I have used Erasmus (1961), Kahn (1969), Niehoff (1966), Rogers (1971) and Spicer (1952). From the Philosophical Synthesis tradition, I have relied largely on Michael (1973) and Schon (1967, 1971); from Organizational Development on Bennis, Benne, and Chin (1969); and for the Rational Tradition I have



gone to evaluations of some of the major efforts, including Brewer (1973) and Sapolsky (1972). In addition, the review articles by Bolan (1974) and Friedmann and Hudson (1974) provided considerable background and analysis. Other works were also reviewed, but those mentioned above provide the bulk of the evidence which could be traced to experience.

Lesson #1: There are several traditions of planning, none of which are clearly the "best". Moreover, there is no unifying theory of planning. Bolan (1974) and Friedmann and Hudson (1974) make this abundantly clear. There is at this time a veritable explosion of papers and views about planning. Thus, it is likely to be unproductive in the short run to go in search of the one best way to do planning.

Lesson #2: Some planning has been successful, but more often it has failed. Waterston (1969), after reviewing development planning experience in some 55 countries says, "Without question planning has helped promote growth in less developed countries" but "an examination of postwar planning reveals that there have been many more failures than successes" (p. 293). In his nineteen case studies of planned change in diverse cultures, Niehoff (1966) strikes a balance in the number of successes and failures, but "not because we believe that this is the normal percentage of successes and failures" (p. 8). Most of the major reviewers have similarly found some successes but many more failures.

Unfortunately, the successes have rarely been analyzed with sufficient depth and rigor to establish causal connections between planning and success. Sapolsky (1972) may be an exception. His indepth analysis of the Polaris missile-submarine program establishes the value of planning, but the type of planning he found was radically different from the generally held view.

The failures can be classified as three types: a) failures to implement, b) failures to achieve the stated goals even if policies and programs



are successfully implemented, and c) failures to improve general well-being even though stated goals are reached. Implementation has been widely recognized as the most frequent cause of failure. On the other hand, the most serious failures may be the ones which achieved the stated goals, but which also brought unforeseen and sometimes horrifying results. Spicer (1952) illustrates this point richly among his fifteen case studies.

Lesson #3: The evidence is building that the rational tradition of planning, as it has been practiced, does not work very well in many situations. This is, of course, a surprising turn of events because for a time "rational planning" was synonymous with "planning" for many people. But the assault on the rational tradition has come increasingly from all sides and even from within.

Considerable experience has been obtained in using the rational approach, and the reasons for its failures have been widely analyzed. For these reasons, as well as its dominant position, this may be the most important lesson from the planning literature.

The reasons for the failings of the rational tradition are numerous, but for exposition, and following the lead of Friedmann and Hudson (1974) I collapse them into three major problems: problems of rationality and goals, problems of knowledge, and problems of coordination. The first major problem stems from the fundamental assumption made by the rational tradition that humans are rational beings, and therefore can be treated in instrumental terms. There is abundant evidence that this assumption is in error. Bolan (1974, p. 17) notes Lindblom's comments on the complexity of human values: "values are 1) multiple, 2) conflicting, 3) non-hierarchical (which is to say some values may assume primacy in some situations, others in other situations) and 4) unstable, or in a constant state of flux". In other words Lindblom believes "value formation, value adoption, and value rejection are a dynamic, constantly changing process". This is one man's view (which I share), but a large number of the recent authors



from the Philosophical Synthesis tradition as well as the Organizational Development tradition present convincing evidence that humans had best be thought of as the complex, emotional and much-more-than-rational beings that they are, or planning will fail. I find the stories of innovation in organization by Hainer (1968) and Schon (1967) particularly persuasive in this regard. Moreover, certain humans are left out altogether. As Churchman (1974, P. 6), one of the pioneering figures in systems analysis, recently noted: "I've never heard anyone who works with models explain why they are reasonable approaches to reality, although common sense would seem to argue that anyone who approaches society systematically would have to defend his own inquiring system. But then a very peculiar thing about many systems analysts is that they do not consciously include themselves in the system being studied." The problems at the individual level are simply compounded when an entire organization or society is considered. Writers from the Organizational Development tradition have convincingly pointed to the failings of the rational tradition in this regard. Finally, Arrow's famous proof of the impossibility of an appropriate social welfare function remains totally unanswered by the rationalists.

Problems of knowledge have also plagued the rationalist approaches to planning. Schon (1971) has convincingly shown the difficulties of predicting the future in this world which is changing so rapidly by our own hands. He likens the problem to that of a weatherman: weather predictions are not too bad as long as a single front is moving through, but if two fronts should collide then it is total guesswork as to the kinds of turbulences and weather which will result. It is not just that our predictive models are not quite good enough yet, they are not even close because irrational man is now involved. Stolper (1966) has also been concerned with humankind's great ignorance. Not only are statistics generally totally inadequate for the systems models, but the models themselves underestimate by far the level of disaggregation required to learn anything useful. This has led him to favor a greatly decentralized approach to planning.



Finally, there are problems of coordination. The rational tradition generally assumes that once the best alternatives (policies and projects) are identified and planned, implementation will proceed. This is rarely the case. In fact, implementation is the most frequent failure for a whole variety of reasons. In addition, the communication difficulties expand in the face of largeness and increasingly rapid change.

The propensity of the rational tradition to use advanced mathematical techniques and sophisticated models has suffered some of the most sustained criticism. Most practitioners who have been involved with such efforts agree with Waterston (1969), who says "... techniques for getting the highest possible returns ... such as econometric model-building based on linear or curvilinear programming, input-output matrices, shadow-pricing methodology, simulation technique, operations research, and theory of games ... has thus far proved to be of little practical use to planners in most less developed countries" (p. 3), and with Stolper who says, "I have unsuccessfully involved some of my brilliant, mathematically trained colleagues in attempts to solve this problem and to construct such a model. However our attempts have not thus far been successful." (Stolper, 1971, p. 79). In his investigation of computer simulations of urban policy problems in Pittsburgh and San Francisco, cities reputed to be leaders in the field, Brewer (1973) convincingly demonstrates that computer simulation is not yet useful for policy purposes.

Some recent critics have taken an even more cynical view. Benveniste (1972) suggests that the experts who develop models are useful, but in ways quite different than they originally intended. For example, they are used to rationalize decisions already made, including the decision to do nothing, or they are used to test the acceptance to an idea, i.e., as a "decoy", or simply as a delaying tactic. Any experienced consultant recognizes the truth of these observations.

Sapolsky (1972) makes one of the most telling blows, and yet, like Brewer, finds a real use of sophisticated techniques. The Polaris missile-submarine system has been held up as the crowning achievement of



rational planning and systems management at the project level. It not only developed and implemented a tremendously sophisticated and complex technical system within the budget and two years ahead of schedule, but in the process it developed the most advanced quantitative management systems known, including PERT. Sapolsky (1972) methodically destroys the myth that the sophisticated planning management techniques were in fact used to plan and manage the project. Instead, they were used primarily as public relations devices. The major planning effort dealt with political issues; the sophisticated models were used as a smokescreen by the project leaders.

Biggs (1974), in his critique of sophisticated models in less developed countries where skilled humanpower is scarce, questions the use of such a sophisticated model for any purpose: "Complex computer programming models are not the answer to planning problems and they may be disfunctional if they displace other less sophisticated techniques" (p. 34). However, Biggs has identified a use of less elaborate models which other authors have missed. He says, "I would thus use the model as a teaching tool and by very disappointed if any developing country or region devoted scarce resources to a more elaborate model with the idea that the projection for planning would be more accurate or worthwhile" (p. 34). I think Biggs is correct; models which help individuals reduce perceived uncertainty about the causes of problems, or are convincing in their anticipation of future desirable or undesirable states of affairs, increase understanding and play a key role in motivating persons into action.

Lesson #4: The process of planning is more important than the plan. Many of the earlier noted classifications of the structures of planning make clear, I think, the potential complexity of the planning process. A whole variety of actions are carried out by numerous individuals and organizations. These actions include a broad range, such as thinking, data collection, implementation, resistance, etc., which are greatly intertwined and each one is usually being modified in some way. Moreover, the way in which the early tasks such as data collection are carried



out (e.g., who did it under what circumstances) influences both the way to go about implementation and its success. The recent writers of the Philosophical Synthesis tradition (Friedmann and Hudson (1974) call them the "New Humanists") use the paradigm "societal learning" to describe this process.

Stolper (1966) makes the point that one never enters the planning process at the so-called beginning, for there are always projects underway and agencies at work. The planning process, if it is to be successful, must take up with these ongoing activities, and not attempt to return to some theoretical beginning point. Spicer (1952) goes further. He claims that all cultures are undergoing some change and that interventions in the form of planning must take this change into account, and adapt to it. This, of course, is the point that Schon (1971) and Michael (1973) make so well -- our modern world is undergoing such rapid and turbulent change that adequate foresight is nearly impossible, and so planning must improve its short-term learning capability. Thus, not only is planning a process, but so is the setting in which it is carried out.

Lesson #5: The style of planning should fit the environment in which it is practiced. One is tempted to conclude that certain types of societies are more amenable to planning than others. For example, development planning has tended to be more successful in situations where power is concentrated at the top. But this may be because the top-down, rational approach has been the tradition in use, and that this approach is more successful in authoritarian situations. Waterston (1969) notes that "two factors, more than any others, condition the form and role of a country's planning: its institutional framework and its stage of development" (p. 45). Thus he divides the world into socialized and mixed economies and into industrialized and undeveloped economies. Recent successes reported for the undeveloped, socialized nations, if true, may well mean they have found a style of planning appropriate to their situation. Friedmann and Hudson (1974) believe this may be the case in China, where there is a "national preoccupation with the unity of theory and practice" (p. 14).



They note that America has not been able to "generate a significant and effective demand for social theories that would allow their direct translation into practice", but some socialist societies such as China appear to have been more successful in this regard, perhaps because of the massive, ubiquitous, and urgent nature of their problems" (p.14).

Lesson #6: Commitment of key persons at all levels is necessary for successful planning. Political leaders, administrators, and participants must all be committed to the general goals. This may seem to be an obvious requirement, but many projects have failed because they have attempted to substitute logic for commitment. Waterston (1969), after reviewing planning in 55 countries, goes so far as to say that not only is the commitment of the political leadership necessary to the success of development planning, but if the political leadership is committed to development, development will occur whether or not it is planned for. (Upon first confronting such a conclusion, I wondered why bother with planning, but elsewhere Waterston points to situations, primarily in undeveloped countries with authoritarian governments, where the success of the combination of committed political leadership and development planning appeared to demonstrate the use of planning. In addition, I suspect that good planning may serve to help achieve and maintain a committed political leadership.) In his discussion of the various ways that the political leadership can use experts, Benveniste (1972) gives some insight as to why commitment of political leaders is so important. So does Lewis (1967), when he says: "... a government's most important planning measure is to raise a large budget surplus. A plan without a large budget surplus will get nowhere; whereas a large budget surplus can work wonders even without a plan." (quoted in Stolper 1971, p. 32)

Similarly, administration must be committed to the general goals. Almost everyone recognizes this. Hirschman (1967) has written brilliantly about the way that committed executors can work their way to success. Waterston (1965) notes that most projects fail during implementation, and that administrative commitment and capability is the key to implementation.



Schon (1967) describes the hard work and perseverance required by U.S. corporate managers to implement new projects. What is required is a certain flexible determination, similar to the best running backs in American football who "Run for daylight:", rather than put their heads down and run straight for the spot where the hole was planned to be.

Finally, the participants must be committed. Spicer (1952), Erasmus (1961) and Rogers (1971) provide ample evidence. There are many examples of a new way which lasts only as long as the change agent is present. The success of wartime planning is largely due to this universal commitment to a single goal.

Lesson #7: Projects frequently fail to be implemented for lack of capable management. The frequent failure at the implementation stage has already been noted. So has the need for management which can make projects work in spite of the many difficulties which always seem to arise. Since this has proven to be one of the greatest bottlenecks, many have concluded that the place to start is with well-conceived projects and capable managers. In the extreme, this has led to the adage, which is seriously adhered to by some of the most successful activists, that one should "Pick a project that heads in the right direction, appears to be feasible, and get on with it!". This attitude fits with the view that planning is best thought of as a learning process which always begins in the middle somewhere.

Lesson #8: Persons responsible for implementation should be involved in pre-implementation planning activities. This lesson is apparent in nearly all the literature based on actual experiences. First, it enables the executors to gain understanding and commitment, which is apparently necessary for success. But further, early involvement of the executors is necessary because their knowledge of details is required, or viewed alternatively, because of the profound ignorance of planners in relation to the complexity of the situation they face. This point



was made earlier, and has led to recommendations for decentralized decision-making. Ross (undated) has done some interesting theoretical work on decentralized vs. centralized planning in Eire, while Stolper (1966) has pointed to the political desirability of decentralization.

Lesson #9: Attempt to achieve a small success in the minimum possible time. This lesson emerges in unexpected ways, but emerge it usually does. Waterston (1969) says to keep the planning horizons short, keep the goals few, and start with partial planning. Community organizers discovered this principle long ago (See Bennis, 1969). Management consultants go out of business in a hurry if they forget this dictum. Planning that begins as a grand and long-time effort rarely succeeds.

Lesson #10: In governments, the budget is the key operational device for real planning. This lesson comes from the empiricist tradition, especially the national development planners.

NEXT LESSONS: There are a number of lessons which are not yet clearly obvious from the literature, but for which there is significant support, and I believe will be proven correct.

Next Lesson #1: The practice of planning differs considerably from what is espoused, and with good reason. Argyris and Schon (1974), in a recent and potentially classic work, proceed on the basis of their finding that people's behavior is often incompatible with the theories of action they espouse, to analyze this difference. I believe their work will provide the motivation and groundwork for much more careful analysis of this phenomena in planning. Writers from the empiricist tradition are already well-aware that most of the theories of planning being espoused in the literature are quite different than those used in practice, particularly in the rational tradition. Friedmann and Hudson (1974) make this point explicitly: "While rationalism argued a thin logic from first principles to derive the basis for rational choice, empiricists labored to discover how 'real' planning worked or did not work -- and why.



And what they discovered -- if nothing else -- was that planning-in-practice did not look at all like planning-in-theory," (p. 12).

Next Lesson #2: With regard to the two major instruments for causing change, policy and project, policy will become the major tool of central planning while projects will be the forte of decentralized planning. Policy analysis is a fairly recent development of the rational tradition, and may well prove to be its most successful, particularly in lesser developed countries.

Next Lesson #3: Successful planning will focus far more on humans and humaneness. This is the major theme of the recent writers of the Philosophical Synthesis tradition. Friedmann and Hudson (1974) summarize them thus: planning's ultimate purpose is "to support and enhance man's own development as a person in the course of the transforming action itself," (p.7).



## REFERENCES: MAJOR TRADITIONS OF PLANNING

- Altshuler, Alan A. (1965) The City Planning Process. Ithaca, N.Y.: Cornell University Press.
- Argyris, Chris (1962) Interpersonal Competence and Organizational Effectiveness. Homewood, Ill.: Irwin Dorsey.
- \_\_\_\_\_ (1965) Organization and Innovation. Homewood, Ill.: Irwin Dorsey.
- \_\_\_\_\_, and Donald A. Schon (1974) Theory in Practice: Increasing Professional Effectiveness. San Francisco: Jossey-Bass Publishers.
- Arrow, Kenneth J. (1951) Social Choice and Individual Values. New York: John Wiley and Sons.
- Banfield, Edward C. (1961) Political Influence. New York: The Free Press.
- Barnard, Chester I. (1938) The Functions of the Executive. Cambridge, Mass.: Harvard University Press.
- Bauer, Raymond A., ed. (1966) Social Indicators. Cambridge, Mass.: The MIT Press.
- \_\_\_\_\_, and Kenneth J. Gergen, eds. (1968) The Study of Policy Formation. New York: The Free Press.
- Beneviste, Guy (1970) Bureaucracy and National Planning. A Sociological Case Study in Mexico. New York: Praeger.
- \_\_\_\_\_ (1972) The Politics of Expertise. Berkeley, Cal.: The Glendessary Press.
- Bennis, Warren G. (1969) Organization Development: Its Nature, Origins, and Prospects. Reading, Mass.: Addison-Wesley.
- \_\_\_\_\_, K.D. Benne, and R. Chin, eds. (1961) The Planning of Change. Readings in the Applied Behavioral Sciences. New York: Holt, Rinehart, and Winston. A substantially revised second edition was published in 1969.
- Berry, Brian J.L. (1973) The Human Consequences of Urbanization. New York: St. Martin's Press.
- Biggs, Stephen D. (1974) "Lament for Policy Oriented Research", Institute for Development Studies Bulletin, v. 5, n. 4, pp. 28-36.
- Bolan, Richard S. (1974) "Mapping the Planning Theory Terrain: A Search for Benchmarks and Contours." A paper presented to the Symposium on Planning Education, University of North Carolina.
- Brewer, Garry D. (1973) Politicians, Bureaucrats and the Consultant. New York: Basic Books.



- Brown, W.H. and C.E. Gilbert (1961) Planning Municipal Investment. A Case Study of Philadelphia. Philadelphia: University of Penn. Press.
- Chin, Robert and Kenneth D. Benne (1969) "General Strategies for Effecting Changes in Human Systems." In Bennis, Warren G., K.D. Benne, and Robert Chin (eds.) The Planning of Change, 2nd Edition. New York: Holt, Rinehart, and Winston, Inc.
- Churchman, Charles West (1968) The Systems Approach. New York: Delf.
- \_\_\_\_\_ (1971) The Design of Inquiring Systems: Basic Concepts of Systems and Organizations. New York: Basic Books.
- \_\_\_\_\_ (1974) "Perspectives of the Systems Approach", Interfaces, v. 4, n. 4, pp. 6-11.
- Cohen, Stephen (1969) Modern Capitalist Planning: The French Model. Cambridge, Mass.: Harvard University Press.
- Dahl, Robert A., and Charles E. Lindblom (1953) Politics, Economics, and Welfare. New York: Harper and Row.
- Devons, Ely (1950) Planning in Practice. Cambridge, England: Cambridge Press.
- Dror, Yehezkel (1968) Public Policy Reexamined. San Francisco: Chandler.
- Dunn, Edgar S. (1971) Economic and Social Development. A Process of Social Learning. Baltimore: The Johns Hopkins Press.
- Eramus, Charles J. (1961) Man Takes Control. Indianapolis, Ind.: The Bobbs-Merrill Company, Inc.
- Etzioni, Amitai (1968) The Active Society: A Theory of Society and Political Processes. New York: The Free Press.
- \_\_\_\_\_ (1969) "Toward a Theory of Societal Guidance." in Sarajane Heidt and Amitai Etzioni, eds., Societal Guidance: A New Approach to Social Problems. New York: Thomas Y. Crowell.
- Faludi, A.,(ed.) (1973) A Reader in Planning Theory. Oxford: Pergamon Press.
- Faber, Mike and Dudley Seers, eds. (1972) The Crisis in Planning. Vol. 1: The Issues; Vol. II: The Experience. London: Chatto and Windus for the Sussex University Press.
- Franks, Oliver (1947) Central Planning and Control in War and Peace. Cambridge, Mass.: Harvard University Press.
- Fried, Robert (1971) Planning the Eternal City: Roman Politics and Planning Since World War II. New Haven: Yale University Press.

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COMMUNITY SYSTEMS FOUNDATION



- Friedmann, John (1973) Retracking America: A Theory of Transactive Planning. Garden City, N.Y.: Doubleday.
- Gold, Bela (1959) Wartime Economic Planning in Agriculture. New York: Columbia University Press.
- Gross, Bertram M. (1966) "Planning as Crisis Management." A Prefatory Comment in B. Akzin and Y. Dror, Israel: High Pressure Planning. Syracuse, N.Y.: Syracuse University Press.
- Hagen, Everett E., ed. (1963) Planning Economic Development. Homewood, Ill.: Richard D. Irwin.
- Hainer, Raymond (1968) "Rationalism, Pragmatism, Existentialism". In Shelly, M.W. and E. Glatt (eds.), The Research Society. New York: Gordon and Breach.
- Hall, Arthur D. (1962) A Methodology For Systems Engineering. Princeton, N.J.: D. Van Nostrand Company, Inc.
- Hampden Turner, Charles (1971) Radical Man: The Process of Educational Development. Garden City, N.Y.: Anchor Books. Originally published in 1970 by Schenkman.
- Hirschman, Albert O. (1963) Journeys Towards Progress: Studies of Economic Policy Making in Latin America. New York: The Twentieth Century Fund.
- \_\_\_\_\_ (1967) Development Projects Observed. Washington, D.C.: The Brookings Institution.
- \_\_\_\_\_, and Charles E. Lindblom (1962) "Economic Development. Research and Development. Policy Making: Some Converging Views." Behavioral Science 7, no. 2 (Apr.): 221-222.
- Jantsch, Erich, ed. (1969) Perspectives of Planning. Paris: Organization for Economic Cooperation and Development.
- Jones, Garth N. (1969) Planned Organizational Change: A Study in Change Dynamics. London: Routledge and Kegan Paul.
- Kahn, Alfred J. (1969) Theory and Practice of Social Planning. New York: Russell Sage Foundation.
- \_\_\_\_\_ (1969) Studies in Social Policy and Planning. New York: Russell Sage Foundation.
- Lasswell, Harold D. (1971) A Preview of Policy Sciences. Amsterdam: Elsevier.
- Lawrence, Paul R., and Jay W. Lorsch (1967) Organizations and Environment: Managing Differentiation and Integration. Boston: Graduate School of Business Administration, Harvard University.

COMMUNITY SYSTEMS FOUNDATION



- Lewin, Kurt (1948) Resolving Social Conflicts: Selected Papers on Group Dynamics. New York: Harper and Row.
- Lewis, W. Arthur (1966) Development Planning. New York: Harper and Row.
- \_\_\_\_\_ (1967) Reflections on Nigeria's Economic Growth. Paris: OECD, Development Studies.
- Likert, Rensis (1967) The Human Organization: Its Management and Value. New York: McGraw-Hill.
- Lindblom, Charles E. (1965) The Intelligence of Democracy. New York: The Free Press.
- \_\_\_\_\_ (1968) The Policy-Making Process. Englewood Cliffs, N.J.: Prentice-Hall.
- Lippitt, Ronald, Jeanne Watson, and Bruce Westley (1958) The Dynamics of Planned Change. New York: Harcourt, Brace and World.
- Mannheim, Karl (1935) Mensch und Gesellschaft im Zeitalter des Umbaus. Leiden: A.W. Sijthoff's Uitgeversmaatschappij N.V.; English version: (1949) Man and Society in an Age of Reconstruction. New York: Harcourt, Brace.
- March, James O. and Herbert A. Simon (1959) Organizations. New York: John Wiley and Sons.
- Meyerson, Martin, and Edward C. Banfield (1955) Politics, Planning and the Public Interest. The Case of Public Housing in Chicago. Glencoe, Ill.: The Free Press.
- Michael, Donald N. (1973) On Learning to Plan - and Planning to Learn. San Francisco: Jossey-Bass Publishers.
- Miller, George A., Eugene Galanter, and Karl H. Pribram (1960) Plans and the Structure of Behavior. New York: Henry Holt.
- Mills, Roger C. and James G. Kelly "Cultural Adaptation and Ecological Analogies: Analysis of Three Mexican Villages". Prepared for S. Golann and C. Eisdorfer, eds. (undated) Handbook of Community Psychology. New York: Appleton-Century-Crofts.
- Niehoff, Arthur M. (ed.) (1966) A Casebook of Social Change. Chicago: Aldine Publishing Company.
- Novick, David (ed.) (1967) Program Budgeting: Program Analysis and the Federal Budget, 2nd Edition. Cambridge, Mass.: Harvard University Press.
- Popper, Karl R. (1945) The Open Society and Its Enemies. London: Routledge and Kegan Paul.



- Rabinovitz, Francine (1969) City Politics and Planning. New York: Atherton Press.
- Ray, Paul H. (to be published manuscript) Strategies of Social Intervention. Ann Arbor, Michigan: University of Michigan.
- Rogers, Everett M. and F. Floyd Shoemaker (1971) Communication of Innovations, 2nd Edition. New York: The Free Press.
- Ross, Miceal (undated) Two-Stage Planning in the Irish Context. Dublin: The Economic and Social Research Institute, Reprint No. 19.
- Sapolsky, Harvey M. (1972) The Polaris System Development. Cambridge, Mass.: Harvard University Press.
- Schein, Edgar, H. (1969) Process Consultation: Its Role in Organization Development. Reading, Mass.: Addison-Wesley.
- Schon, Donald A. (1971) Beyond the Stable State. New York: Random House.
- \_\_\_\_\_ (1967) Technology and Change. New York: Dell.
- Selznick, Philip (1949) TVA and the Grass Roots. Berkeley, Calif.: University of California Press.
- Simon, Herbert A. (1947) Administrative Behavior. A Study of Decision-Making Processes in Administrative Organizations. New York: MacMillan, 2nd Edition, (1949).
- \_\_\_\_\_ (1957) Models of Man: Social and Rational. New York: John Wiley.
- Somers, Herman. (1950) Presidential Agency: OWMR: The Office of War Mobilization and Reconversion. Cambridge, Mass.: Harvard University Press.
- Spicer, Edward H. (ed.) (1952) Human Problems in Technological Change. New York: Russell Sage Foundation.
- Stolper, Wolfgang (1971) Budget, Economic Policy and Economic Performance in Underdeveloped Countries. Ann Arbor, Michigan: Center for Research on Economic Development, University of Michigan.
- \_\_\_\_\_ (1971) 'Comments on Professor Aboyade's Paper' in Ayida, A.A. and H.M.A. Onitiri (eds.) Reconstruction and Development in Nigeria. Ibadan: Oxford University Press.
- \_\_\_\_\_ (1966) Planning Without Facts. Cambridge, Mass.: Harvard University Press.



- Thernstrom, Stephan (1969) Poverty, Planning, and Politics in the New Boston: The Origins of ABCD. New York: Basic Books.
- Tinbergen, J. (1952) On the Theory of Economic Policy. Amsterdam: North Holland.
- \_\_\_\_\_ (1964) Economic Policy: Principles and Design. Amsterdam: North Holland.
- von Hayek, Friedrich A. (1944) The Road to Serfdom. London: George Routledge and Sons.
- Waterston, Albert (1965) Development Planning: Lessons of Experience. Baltimore: The Johns Hopkins Press.
- Wildavsky, Aaron (1964) The Politics of the Budgetary Process. Boston: Little, Brown.
- \_\_\_\_\_ (1973) Politicians, Bureaucrats, and the Consultant (Book Review), Science, v. 182, pp. 1335-1338.
- Wiles, P.J.D. (1962) The Political Economy of Communism. Cambridge, Mass.: Harvard University Press.
- Wilson, James O. (1968) City Politics and Public Policy. New York: John Wiley and Sons.
- Wootton, Barbara (1945) Freedom Under Planning. Chapel Hill, N.C.: The University of North Carolina Press.

**NATIONAL NUTRITION PLANNING: THEORIES AND PRACTICE**

Friedmann and Hudson (1974 - see Chapter 2 references) argue that the lack of a unity of theory and action may well be responsible for our inability to plan, for our inability to solve our pressing social problems. We are not able to act from a comprehensive theory of action. China is cited as a likely counter-example; a civilization that has stressed the unity of theory and action, and possibly because of this has made great strides towards solving many of its social ills. Certainly, recent evidence indicates that China has gone a long way towards eliminating malnutrition (see Horn, 1972; Rifkin, 1973; Patterson, 1974). Similar evidence is beginning to come from Cuba (see Navarro, 1972).

The lack of a unity of theory and practice was evident in our search for national nutrition planning efforts. We found precious few. Moreover, there has been little or no chance for evaluation in the few recent examples we did find where a national program of projects and policies aimed at nutrition improvement was based on theories of the causes of malnutrition and theories of how to intervene to improve things. Only rarely have actions been taken, let alone an evaluation of the results of those actions.

**CONTENTS OF THE CHAPTER**

The main part of this chapter contains seven case studies of national nutrition planning efforts. The first three are based largely on experiences in India: The Bihar Famine Conquered is the only study where actions are taken and the results evaluated. It is also the only case study where planning was done in a crisis situation. The Systems Approach by Berg and Muscat (1973), although not referenced directly to India, nevertheless had many of its beginnings in the Indian experience of Berg. It is the only case study which has not been



applied. We present it here, in spite of the fact it has not been applied, because it is one of the best of the proposed approaches to planning and because it is interesting to view in juxtaposition to the experiences of the Bihar Famine. The ambitious Tamil Nadu study is the most recent and technologically advanced of the Indian efforts.

We were hampered by lack of adequate documentation in the Zambian study, which is reflected in its briefness here; while in the U.S.A.I.D. nutrition strategy, our problem was to select from among the surfeit of documents. The U.S.A.I.D. case study probably comes the closest to a unified theory and action, one which views planning as a process of learning at many levels.

Two case studies of agriculture sector planning are given. Both of these efforts seek to incorporate nutrition goals, but not with great success. Nevertheless, these two studies show more promise than other agriculture sector studies. In a detailed evaluation of 12 agriculture sector studies, Rice and Glaeser (1972) note that a disturbing picture emerges. The 12 studies (which do not include the two case studies reported here) are found to be:

- (a) of mediocre quality,
- (b) have low rate of utilization, and
- (c) demonstrate little correspondence between quality and utilization.

They finally conclude that the sector approach to planning does hold promise, and that further development should increase capability in: (1) comprehensive computerized modeling; and (2) an improved analytic base for more traditional sector planning.

Following the case studies is a section which presents some proposed approaches to national nutrition planning. They are noted briefly. The final section presents examples from the literature that shed light on some aspects of a nutrition planning process. Of particular interest are the models of the causal networks related to malnutrition. Obviously, no attempt has been made to be comprehensive in this section;



its purpose is to illustrate how individual contributions can begin to be fitted together into a more unified picture.

## A. THE BIHAR FAMINE CONQUERED

### THE STATE OF BIHAR

In the hot northeastern plain of India lies the crowded and impoverished State of Bihar, where, in 1966, 53 million people lived in 70,000 villages, mainly farming and earning an average of \$27 per year. A severe drought in 1966 brought Bihar to the brink of a disastrous famine, and when the drought repeated itself in 1967, it appeared inevitable that millions would starve to death. Most of India was in the grip of the drought -- grain production had fallen from 88 million tons in 1964-65 to 72 million tons in 1966 and 74 million tons in 1967, a shortfall of 30 million tons -- but Bihar was in the greatest danger. In addition to having the lowest income per capita in the country, Bihar's antiquated farming system was traditionally in deficit so that even in good times, Bihar was required to import food. Moreover, its administrative apparatus was thought to be one of the less effective in the country.

In the book The Nutrition Factor (Berg and Muscat, 1973), Alan Berg describes the efforts which prevented this mass starvation (Chapter 11 and Appendix A). It may be the single most important success story in the nutrition planning literature, and possibly one of the more important recorded successes of organized human endeavor. It provides insight into crisis planning, and by implication, the value of crises in planning.

### THE RESULTS

In brief, the 20 million tons of food grain which were moved into the drought areas of India (from both India and abroad) are estimated to have been the sole sustenance of 60 million Indians for two years. To distribute the food in Bihar, 20,000 fair price shops were established and work relief schemes were authorized to provide employment so that money would be available to purchase the food. A second food distribution



program reached a million aged and infirm; a third program fed as many as 6 million children and mothers; and voluntary agencies operated numerous free-food kitchens. The operation which received the grain and moved it to distribution points was massive and effective, although not a model of efficiency. A new food, Bal Ahar, was developed to assist in this distribution. In addition, in order to provide water in Bihar, half a million mud wells were dug and 25,000 tubewells were sunk or deepened; water delivery routes were established where no wells existed; inoculations and disinfectant treatments were undertaken to prevent the development of epidemics, particularly of cholera.

Berg makes clear that this result would not have been achieved without the strong support of India's top political and private leadership. High-ranking central officials, including Prime Minister Indira Gandhi, visited Bihar and generally supported the program throughout. In mid-1967 top business leaders organized, assessed their responsibility, carried out regional food habit surveys, and bolstered the political leadership. Later, this commitment to solving the problems of malnutrition continued and was made a major political plank in the platform of the ruling Congress Party. Large sums of government funds were committed to continuing the effort even though the rains had come and the worst was over. The famine had made a deep impression on public officials.

The infrastructure and commitment to deal with malnutrition had been created, both in Bihar and at the national level. India began a crash program to increase grain production: new seed varieties were introduced, machinery, fertilizer and pesticides were introduced, and by 1971 grain production had risen to 106 million tons. A major government and private industry program was undertaken to assess which foods could be fortified which would reach most in need, and proceeded to introduce a variety of fortified and new high-nutrient foods in the marketplace. By 1972 there were 27 new foods under development or on the marketplace, and one, Bal Ahar, had achieved production of 55 million tons. In addition, nutrition had become an important consideration in India's



national planning, and efforts such as the Tamil Nadu planning project were to flow from it.

### LESSONS LEARNED

As Chief of Food and Nutrition of AID/India, Berg had an especially good vantage point from which to view the events. He drew a number of conclusions about how to proceed in the time of a nutrition crisis and more general conclusions about how to do nutrition planning in more stable times.

- (1) Think big; develop a massive attack.
- (2) Strong leadership that is willing to take authority is a must during a crisis.
- (3) Events never develop according to plan; unexpected problems must be met and opportunities seized. (In football jargon, "Run for daylight!") This is true at all times, but especially during a crisis.
- (4) In the midst of a crisis, use existing institutions, but in the aftermath create new ones if the old ones do not fit. During a crisis voluntary organizations that are in place, such as CARE, are much more effective than new ad hoc ones.
- (5) In India projects were successfully begun by a loose constellation of businessmen, scientists, a newspaper editor, and senior civil servants, but not by either a top-down or bottom-up approach in the government hierarchy.
- (6) Factors other than the nutritional and technical usually control the success or failure of nutrition projects. Projects quickly move into the administrative realm, where political attractiveness, early results, opposition groups, and bureaucratic constraints take over.
- (7) Governments should budget for disaster. They can make some useful preparations ahead of time, such as India's Famine Guide for local officials.
- (8) During a crisis, effective communication with field staff must be developed. In Bihar, radio broadcasts were used. The telephone supplanted written memos in many instances.
- (9) During a crisis, field staff must have the authority to make decisions on their own, and exercise it. "Decentralization" is the word.
- (10) In a famine, the most important thing is to supply more of the staple food, not new and better food. Shelf-life and transportability are important features. Vitamin tablets are not of much value.



- (11) During a famine, avoid manual labor projects which sap energy.
- (12) Competent field personnel are a must in a crisis. Commitment can be maintained with projects whose value extends beyond the immediate crisis, such as the digging of wells.
- (13) A crisis situation forces attention to problem solution and may enable governments to apply new technology which would not be attempted during stable times of organizational constraints or ingrained behavior patterns.
- (14) Although difficult during a crisis, programs should be evaluated. Generally this will result in abandoning aggregate data and focusing on localized groups in need. For example, India began to examine what a child eats, as opposed to what foods can be fortified.
- (15) In a crisis, and in other times too, it appears that attention to infectious disease can greatly increase effectiveness.

This is planning of a different sort. It contains neither the careful models and analysis of the rationalist tradition nor the attention to the organizational and personal concerns characteristic of the organizational development tradition. Yet it succeeds. Some of the reasons are clear: there was a common goal to which all levels committed themselves; averting mass starvation became the priority problem and sufficient resources were made available (one sees this same phenomenon in the U.S. Polaris Missile-Submarine program, where the perceived crisis of the missile gap brought forth essentially unlimited funds to the program). In addition, there was a rather obvious measure of success -- people were not starving to death, the goal was being accomplished and people knew it.

Unfortunately, Berg does not report how some of the key operational successes were achieved. For example, he notes that competent field personnel who will assume authority are a must, and apparently, this was achieved, but how is not made clear. (It would seem local officials and personnel of established voluntary organizations met this need.)



## STARVATION IN BIAFRA

It is interesting to compare the success in Bihar to the problems in Biafra a year or so later. Aall (1970) reports that lack of competent field staff was one of the major causes of the failure in Biafra to prevent mass starvation during the Nigerian/Biafran War of 1967-69. Aall notes other problems as well, many of which correspond to Berg's conclusions as to what led to success. One item stressed by Aall but not by Berg is the need for a surveillance system to determine who is in need of food and medical attention. However, in addition to the specific failings in the Biafran situation, one suspects that man's bitter war there proved a more intractable foe than nature's drought in Bihar, if for no other reason than the Indian Government put its full weight to the solution of the problem in Bihar.

### B. A SYSTEMS APPROACH BY BERG AND MUSCAT

After living through the successful relief effort of the Bihar Famine, and viewing the increasing nutrition problems in the world, Berg and Muscat conclude, in The Nutrition Factor (1973), that "comprehensive nutrition planning and analysis are sorely needed" (p. 200). ~~Thus,~~ Appendix D lays out a systems approach to nutrition planning which, they say, is "an adaptation of established planning techniques". It is an adaptation of the rational tradition of planning, but one which attempts to avoid some of the key points of failure in the rational tradition.

For example, Chapter 12 puts the systems approach in a political and administrative framework. Berg and Muscat believe that "if malnutrition is to be overcome, governments must intervene" (p. 196) because governments have both the resources and the mandate. Organizations outside the government such as nutrition institutes, may be useful in research, but are not a fit home to take responsibility for a comprehensive program. Within the government, they doubt that single ministries such as Health or even interministerial councils have proven



successful, and that a separate nutrition entity should be established reporting directly to the most important policy official.

#### DIFFICULTIES OF IMPLEMENTATION

Further, the difficulties of implementation are well noted. Because skilled administrative manpower is scarce, they believe a comprehensive program should focus on a few high payoff projects, and avoid the scattering effects of an "every little bit helps" approach. Pick projects which require a minimum of administrative apparatus; thus, Berg and Muscat recommend projects in fortification, genetic improvement of seeds, pricing policies, and mass media promotion, rather than village level education projects. But they also note that such projects may be of little use in reducing malnutrition, even if fully implemented, if they do not reach the most vulnerable groups, particularly the weaning child. Thus, they also recommend education programs focusing on breast-feeding and supplementary solid feeding, and by implication a monitoring system that at least differentiates the vulnerable groups from the rest of the population. (Berg and Muscat's views on "keeping the administration simple" are reminiscent of Hirschman's (1958 - see Chapter 2 references) comments on operational problems in undeveloped countries. Hirschman is of the opinion that in undeveloped countries systems should be designed which require almost no periodic administrative attention to function properly or where attention is inescapably imposed for the system to function at all, such as an airline; and that systems should be avoided which erode over time but function in the meanwhile, such as highways.)

Prior to describing the tasks which must be performed, Berg and Muscat put the planner in his place. He is staff to a "decision-maker". The decision-maker has already concluded that nutrition is an important goal, and he understands its impact on development. He has, in effect, hired the planner to make for him a written plan. Thus the scene is set: we are in the government, hopefully in a nutrition organization reporting directly to the top policy-maker, which organization contains

a decision-maker who is both knowledgeable about and committed to nutrition goals, and there is an expert planner who reports solely to that decision-maker, and who restricts his activities to providing the desired information to said decision-maker. I have no doubt that such a scene is the appropriate pre-condition to do planning in the rational tradition, but it is also a very unlikely set of conditions to actually find somewhere.

#### A LIST OF TASKS

The systems approach is then described as a set of tasks, to be completed by the planner, in sequence.

TASK 1. Identify the problem. Determine the type and severity of nutritional deficiencies, the age, location, and other characteristics of those who are deficient, and the trends. Four sources of data include: food balance sheets, consumer expenditure surveys, food consumption surveys, and direct medical nutrition surveys. Short of such a formal survey, patterns may be distinguishable from a review of available vital statistics and interviews with knowledgeable persons. In short, Berg and Muscat believe that the problem can be identified from existing sources.

TASK 2. Establish nutrition objectives. They should be specific, citing a specific deficiency and numerical target (such as percent reduction), with a deadline for achieving that target, and eventually the funds and other resources required to reach the target. Such goal setting evolves during communications between the planner and the decision-maker, moving from general statements to increasingly specific statements. Along the way, sub-objectives may be formulated, such as creating a receptive climate for the nutrition plan itself.

TASK 3. Analyze the causes of the problem. In Berg and Muscat's words: "A systems approach, instead of jumping forward from problem to solution, moves backward to a study of the complex, interacting



forces of the environment within which the malnutrition arises" (p. 239). They note three strata of causes: the proximate causes, which include low nutrient intake, poor utilization, and poor general health; at the other extreme the general national malaise of poverty and related problems; and in between a network of interacting factors, which like the mid-game in chess, are often unique and the key area for the attention of the planner. Where sufficient data exist, simulation models might be developed. The purpose of this is to "yield guidance for decision-makers within a reasonable time period" (p. 238), and reveal points of intervention. To this end, they note that the Tamil Nadu Nutrition Systems Study included an analysis of the role of government as a part of the complex network of causal factors.

TASK 4. Identify alternative action programs. The problem definition and causal analysis should suggest what to do. Design projects which attack the causes. Berg and Muscat note that reference to certain population groups may assist in identifying projects; in particular, subsistence groups, partially monetized small farmers, landless farm laborers, urban migrants.

TASK 5. Compare the alternatives. The comparison centers around three considerations: benefits, costs, and the likelihood of successful implementation. Benefits should be measured in terms of the degree and timeliness of attainment of the nutrition goals, although the goals can be translated into both economic and welfare benefits. In addition, a nutrition project may have non-nutrition impacts which should be taken into account. There are severe methodological problems in measuring and relating multiple and elusive benefits, of course, but Berg and Muscat's point is that, as long as the difficulties are kept in mind, better decisions can be made with the analysis than without it. Similarly, costs are difficult to project. They may need to be met from different sources -- operating, capital, foreign exchange. The implementability of a project may depend on such factors as availability of required equipment, skilled manpower, and support systems, ease of replicability, competence and commitment of the people responsible, and potential opposition.



The well-known methodological problems in applying benefit-cost analysis to social areas such as nutrition are not dealt with by Berg and Muscat in The Nutrition Factor. For example, no scheme is given for actually combining the estimate of benefits, costs, and implementability into a comparative format, although admittedly any scheme adopted will face problems.

TASK 6. Iterate. By this time, Berg and Muscat suggest, the proposals will have faced the cold truth of the budgeting process and most likely, goals and costs will have to be revised downward.

TASK 7. The planner presents the options and the decision-maker tries to achieve a decision. If the planner did his job well, he will have taken the political dimension into account and thus anticipated the concerns of the decision-maker in his analysis of the options. But the planner does not make the decision. Berg and Muscat say, "Decisions finally result from a complex debate and adversary process among various interest groups, the legislative body, and the executive, involving political values and judgements based on emotion, intuition, or the desire to protect a bureaucratic position" (p. 245).

TASK 8. They then finish with evaluation, having consciously left implementation and operation out of the planning process. Evaluation should measure actual performance, and feed back into the next planning cycle. They suggest someone other than the original planner should carry out the evaluation.

Of course, Berg and Muscat are well aware that they have presented an ideal; one model (which they think will produce good results) of the process and its context. For example, they note that there are often several decision-makers to whom the planner relates, that planning often takes too long, that on-going projects should and will continue, that the planning process may not be too successful at first but should



improve, and that things will rarely proceed according to the prescribed sequence. They drive home this last point with one of the numerous and delightful analogies found in the book: "In practice, planning does not simply follow a series of textbook steps, but is rather an iterative process that resembles more the tango -- four steps forward, three steps back, with an occasional turn-around" (p. 234).

### COMPARISON TO THE BIHAR EXPERIENCE

One of the most interesting aspects of The Nutrition Factor is the difference between the type of planning which was done in the crisis situation in Bihar and the type of planning which Berg and Muscat propose should be done when things are not in a crisis state. In Bihar, the focus was on strong, committed leadership, decentralized decisions, and action -- move the food and dig the wells. The systems approach takes a more deliberate course through the bureaucratic model, focusing on the conceptual aspects more than action or commitment. If they are correct, then "good" crisis planning is very different from "good" other planning. I believe that the planning lessons from the Bihar experience are transferable, and should be incorporated into a planning methodology.

### C. A SYSTEMS APPROACH IN TAMIL NADU, INDIA

If not the most important, the Tamil Nadu study is probably the most ambitious nutrition planning study yet undertaken. It was the first major testing ground for the views that had been developing in the 1960's that a systematic and comprehensive planning effort was needed to attack the problems of malnutrition, rather than the piecemeal approach of the past.

The study was conceived out of the successful effort to prevent the Bihar famine in 1966 through 1968: interest in food and nutrition problems was high in the Indian government and on the international level, the U.S. Agency for International Development was deeply



involved in the Indian food and nutrition problem, and a number of key Indian and U.S.A.I.D. personnel became convinced of the need for a more systematic approach to nutrition planning. The State of Tamil Nadu (which contains the city of Madras) was chosen as the site for the study because: (a) it had an on-going child feeding program; (b) state officials were enthusiastic; and (c) the state government had the beginning of an interdepartmental nutrition coordinating committee with representatives from Social Welfare, Agriculture and Food, Health and Family Planning, Rural Development, Education, and Finance and Planning.

### INITIAL OBJECTIVES

In September, 1970, the Indian Government approved a project to be largely funded by U.S.A.I.D. and under the direction of Sidney M. Cantor Associates Incorporated, a U.S. consulting firm, to carry out a comprehensive systems study of food and nutrition in the State of Tamil Nadu. The five objectives of the study were:

- (1) describe and analyze a nutrition system
- (2) identify intervention points in that system which will increase child survival
- (3) determine the relationship of increased nutrition to family planning, general economic development and quality of life
- (4) limit the analysis to elements most relevant to proposed solutions
- (5) propose specific action programs to achieve the solutions.

A large number of Indian and American experts of various disciplines were involved in the project through a multitude of sub-contracting arrangements. Some handled data collection and field interventions in Tamil Nadu, while others handled the data processing, analysis and methodology development at the U.S. office of Cantor and at the U.S.A.I.D. computer center.



### CHANGES DURING THE STUDY

Several disruptions occurred during the course of the project. Most important was the war in Bangladesh (1971-72), which interfered with communications, lessened government attention to the project, and generally was the source of many delays.

In the course of the study, it also became clear that the original work plan was overly ambitious; data and analysis problems proved increasingly intractable; and original goals for policy guidance were lowered. But the original methodological approach was adhered to. That approach included letting "the model emerge from the data" (Vol. I, p. 72), no pre-aggregation of the data, and possibly most telling, "To create the model, every conceivable relationship which affects the state of the system must be examined" (Vol. I, p. 73). This focus on data and analysis, rather than policy output, seems to be the key issue in the controversy which has accompanied this project.

Thus, the data collection methods, the formal models, and the analysis of them are extremely elaborate and in many ways technically sophisticated. The description here suggests only the outline of that work; the reader interested in more detail is referred to the six volumes which are the final report of the study to U.S.A.I.D.

### THE THREE SUB-SYSTEMS

The overall food system is divided into three subsystems which are, of course, highly interrelated in a dynamic process: (1) agriculture production subsystem; (2) food processing and distribution subsystem; and (3) consumer subsystem. The model of the agriculture subsystem, which was not yet completed at the time of the final report, is essentially a production function using input/output analysis over a ten year period with the traditional factors of production as input and commodities and nutrients as output. Nutritional requirements and diet constraints for various population groups, as determined from the consumer subsystem, will then be used as constraints in a

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COMMUNITY SYSTEMS FOUNDATION



linear programming model. The objective of the model will be to seek to minimize production costs while meeting those constraints.

A special study was undertaken to identify the major processing units and the quantity of food which flows through them (a preliminary finding says 80% of all food consumed is processed first, primarily because all rice is milled). Losses during processing were also analyzed, with the result that great differences were found between commodities. This subsystem proved to be the source of sizable data reliability problems. For example, the protein in the food processed accounts for only two-thirds of the protein in the processed food consumed. For a time, underestimation of the output of small rice mills led to gross errors in loss estimation. Another major problem may exist with families that purchase food both for consumption and resale. It was hoped the analysis of this subsystem would point the way to significant intervention points, but the data reliability problems have set back those hopes to some extent, and have made field trials of proposed interventions even more important.

The consumer subsystem was the area of most attention. A survey of nearly 5,000 households was taken in four rounds. The 15-page survey obtained a wealth of data on each individual: income, expenditures, food consumption, health and nutritional status, and so on. This data was analyzed in a variety of ways: nutritional status was correlated with occupation (where white-collar occupations were best off nutritionally, rural blue-collar next, and urban blue-collar worst off nutritionally), with caste (surprisingly, higher caste did not correlate with better nutrition), by location (persons in high food production areas and along waterways are better off nutritionally), and a number of other variables. The analysis proceeded further, attempting to relate all the variables and draw implications:

"The socioeconomic data appear to be a morass in which job, education, socio-ritual status and the rural/urban division each individually correlate poorly with nutrition status but all four together provide much greater insights to food behavior, and no one of the four can be ignored. The implication for a package of services or actions rather than single pressure changes in the system is clear" (Vol. I, p. 74).

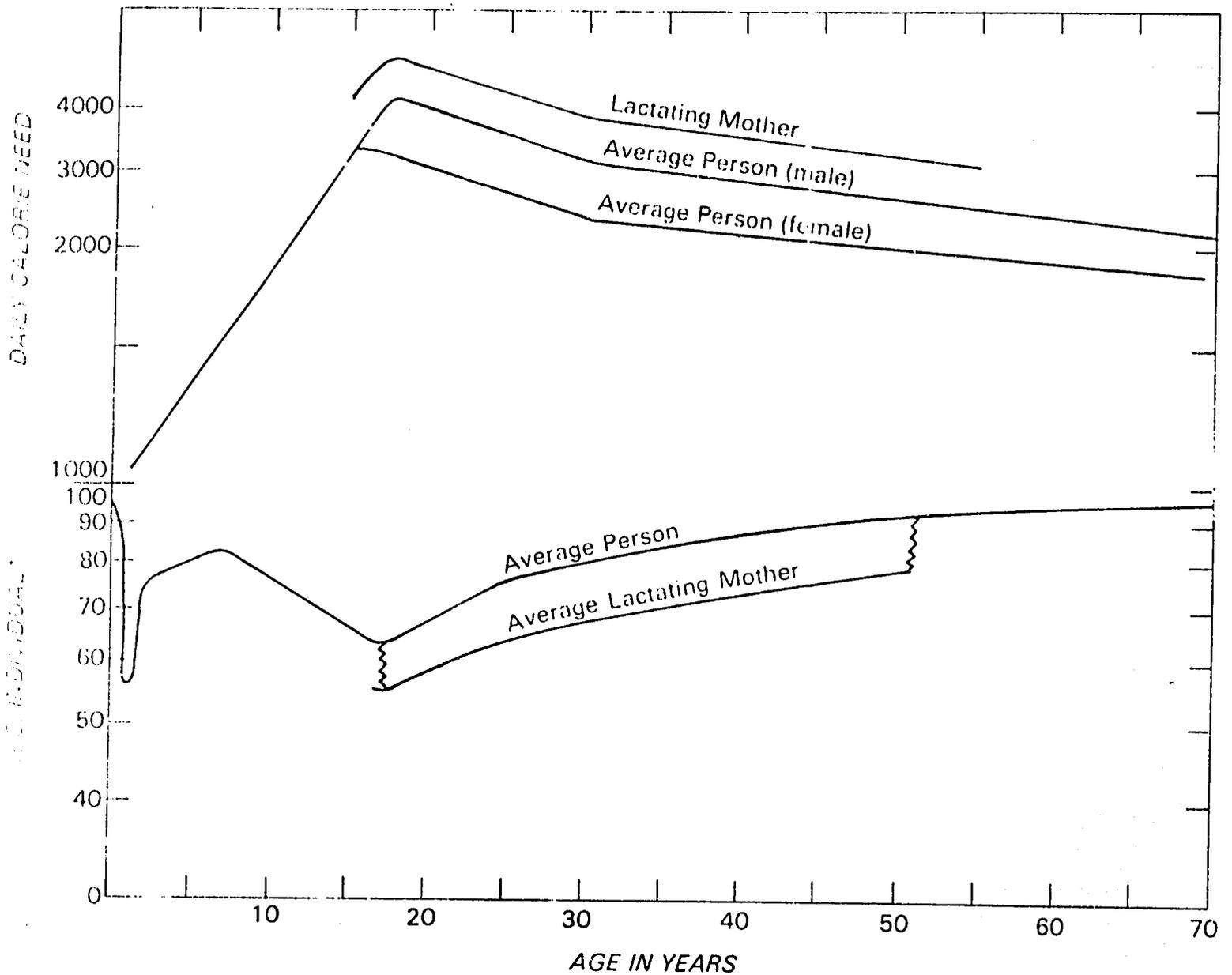
### A MODEL OF CONSUMER BEHAVIOR

Several useful insights and models of consumer behavior were developed. One of the most interesting findings is the calorie consumption as a function of age. The accompanying graph copied from the Tamil Nadu final report (Vol. I, p. 83) shows the percentage of required calories consumed by the average person in Tamil Nadu compared to the required calories for various types of individuals according to acceptable medical standards. The shape of this graph appears to stay the same, although move up and down, for various subgroups, such as different castes. One explanation might be that Indian families have a different notion of relative calorie requirements for its various family members and distribute calories accordingly. This model may help explain intrafamily redistribution resulting from child feeding programs. The shape of the graph also points up the vulnerability of the adolescent years as well as the weaning years.

The discussion of the consumer subsystem most forcefully reflects the issues of controversy in the Tamil Nadu study. It has come the furthest and achieved results. But these results are often of a research nature, such as the model of relative calorie consumption, which can then be used in arriving at policy recommendations. But the report itself focuses on the methodology and not the policy.

A number of important special studies were carried out. They include several anthropological studies and analyses which have been brought together in Volume II-B of the final report. It included reports on life cycle studies in two separate villages, food behavior studies

FIGURE 8. Comparison of Daily Calorie Need (upper graph) and Percentage Fulfillment of Calorie Need (lower graph).



\*Percentage fulfillment of individual calorie needs.

copied from: Sidney M. Cantor Associates, Inc. (1973) Volume 1, p. 83.



in two districts, a study of social status and occupation, an in-depth study of five villages, and a general review of cultural aspects of infant malnutrition. Other special studies were performed on Take Home Dry Foods, Feeding Programs, Extruded Foods, and an analysis which attempts to design an effective administrative model for nutrition programming in Tamil Nadu.

### CONCLUSIONS

Thus, the project produced an enormous quantity of work and numerous outputs, including a large data base on consumers which has been coded and stored for computer access, a variety of special studies, tests of certain interventions, and possibly most important, a commitment by the State of Tamil Nadu to continue the process of planning already begun.

The study also produced numerous insights and conclusions which it claims apply anywhere. Most important are the following (Vol. I, p. 19):

- (1) Nutrition intervention programs must integrate and coordinate with every aspect of development: economic, social, and cultural.
- (2) Nutrition, and therefore nutrition planning, should focus on the biological processes in the human life cycle. In Tamil Nadu, this focus has produced the following four population groups that are most in need: weaning child, adolescent female, pregnant woman, lactating mother.
- (3) Local culture is the prime determinant of the ultimate success of any proposed intervention.

The study contains many more observations, such as the greater importance of calories than proteins in Tamil Nadu, the difficulty of reaching the vulnerable groups in need simply with more production, and the implications of better nutrition on family size.

One of the most interesting results of the study is the importance of viewing planning as a learning process. Although the original



proposal did not mention this view, it crops up frequently in various ways in the final report. For example, while recognizing some of the inadequacies of the current models, it notes that they should improve with use, and in the organizational analysis the introduction notes that "the important point not emphasized sufficiently in this paper is that we are dealing with a process" (Vol. II-D, p. iv).

#### **D. A BEGINNING IN ZAMBIA**

The Government of Zambia has been moving towards a nutrition planning program for some time. In 1966, it requested the Food and Agriculture Organization of the United Nations to undertake a study to find ways of improving the level of nutrition. A National Food and Nutrition Commission was established in 1967, and in 1969 the UNDP approved funds for a study by the FAO to assist the Commission in developing a national nutrition plan.

The original aims of the study were:

- (1) undertake household surveys of food consumption and nutrition status
- (2) formulate food and development policies
- (3) initiate programs to improve nutrition
- (4) train local personnel to continue the effort.

The study was to phase in one new province a year, while implementation was still underway in the previously studied provinces.

#### **CHANGES DURING THE STUDY**

However, the aims were altered after the midway evaluation: the survey was "drastically scaled down to allow time for the collection of data and ensure soundness of methodology" (Report 1, p. 1). Moreover, the delay in preparation of Zambia's Second National Development Plan apparently made it desirable to fit the nutrition study more closely to the development of the national plan, and therefore this study reoriented itself to supplying survey data to the plan. Thus, implementation was dropped for the time being, and attention was



turned to completing the survey and analyzing the data; international staffing was increased and computer time was rented at the University of Zambia.

A large amount of data was collected. A survey of nutritional status was taken throughout the country over a two year period on some 7,550 individuals. It identified the types of nutritional deficiencies by a variety of personal and socioeconomic characteristics. Socioeconomic data was obtained from employment and education statistics. Data on the food system was obtained from histories of marketed commodities, and these histories were projected forward in time by various forecasting techniques to obtain predictions of future supply by commodity.

An analysis of this data is then carried out. For example, it is noted that at present trends, the "food imports bill at current prices...(will be)...30 percent of the income which the Government hopes to derive from all activities in the mining sector" (Vol. 1, p. 34). More useful, perhaps, is the analysis of nutrient and food requirements in the future based on the predictions of the urban and rural population characteristics. Food elasticities are estimated for 17 socioeconomic classes in order to understand certain food purchasing behavior.

Finally, a general discussion is held of the problems and the kinds of strategies which might solve them. This is backed up with specific policy recommendations for a list of specific commodities.

It is clear that this effort did not attempt a full and careful analysis. It focused on the data. Although there is certainly some logic expressed which attempts to connect the recommendations to the data and analysis, it is quite thin. (This is not to say, of course, that the recommendations themselves are better or worse for the lack of it.)



The project, I think, is interesting because it began with the intent of doing analysis and implementation based on the analysis, and staging the analysis and implementation so that learning could occur. Along the way it re-aimed, although whether to avoid disaster or seize an opportunity is not clear. Nevertheless, it still represents one of the more advanced attempts to do nutrition planning and is worth watching further.

#### E. U.S.A.I.D. NUTRITION PLANNING STRATEGY

The Office of Nutrition in U.S.A.I.D. has developed a broad approach to nutrition planning which is set forth and illustrated in a collection of documents. Focusing on Less Developed Countries (LDC), the U.S.A.I.D. strategy has two primary goals:

- (a) "The introduction of nutrition policies into national planning, and
- (b) the enhancement of LDC capabilities to plan and implement nutrition programs which will reduce malnutrition among pre-school children and pregnant and lactating mothers" (U.S.A.I.D., July, 1973, p. 1).

"The keystone of AID's nutrition effort should be assisting countries to develop their capability for planning and implementation of programs which will reduce malnutrition" (U.S.A.I.D., June, 1973, p. 2).

The U.S.A.I.D. strategy notes that "little will happen to affect nutrition in LDC's, except as incidental effects (positive and negative) of programs aimed at other objectives, until national policy-makers understand that malnutrition is a major problem, are aware of potential solutions, and are prepared to establish program goals and allocate significant resources to the attainment of them" (U.S.A.I.D., June, 1973, p. 14). The policy-makers should "acquire a clear perception of (a) how to intervene, (b) under what conditions a given intervention can succeed, (c) what the cost of the intervention might be, and (d) what benefits and results are to be expected from a given intervention" (U.S.A.I.D., July, 1973, p. 1).



## INFORMATION DISSEMINATION STRATEGIES

In order to foster the needed understanding and commitment, U.S.A.I.D. offers nutrition planning workshops, disseminates relevant information, and offers in-country technical assistance to policy-makers and planners from LDC's. In addition, it sponsors research to increase the stock of knowledge which it can transmit through the above channels. The strategy calls for focusing on: (1) protein-calorie malnutrition; (2) the most vulnerable groups; and (3) introducing nutrition policies into national plans. It also focuses on interventions which hold the promise of mass coverage, such as:

- (a) "greatly improving the content of the basic food supply grown;
- (b) fortification of the food supply" (U.S.A.I.D., June, 1973, p. 10).

The strategy includes statements on various types of interventions (such as feeding programs) and interrelationships (such as nutrition and population growth).

However, its approach to national nutritional planning is most relevant here. The U.S.A.I.D. strategy suggests two approaches: introducing nutrition concerns into the programs of other sectors, and undertaking an integrated national, intersectoral nutritional planning effort. The sector strategy implies that LDC's can begin with simple planning and evaluation techniques which allow the comparison of alternative possible interventions in one or a few sectors (such as agriculture, health, education), and then as the planning capabilities grow, expand to include more sectors.

## A PRACTICAL GUIDE FOR ANALYTIC PLANNING

A similar philosophy of "start simple and learn" governs the approach to national intersectoral planning. A simple methodology which is similar to the Berg-Muscat approach was developed for U.S.A.I.D. by Jim Pines of the American Technical Assistance Corporation, and tested with data from Ecuador. It is now being used by several



countries, including the Philippines and Thailand, with the help of technical assistance. Thus, although it is too early to tell whether the approach has succeeded in building the indigenous capability and infrastructure to carry on the planning, or to tell whether the approach has resulted in better nutrition, considerable experience has been gained in its application.

In practice, the strategy has been applied after key policy-makers in LDC governments have decided that national nutrition goals are desirable, and have established an administrative and policy-making framework within which the planning can proceed. For example, in Thailand an intersectoral Sub-committee of the National Economic and Social Development Board was mandated to develop a national food and nutrition plan. Staff from various ministries were constituted as a part-time Working Group, and U.S. consultants sponsored by U.S.A.I.D. provided technical assistance to the Sub-committee and Working Group in undertaking the planning effort.

The approach has a practical bent -- it "assumes that the planning process can be started quickly and inexpensively -- with data already existing in the country" (U.S.A.I.D., January, 1973, p. 2). The planning process then proceeds through the following steps, in sequence, always using data from existing studies and surveys.

#### THE STEPS OF THE PLANNING PROCESS

1. Describe nutritional problems, in terms of personal characteristics, location, severity, frequency and type of malnutrition. The description may include data from clinical surveys, food consumption surveys, food habits, and even income surveys. For example, a comparison of prices, consumption patterns and income distribution may enable an estimate of the families too poor to purchase adequate nutrients. Another useful technique is to record the data from various surveys on a map of the country, in order to get a picture of the geography of malnutrition.

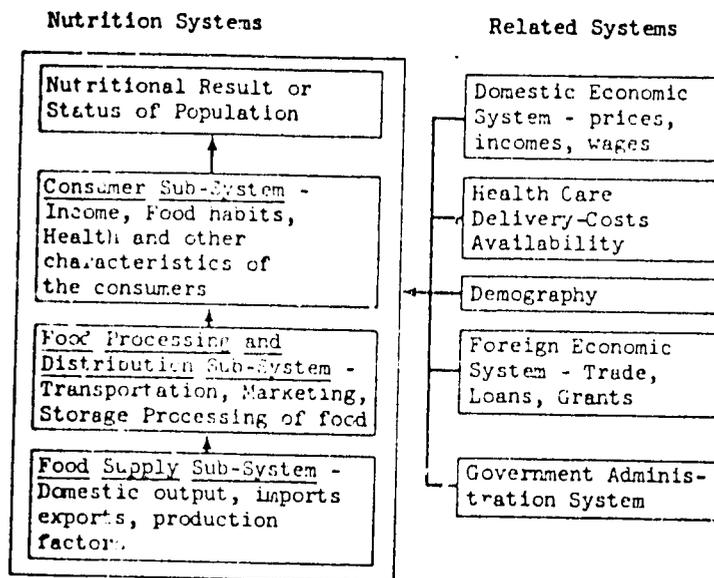


2. Set preliminary goals. The problem description should suggest subgroups of the population which can be assigned highest priority, for example, by type of malnutrition, by age category, or by location. Goals should be revised several times during the planning process as knowledge increases, always as a result of dialogue between planners and the formally constituted decision-making entities.
  
3. Develop a model of the causal relationships in the national nutrition system. Figure 1 below summarizes the components of the nutrition system. The model should be as quantitative as possible, showing the flow of nutrients from producer to consumer and flow of money in the other direction. When possible, trends over time and future collisions should be identified. The biggest problem the planner faces at this step is limiting the analysis: time and resources are limited, but the complexities of the nutrition system are not.
  
4. Identify possible interventions. In the theoretical methodology interventions are developed purely from a consideration of the problems and causal relationships, but in practice on-going nutrition projects are also inventoried. The idea is to seek out interventions which attack the causes of the malnutrition problems. Several categories of intervention are suggested: interventions which attack a specific nutritional deficiency, broad policies designed to uplift some set of activities such as a credit program, projects aimed at a specific target group, and non-food system interventions such as an immunization program.
  
5. Compare and select interventions. A variety of considerations must be taken into account, including the ability to meet constraints such as funding, talent, and foreign exchange. Cost-effectiveness studies should be carried out, in such terms as cost of nutrient delivered to target group members. This requires a fairly detailed description of the intervention to estimate costs and the number of persons who



### THE NUTRITION SYSTEM

FIGURE 1



The interaction of elements in the sub-systems and related systems affect the supply and flow of nutrients to the consumer, and his ability to purchase and utilize the nutrients



will be reached by the program. Experiential data from pilot programs or on-going programs is a great advantage. Each intervention should be judged in terms of its feasibility; are the various support systems for its success in place.

6. Project design. A specific plan for the implementation of each selected project must be designed.

7. Intervention evaluation. This is how one learns.

Accomplishing these tasks, of course, is not trivial. The authors recognize this:

"The nutrition planner is faced with an immense task. First he must convince decision-makers that his country has a nutrition problem that is soluble, at least in part, through investments, and that improvement of the nutritional status of the at-risk population is of consequence in national development. Second, the planner must be able to argue persuasively for specific courses of action that will ameliorate the nutrition problems. Thirdly, he must monitor and evaluate programs which claim nutritional benefits although the effects may not be apparent for many years" (U.S.A.I.D., March, 1973, Vol. II, p. 148).

#### APPLICATION IN ECUADOR AND THE PHILIPPINES

The first five tasks above were illustrated in Ecuador and published in an accompanying volume to the methodology. The Ecuador case study contains an especially useful analysis of interventions of donated foods, pulses, milk, wheat fortification, fish and seafood, credit to small farmers and irrigation projects.

A partial application is reported in the Philippines in 1973. Careful descriptions of the problem, the nutrition system, and current government nutrition programs are provided.



## APPLICATION IN THAILAND

I had the opportunity to participate in the application of this approach in Thailand in the summer of 1974. The operational goal was to build nutrition into the next national plan. During the summer we were able to move partway through step 3. Although it is much too soon, as of this writing, to judge the Thailand experience, several observations seem germane here:

- (1) The methodology clearly provided a framework from which to begin. The step-by-step process helped everyone to know in general terms where things were heading, and the general qualitative model of the national nutrition system provided a common language for people from different backgrounds.
- (2) Collecting existing studies is a painless way to begin a group effort, as opposed, for example, to the building of a model or the design of a good survey form.
- (3) The hypothesis that sufficient secondary data can be obtained to accomplish Tasks 1, 2 and 3 was supported.
- (4) Earlier consideration of current projects would have been useful.
- (5) Although the methodology provided guidelines for part of the study, it also ignored many of the tasks required to make the project successful. Considerable and important attention was paid to organizational relations, personnel development, commitment, history of governmental behavior, and the like; in other words, the issues traditionally missing from the rationalist school.

## F. COLOMBIAN AGRICULTURE SECTOR MODELS

A large collection of documents have resulted from the collaborative research effort between the Latin American Bureau of U.S.A.I.D. and the Agriculture Ministry of Colombia. The general purposes of that collaboration were twofold: (1) explore methodologies for agriculture sector analysis, and (2) identify policy alternatives. Eventually, the effort began to incorporate nutritional concerns into the analysis.



The main results reported in three of the documents are presented here: the first two (Daines, April, 1972; Daines, November, 1972) do not incorporate nutritional concerns, while the third (Suttor, April, 1973) does.

### METHODOLOGICAL ISSUES

Several methodological issues are discussed in the two papers by Daines which are worth considering.

1. Normative. Daines argues that models for strategy development should point the way, and not just predict the future under various assumptions (November, 1972, p. 5-6). This is an argument for an optimization approach (e.g., linear programming) such as is used in these models, rather than a simulation. However, it seems to me that this argument confuses the utility of the model with the purpose of the planning process. As we have seen, the usefulness of models in planning is not well understood and is certainly rather subtly intertwined with the persons using them.

2. Data. Daines argues for a "data-rich" approach, one where the models emerge from the data. The following quote, I think, makes the point as well as I have ever heard it:

"We are seduced into thinking that we have learned general principles only to find that they were really subtly intertwined with the environment in which they were learned.... The task is more one of 'ad nauseam' and 'ad infinitum' gathering of information, and struggling to relate it, then one of clever 'systems methodology'" (Daines, April, 1972, p. 155).

The dominance of the local environment is a theme we heard before, for example, as one of the lessons emerging from the Tamil Nadu study. We have also heard, however, of the paralysis which never-ending data collection and analysis can bring to the planning process.



3. Disaggregation. The level of disaggregation of data is more or less directly proportional to the amount of data one must collect. Thus, in terms of time and money it is best to aggregate data as much as possible. Such aggregation also makes it more likely that generalizations from other situations can apply. Daines tested the hypothesis that the Colombia agriculture was sufficiently homogeneous in all ways (time, geography, family types, income, etc.) to aggregate, but the hypothesis was rejected. Wide differences were found among commodities (for example, strawberries generate 50 times as much labor per hectare as cattle, and small farms were found to be less productive than large farms because of commodity mix rather than technology or any inherent inefficiencies). Other dimensions were found to require disaggregation as well, particularly seasonality of labor demand. Non-homogeneity, disaggregation of data, and decentralization of decisions are closely related issues which need more careful thought, such as Daines has presented here. For example, if homogeneity increases the success of central planning, then central planners may implicitly adopt homogeneity as a goal, a development of dubious value.

### MODELS

In the April, 1972 document, Daines used three approaches: an input/output model with 245 commodities based on 1968 price data, special studies of the small farmer, and a linear programming model of the agriculture sector. The linear programming model searches for the best production levels for the 58 different commodities. Several variations were run in order to obtain these levels for different objectives, such as maximum employment, maximum value added, maximum income, and maximum private profits. The model contained several types of constraints:

- (a) 58 domestic market constraints, reflecting maximum demand for each commodity
- (b) 58 export market constraints
- (c) 12 labor supply constraints, one for each month of the year



- (d) 6 land constraints, maximum hectares available of each type
- (e) 4 credit constraints.

The analysis produced several interesting insights, which, of course, are only as correct as the data and model. Small farms were found to be credit constrained, due to the requirement for hired seasonal labor and the artificial interest ceilings that do not keep pace with inflation. Agriculture is a good employment and income generator (i.e., investments in the agriculture sector will produce relatively more jobs and income than other sectors), but certain industries (wood, clay) are the best income redistributors.

In his second paper, Daines (November, 1972) develops the linear programming model and the data which goes into it. He defines a strategy to be: (1) a level of production of each commodity; (2) technology level for each commodity; (3) location of production; and (4) the allocation of limited resources (fertilizer, etc.) to production activities. One of the limited resources in Colombia is credit, and here Daines builds two levels into the model -- the traditional and rigid system, and a new flexible system which allows all available credit to go to small farmers if they demand it. He then looks at strategies which maximize employment, maximize value added, and maximize private profits for the two credit systems. Constraints are similar to the previous model. His analysis looks at the trade-off between the various maximizing strategies. For example, under the next flexible credit system in 1975, the Value Added Maximizing Strategy produces 455,000 more jobs but 1.188 billion pesos fewer in private profits than the Private Profits Maximizing Strategy, for a trade-off of 2,610 pesos per job.

#### INTRODUCING NUTRITIONAL REQUIREMENTS

Suttor also uses a linear programming model, but introduces nutritional requirements into the problem. Specifically, he introduces 22 nutrient constraints, reflecting the minimum annual requirement for 21 different



nutrients for the entire Colombian population, and one constraint representing the upper limit on calories. He then compares the results of a strategy that minimizes the retail cost of food sold with a strategy that maximizes value added (a typical agriculture sector strategy). He notes that the minimum cost strategy uses more grains and vegetables and less sugar than the maximum value added strategy. He also notes that relaxing the marked constraints by allowing demand for certain commodities to increase at a more rapid rate greatly reduces the cost of the minimum cost diet.

It is clear that this effort is not yet to the point of practical contribution to national nutrition policies. It is a research effort, with much of the work carried out in Washington rather than Bogota. Nevertheless, it may create a data base, establish a framework for analysis, and motivate and train Colombians who are familiar with its use and who will succeed in introducing nutritional concerns into the agriculture planning activities.

#### **G. AGRICULTURE SECTOR SIMULATION IN NIGERIA, KOREA, AND VENEZUELA**

Efforts to model and plan in the agriculture sector are widespread and varied, certainly surpassing the current efforts in nutrition planning. The agriculture simulations of Nigeria, Korea, and Venezuela arising from the work at Michigan State University are among the most technically advanced, and have incorporated nutrition concerns in some of the work. Therefore, I think it is instructive to review this work in juxtaposition to some of the efforts aimed more directly at nutrition planning.

#### **THE NIGERIAN MODEL**

The initial research project was undertaken by Michigan State University with U.S.A.I.D. funds. The final report (Manetsch, 1971) makes clear that although the Nigerian agriculture was simulated, the intent of the project was to develop and test the technical feasibility of a large-scale simulation in the agriculture sector



and not to use it for policy-formation in Nigeria. This intent was made certain by the advent of the Nigerian/Biafran war during the project. The project included development of nutrition models, reported by Smith in a series of papers (Smith, 1969, 1970 and 1972; Smith and Hlossein, 1972). One of the Nigerian study team members adapted the cattle industry sub-component of the Nigerian simulation to Venezuela, with good results (Halter and Miller, 1973). Finally, the Michigan State team took on the task of assisting the Korean Government in developing an agriculture sector plan. They report their success in adapting the lessons from the Nigerian study in Rossmiller (1972).

The simulation techniques on which most of the work is based consists of interrelated equations whose solution determines the state of the system at a point in time. Some of the results of that solution provide the input for the next round, so that the system iterates from year to year. This allows the simulation to predict the consequences of alternative policies over time. The equations have been programmed for a large computer so that "policy runs" under different assumptions are easy and inexpensive.

The development of the simulation the first time was no easy task. After acquiring the funding, they proceeded to specify the relevant decision-making clientele and their most important questions, and then develop conceptual models which related to those questions. Some of the models were done before others (such as the cattle industry model) and proceeded forward to collect data from secondary sources, from interviews, and when all else failed, from educated guesses. Meanwhile the computer programs were coded and debugged. Then sensitivity tests were run to test the relative impact of data errors on policy outcomes. Additional effort was spent in increasing reliability, the lack of which appeared to have large effects on policy outcomes. Tests of reasonability were also run to track variables over time, and adjustments made at this point. All this costs a great deal.



The model itself is very disaggregated in terms of commodities and regions. I will not attempt to describe it here, due to its complexity, but it is essentially a causal network which has been quantified. More details of the model will be given in the descriptions of Venezuela and Korea.

Two general categories of interventions are considered for Nigeria: reduction in commodity prices (Nigeria controls prices through its Regional Marketing Boards) and investments in modernization. For example, modernization programs considered were tsetse fly eradication, higher yielding rubber trees, planting bush land in cocoa, and modernization of the food crops in the middle belt. The simulation then traces the effect of combinations of these policies over time on such variables as: value added, foreign exchange, gross domestic product, market price for food, and caloric consumption. One result was that there was an inverse relationship between foreign exchange earnings and caloric consumption; when one went up, the other went down. Thus they have quantified the classic trade-off between food crops and cash crops.

### NUTRITION MODELS FOR NIGERIA

Smith, sometimes in collaboration with planners of LDC's, generates numerous linear programming models based on the Nigerian model and data, but which include nutritional concerns. His methodology, then, is closer to that used by U.S.A.I.D. in the Colombia agriculture studies.

In his paper with Hossein (Smith and Hossein, 1972), Nigeria is divided into six regions and a model developed for each region. The constraints are of three types: nutrition constraints (minimum nutrients for the population of the region), factors of production (seasonal labor, land), and growth rates of population and consumption by commodity. He looks at income and foreign exchange for various levels of technology (for example, new commodities might be



introduced with a different mix of inputs under a higher technology). The model quickly shows the trade-offs between food and cash crops, although unrealistic results are obtained when estimating future results under high technology policies, probably because of Smith's assumption of constant population (not made in the larger simulation).

Smith notes a number of shortcomings, but indicates the approach is sufficiently well-developed to use in policy formation (p. 29). I doubt that the conclusion is justified.

### THE CATTLE INDUSTRY IN VENEZUELA

Halter and Miller (1973) describe the application of the cattle industry sub-component of the Nigerian Simulation to the Venezuelan cattle industry. Essentially, the simulation traces the cattle population from one year to the next, based on births and deaths in each year. Along the way it notes milk and meat production, as well as food consumed by the herd. Food is supplied in a variety of ways: traditional grazing land, modernized grazing land, feed crops and crop residue. Policies can be established which determine the amount of food from each source. The number of animals slaughtered depends on population and requirements for foreign exchange.

Miller was located within the Venezuelan Ministry of Agriculture working on Livestock Productivity Project, and Halter was a consultant to the Ministry. From this vantage point, they convinced the Ministry that the simulation could be useful.

"Overstocking and overgrazing is a major problem in many areas of (Venezuela), resulting in general range deterioration and reduced carrying capacity." This situation exists "in part because of the tropical ecological conditions found generally in Venezuela, but government policies and programs have also played a part in their formation" (Halter and Miller, 1973, p. 109). "The development problem of the Venezuelan cattle industry, stated in a few words,

is to transform traditional cattle farms into modern ones.' The simulation model was then structured along the lines of the Nigerian model, to test various policies and programs which might speed the transition from traditional to modern production" (p. 110).

The Nigerian model was reprogrammed for a computer in Venezuela, modifications were made to more accurately reflect the situation in Venezuela, and data collected. The model was verified by obtaining results of a 10-year historical run, comparing it to actual figures, and discussing the results with experts. Also, the model was subjected to "shocks" in the form of simulated government programs which might have occurred but did not, to see if the model behaved in a reasonable way over the 10-year run.

Then various policies were introduced in simulated form and the results estimated over a 30-year period -- 1972 to 2001. Some of the policies included increasing producer prices by various amounts, subsidies and investments in feed supplementation, pasture improvement, deforestation, and disease control. The results of these policies are plotted over time for various interesting variables, such as the size of the traditional and modern herds, supply, and demand.

These graphs were then used as communication aids with various decision-makers. In their conversations with policy-makers, the authors "took great delight in pointing out the conflicts between the alternatives in attempting to achieve a set of multiple objectives" (Halter and Miller, 1973, p. 114).

The authors believe their conversations had a major impact on national policy. After showing the results to various experts, policy-makers, cattlemen's associations, university personnel, and local officials, the government announced an increase in the price of beef and a reduction in the marketing margin -- recommendations which coincided with the model results. This policy change has caused an uproar in



the public media and has become a political issue. The authors believe the model had some impact on this decision, although they are quick to point out that:

- (1) no one knows whether the final reality will be anything like the predictions of the model, and
- (2) they did not attempt to make recommendations to the policy-makers, but only let them use the model to explore implications of various policies.

### THE MODEL APPLIED IN KOREA

The Korean agriculture simulation was done in a hurry. It began in September of 1971 and was completed in mid-March of 1972, less than seven months. The project was funded by U.S.A.I.D. and carried out by Michigan State University, with the goal of incorporating the results in Korea's Third Five-Year Plan.

The two previous Five-Year Plans had concentrated on achieving industrial growth, a sound social infrastructure, and increasing exports. These goals were achieved with the determination of the strong central government of South Korea -- overall economic growth was 8.2% per year compared to 4.2% growth per year in the agriculture sector. Now, in the Third Five-Year Plan, the Korean Government became convinced that its attention should shift to the agriculture sector. Thus the stage was set for success.

The study proceeded quickly along several parallel paths. First, preliminary evaluation took place by literature review and interviews. Four major constellations of values held for the agriculture sector were identified:

- (1) Food supply. Achieve food self-sufficiency to replace the current deficit situation. No food imports.
- (2) Rural quality of life. Income, electricity, health, stable prices.
- (3) Overall development. Contribute to foreign exchange, healthy urban migrants, land for expanding cities.



- (4) Administrative and political. Peace, infrastructure for more rapid development.

In addition, three major policy alternatives were identified during this stage: (a) the current plan which attempts to increase grain production through research, development and promotion; (b) a price control and population plan which would invest in family planning and use price controls and quotas to achieve a switch from rice to other foods in both consumption and production; and (c) a free market policy which would invest in family planning but remove all price controls.

Meanwhile, twenty multidisciplinary teams, each consisting of an American and a Korean, were formed to undertake a series of working papers. Topics included such things as: the credit system, marketing system, crop production data, food demand relationships, cooperatives. Information was obtained on nutrient intakes, population, land use, and current government programs. Trends were noted: decreasing fertilizer costs due to industrialization, urban migration, increasing scarcity of rural labor, new crop varieties. Also noted were past problems of Korean planning: bad data, autonomous bureau chiefs, and little contact with farmers.

The computer simulation was also adapted to Korea. The model itself consisted of four major sub-components:

- (a) National Input/Output Model, which produces estimates of income and of available factors of production such as fertilizer.
- (b) Urban Consumer Demand Model, which estimates demand from income and population figures.
- (c) Population and Migration Model, which estimated rural and urban population via a cohort survival model.
- (d) Agriculture Production Model, which estimates, for twelve crops in three regions, the level of production and rural consumption, with the remainder available for the urban market. Several factors are used to arrive at these estimates: rural labor supply from the Population model, available factors of production from the National Input/Output Model, land availability for various crops which is a policy decision, yields which is also affected by policies on research,



irrigation, and other investments, and prices to farmers which is also a policy decision. Thus the policies can be manipulated and the results observed over a 15-year period on such variables as per capita income, available calories and protein per capita, foreign exchange earnings, profit per land area, seasonal labor demand by crop, and numerous others. Unfortunately, the entire simulation was not working by the end of the study, and only components of it were used to analyze the data.

Using the Working Papers and partial simulation, the three policies were evaluated by the project team and Korean policy-makers, and out of this evaluation emerged a fourth policy which was finally adopted. This policy calls for more radical price controls on rice, and a time-phased set of two-price controls on barley and other crops to shift away from rice. Investments in multiple-cropping and other higher yield strategies are increased and investments in family planning are kept high.

All along the way, close communication is kept with the Korean decision-makers. Narrow recommendations were avoided and value concerns were kept in the forefront.

#### ADVANTAGES OF SIMULATION

In the documents on Nigeria (Manetsch, 1971) and Korea (Rossmiller, 1972), several claims are made in favor of the simulation approach.

- (1) It allows many performance criteria, not just one. In the opinion of the authors of these studies, the policy-makers should relate the multiple goals, not the planners. (Note that optimization techniques such as linear programming are not restricted to a single performance variable either, although they do not produce multiple results quite so conveniently.)
- (2) It traces changes in the key variables over time.
- (3) The sequence of policies and investments can be analyzed.



- (4) The model is based on logical representation of reality as normal men see it, in which changes in one factor are caused by the action of other variables, rather than abstract representations which are more difficult to describe and comprehend.
- (5) Data is always scarce and in error. This approach is a way of making the best of it.
- (6) Possibly most important, the simulation approach improves with use, while costs decrease.

Based on the experience in Venezuela and Korea, many of the claims would appear validated. Certainly costs were much less in Korea than Nigeria, and the quickness of the results in Korea suggest the approach may not produce too much planning.

One of the most significant aspects in the success of the projects may be the extensive involvement of indigenous policy-makers, planners, and students. In each case, the model development became a focus for a socialization and learning process which dealt with value systems as well as data and models. Apparently, the approach had an impact on policy in agricultural planning. It is too soon to tell whether the approach will be maintained as part of the planning process, whether the policies are successfully implemented and maintained, and whether they achieve the desired results. Nevertheless, it holds promise as a vehicle for introducing nutrition goals into agriculture planning.

#### 4. PROPOSED APPROACHES FOR NATIONAL NUTRITION PLANNING

The literature contains a number of articles which make the case for national nutrition planning and then propose an approach for doing it, but do not actually report an application of the approach. For example, the Berg and Muscat systems approach discussed earlier (Berg and Muscat, 1973) is such a statement. Although some are excellent papers, they do not add a great deal to the Berg and Muscat approach, and so I have chosen simply to note them here rather than describe them in more detail.

Joy (1973) proposes and discusses an approach to nutrition planning from the viewpoint of the economist. He summarizes his basic principles thusly: "The basic fact about the nutrition problem is that it is primarily a poverty problem: a problem of ineffective demand rather than of ineffective supply; for food not just protein" (Joy, 1973, p. 5). He then goes on to discuss the "nature of an effective planning process", step-by-step, but noting that the process is really iterative and the stages rarely clear-cut.

Following his experience with the Tamil Nadu study, Schaefer (1973) prepared a summary of his views on how U.S.A.I.D. should carry out the analysis for a nutrition plan. The paper is in an outline form, but replete with practical details. It contains an extensive list of the required data and how to analyze it. In addition, recommendations are made for organization and staffing, the relationship of the study team to the local U.S.A.I.D. mission, how many people of what skills should be on the study team, and even an estimated budget to complete the plan (\$341,970).

In a report to leaders of Inter-American Governments, Rueda-Williamson (1973) sets forth many of the elements of a comprehensive nutrition planning process. He focuses on policies and the functions of various units which develop those policies. Thus he discusses the tasks to be carried out by various technical support groups, by a central technical group for multisectoral planning, and the political decision-making groups. There is little in the way of analytic models.

Nasset (1962) anticipates some of the later systems planning in India from the viewpoint of a physiologist. The proposed social actions are continually related back to the biological theory. The views on how to measure the progress of a nutrition planning system, which are interwoven throughout the paper, are particularly interesting.



Call and Levinson (1973) propose a comprehensive systems approach to nutrition planning in an excellent and now widely quoted paper. It describes a causal model which begins at the individual and works backward, and also discusses the systematic review of various categories of policies. It does not discuss the planning process as an intervention.

Stickney, Abbott and Chamberlin (1973) proposed the standard steps for a systems approach, noting, however, that the entire process should be subject to improvement and iteration as a planner proceeds through it. They then discuss how linear programming models of food production and consumption can be used based on detailed examples. Finally, they discuss how computer programs might be used to aid the nutrition planner in designing a plan.

A group at the University of Colorado led by David Rogers has suggested a radically different approach. They propose a planning approach which begins with a detailed and systematic analysis of the major food of the area, starting at the consumer and working back. "One begins with the specific preparations of the final food that is eaten in every consuming unit in a given area" (Hersch, 1974, p. 15). In this way an understanding of the causal factors relating to nutrition will be obtained, as well as likely points of intervention. This approach is being tested on cassava in Nigeria. They would like to see the consumer movement become the instrument for eliminating malnutrition, via the "investigation and identification of consumer needs" (April, undated, p. 1). This effort is not far along, but offers the seeds of some innovative and different views to the comprehensive, governmental approach to nutrition planning currently in vogue (see also April, 1973).



## I. LITERATURE ON PARTS OF THE PLANNING PROCESS

As we searched the literature for coherent statements on a comprehensive nutrition planning process, we occasionally ran across papers that described some part of that process in a particularly illuminating way. Since there are many approaches to the planning process which rest on different principles, different philosophies of theory and action, these individual papers do not add up to a whole. Nevertheless, they have added to our understanding and so I note them here. I have attempted to place them in the following rough categories:

- The Big View
- Government Politics
- Project Evaluation
- Nutrition in Agriculture
- Collecting Data
- Miscellaneous Methodological Issues
- The Causal Network

The "Big View" papers set one back a bit. They do not quite fit as a part of the planning process; rather they tend to wrap around it. Two documents I found particularly relevant were Pollack's (1966) balanced views, and Meadows' (1972) future ones. Although nutrition is only one of a number of important factors in the Meadows analysis, it provides one possibly important framework for thinking about the future which might counteract the sometimes narrow views of econometric modeling. In other words, the world models of Meadows, appropriately scaled down, may provide a far more reasonable framework for the nutrition planner to work under than the current econometric modeling.

Maurice King has discussed the approach used by Llewelyn Thompson in founding a Nutrition Commission in Zambia, which H. L. Rice of U.S.A.I.D. has then paraphrased as follows:

- (1) Find something to coordinate (e.g., Volunteer Community Action Groups)
- (2) Establish the Commission independent of those being coordinated



- (3) Get direct access to the Cabinet
- (4) Be concerned only with long term policy
- (5) Commission staff should be independent of ministries
- (6) Obtain an adequate staff
- (7) Obtain a source of adequate funding
- (8) Obtain ability to take executive action
- (9) Establish an effective Public Relations program
- (10) Get a good leader to head the Commission.

A large number of good articles relevant to project evaluation were identified, some discussing general issues and others working through an evaluation of a specific project. The more general papers include Burkhalter (1972), Cook (1968), Gordon and Scrimshaw (1972), Indian Institute of Public Opinion (undated), Lowenstein (undated), Neumann (1973), and Synectics Corporation (1972). Many of these documents deal with estimating results in quantitative and frequently economic terms. In an insightful letter to Alan Berg, David Mathiasen of U.S.A.I.D. provides a critical review of cost-benefit analysis of social areas (Mathiasen, 1972).

Selowsky (1970), Devanney and Mahnken (1971), and General Oceanology, Inc. (1969) provide three examples of excellent evaluations of specific interventions with nutritional impacts. Kreysler (1970) gives a brief but interesting analysis of how to decide how far apart to locate nutrition clinics. Some of the work discussed earlier has extensive discussions of project evaluation (see U.S.A.I.D., March, 1973, and Berg and Muscat, 1973). Also, Berg, Scrimshaw and Call (1973) contains numerous papers on project evaluation and other relevant topics as well.

Not a great deal of good work relating human nutrition and agriculture was found. A favorite analysis seems to be to calculate the calorie gap, that is, estimate with some care the caloric needs of a population and compare this to caloric intake or calories available to consumers. Another favorite analysis is to calculate the nutrient production per



unit of input for different crops, for example, the grams of protein per man-hour for different crops. Such analysis is often a prelude to a linear programming formulation such as we have seen in Suttor (1973). Some papers which demonstrate such analyses include McKigney (1969), Milindankura and Wagner (1969), Oyenuga (1970), and Acciari, Wilson and Quartas (1973). Dema (1965) looks at food production and nutrition at the community level, with emphasis on Nigeria, providing a rather detailed guide for the field worker.

Data collection is an issue covered extensively in every textbook on field work. Nevertheless, planners seem to systematically underestimate the difficulties of data collection. Two articles which will remind nutrition planners of these difficulties are Namboze (1967) and Reddy (1968).

There are, of course, a whole gamut of methodological issues and procedures to be learned about in the nutrition planning process. Some works touch on a number of these issues in an interesting way but do not necessarily present a comprehensive view. For example, Taba (1970) in his report of a conference dwells on various types of data collection, and Battelle Memorial Institute (197) discusses data aggregation and model-building. Much more important are the many articles by Jelliffe; for example, the discussion on identifying the problem in high-risk groups (Jelliffe and Jelliffe, 1972).

Developing a model of the causes of malnutrition is generally an important part of the planning process. The causal network can be immense, including all the primary and secondary causes leading up to malnutrition and all the aftereffects. One might call forth a large portion of the world's research literature on nutrition in the development of such a model. Nevertheless, beginning attempts have been made: most of the comprehensive nutrition planning approaches contain a conceptual model of the causal network, and other papers provide models of all or portions of the network. Many papers, of course, look at one or two relationships in that network.



At the conceptual level, there is, for example, the work of Correa (undated), Jelliffe (1971), Williams (1962), and Wilson and Lema (1971). These range from the extensive and precise mathematical models of Correa to the flow chart of Williams. There are also, of course, a large number of partial models based on data. Possibly most important are the firm guideposts emerging from Scrimshaw's research on infectious disease and malnutrition (see References in Chapter 4). Other work includes Antrobus (1971), Britt (1973), and Levinson (1972).



## REFERENCES: NATIONAL NUTRITIONAL PLANNING

- Aall, Cato (1970) "Relief, Nutrition and Health Problems in the Nigerian/Biafran War." The Journal of Tropical Pediatrics, v. 16, no. 2, Monograph No. 9.
- Abkin, M.H. and T.J. Manetsch (1973) "A Generalized System Simulation Approach to Agricultural Development Planning and Policy-Making." In Cuenod, M.A. and S. Kahne (eds.) (1973) Systems Approaches to Developing Countries. Pittsburgh: Instrument Society of America, p. 97-108.
- Acciarri, Giovanni, Dean H. Wilson and Victoria E. Cuartas (1973) "Produccion Agropecuaria Y Desnutricion En Colombia." Cali, Colombia: Universidad Del Valle.
- Altman, J.W., E.M. Jones and S.J. Munger (1972) Experimental Determination of Alternative Approaches to Nutrition Education in Developing Countries. Submitted to U.S.A.I.D., Office of Nutrition. Allison Park, Pa.: Synectics Corporation.
- Antrobus, A.C.K. (1971) "Childgrowth and Related Factors in A Rural Community in St. Vincent." From Environmental Child Health.
- April, Jay E., G.N. Hersch, D.J. Rogers, and C. C. Slater (undated) Consumerism - A Neglected Decision Tool for Solving Nutrition Problems in Developing Countries. Denver, Colorado: University of Colorado, Taximetrics Laboratory, Paper No. 33.
- \_\_\_\_\_, G.N. Hersch, D.J. Rogers, C.C. Slater (1973) Nutrient Synthesis and Transfer Simulation for Cassava Dependent Environment. Denver, Colorado: University of Colorado, Taximetrics Laboratory, Paper No. 34.
- Battelle Memorial Institute (1970) The Economics of Malnutrition, Volumes I and II.
- Berg, Alan with Robert J. Muscat (1973) The Nutrition Factor: Its Role in National Development. Washington, D.C.: The Brookings Institution.
- Britt, Bonnie, Miguel Kourany and Jack N. Millar (1973) "A Pilot Search for Environmental Factors Influencing Diarrheal Disease in Young Children." From Environmental Child Health.
- Burkhalter, Barton R. (1973) "A Paper Aimed at Estimating the Effect of Malnutrition of Price Reductions in Food in Candelaria, Colombia."
- Call, David L. and F. James Levinson (1973) "A Systematic Approach to Nutrition Intervention Programs." In Berg, Alan, Nevin S. Scrimshaw and David L. Call (eds.) Nutrition, National Development, and Planning. Cambridge, Mass.: The MIT University Press.



- Cantor, Sidney M. Associates, Inc. (1973) The Tamil Nadu Nutrition Study.  
Haverford, Pa.
- Volume I      An Operation Oriented Study of Nutrition as an  
                  Integrated System in the State of Tamil Nadu.
- Volume II
- Section A      Technical Data and Methods
- Section B      Cultural Anthropology and Nutrition
- Section C      Part I - Nutrition Intervention: A Study of Take Home  
                  Dry Food as a Distribution System  
                  Part II - Exhibits and Tables
- Section D      Part I - An Organizational Alternative for Child  
                  Nutrition Programming - Tamil Nadu Childrens Commission  
                  Part II - A Study of Feeding Programs in Tamil Nadu  
                  Part III - Nutrition Intervention: A Test of Extruded  
                  Foods in Balwady Feeding Programs in Tamil Nadu
- Section E      A Survey of Food Processing Industry in Tamil Nadu
- Cook, R. (1968) "The Economics of Malnutrition." In Nutrition Reviews,  
The Economics of Malnutrition, p. 39-41.
- Correa, Hector (undated) Population, Health, Nutrition, and Development:  
Theory and Planning. Baltimore, Maryland: Johns Hopkins University  
Press.
- Daines, Samuel R. et.al. (1972) Summary Results of Employment, Income  
Distribution and Small Farm Analysis. Analytic Working Document  
#2, LA/DR/SASS, U.S. Agency for International Development.
- \_\_\_\_\_ (1972) Partial Implications of the Linear Programming Analysis  
for Decision-Making in the Agricultural Sector. Analytic Working  
Document #6, LA/DR/SASS, U.S. Agency for International Development.
- Dema, I.S. (1965) Nutrition in Relation to Agricultural Production. Rome,  
Italy: Food and Agriculture Organization of the U.N.
- Devanny, Professor J.S., III and G. Mahnken (1970) The Economics of Fish  
Protein. Cambridge, Mass.: Mass. Institute of Technology, Sea Grant  
Project Office.
- Food and Agriculture Organization of the U.N. (1974) National Food and  
Nutrition Programme: Zambia: The Food Economy of Zambia, Technical  
Report 1. Rome, Italy.
- \_\_\_\_\_ (1974) National Food and Nutrition Programme: Zambia: Nutrition  
Status Survey, Technical Report #2. Rome, Italy.
- General Oceanology, Inc. (1969) Commercial Feasibility of Fish Protein  
Concentrate in Developing Countries. Prepared for U.S.A.I.D.,  
Food from the Sea Service. GO Report No. 8.

- Gordon, J.E. and N. Scrimshaw (1972) "Evaluating Nutrition Intervention Programs." From Nutrition Reviews, v. 30, no. 12.
- Halter, A.N. and S.F. Miller (1973) "Simulation in a Practical Policy-Making Setting: The Venezuelan Cattle Industry." In Cuened, M.A. and S. Kahne (eds.) Systems Approaches to Developing Countries. Pittsburgh, Pa.: Instrument Society of America, p. 109-116.
- Hersch, Gilbert, J.E. April, D.J. Rogers and C.C. Slater (1974) Descriptive Model of Cassava Dependent Food/Nutrition System: Southern Nigeria. Memorandum to U.S.A.I.D, Office of Nutrition.
- Horn, J.S. (1972) Articles on Health Services in China: "Building a Rural Health Service in the People's Republic of China." From International Journal of Health Services, v. 2, n. 3, p. 377-383.
- Indian Institute of Public Opinion (undated) The Economics of Malnutrition in India. Part III: Nutrition and Productivity. New Delhi, India.
- Jelliffe, D.B. and E.F.P. Jelliffe (1972) "The At-Risk Concept and Young Child Nutrition Programmes (Principles and Practice)." From Environmental Child Health, p. 199-201.
- \_\_\_\_\_, (1971) "Approaches to Village-Level Infant Feeding." From Environmental Child Health.
- Joy, Leonard J. (1973) Food and Nutrition Planning. University of Sussex Institute of Development Studies Reprint Series No. 107. Reprinted from the Journal of Agricultural Economics, v. 24, n. 1.
- Kreysler, J. (1970) "Rational Development of an 'Under-Five' Clinic Network." From The Journal of Tropical Pediatrics.
- Levinson, F. James (1972) The Morinda Experience: An Economic Analysis of the Determinants of Malnutrition Among Young Children in Rural India. Ithica, N.Y.: Cornell University Press.
- Lowenstein, F.W. "The Cost of Malnutrition. A Brief Consideration of Two Major Problems." 642 E. Walnut Street, New York, N.Y.
- McKigney, J.I. (1969) "An Economic Approach to Food Policy Within National Development." Proceedings of the 8th International Congress of Nutrition, Prague 1969. Excerpta Medica, Amsterdam, 1970, p. 566-569.
- Manetsch, Thomas J., et.al. (1971) A Generalized Simulation Approach to Agriculture Sector Analysis, with Special Reference to Nigeria. E. Lansing, Michigan: Michigan State University.
- Mathiasen, David (1972) Letters to Alan Berg.



- Meadows, D.H., D.L. Meadows, J. Randers, W.V. Behrens III (1972) The Limits to Growth. New York: Universe Books.
- Milindankura, Supanee and M.W. Wagner (1969) The Demand for Thai Agricultural Products: A Nutritional Approach. Bangkok, Thailand: Kasetsart Economic Report No. 30. Kasetsart University.
- Namboze, Josephine M. (1964) "Confusion in the Preparation and Measurement of Milk and Dairy Products at the Village Level." From the Journal of Tropical Medicine and Hygiene, v. 1967, p. 153-154.
- Nasset, E.S. (1962) "An Approach to a Food and Nutrition Programme for India." From Agricultural Situation in India, v. 17, p. 454-466.
- Navarro, V. (1972) Report on Health Services in Cuba: "Health, Health Services, and Health Planning in Cuba." From International Journal of Health Services, v. 2, n. 3.
- Neumann, A.K., C.T. Neumann, A.E. Ifekwunigwe (1973) "Evaluation of Small-Scale Nutrition Programs." The American Journal of Clinical Nutrition 26, p. 446-452.
- Oyenuga, V.A. (1969) "The Present and Future State of Food and Nutrition in Nigeria." Nutrition, Proceedings of the 8th International Congress of Nutrition, Prague 1969. Excerpta Medica, Amsterdam: p. 601-607.
- Patterson, E.H., et.al. (1974) Health Care in China: Introduction. Geneva, Switzerland: Christian Medical Commission.
- Pollack, Herbert (1966) "Nutritional Problems as Part of the Total Economy." From Perspectives in Nutrition, American Journal of Clinical Nutrition, v. 19, p. 285-290.
- Reddy, S. (1968) "Practical Problems with Obtaining Valid and Reliable Information on Household Food Utilization." From The Journal of Tropical Pediatrics, p. 66-70.
- Rice, E. B. and E. Glaeser (1972) Agricultural Sector Studies: An Evaluation of A.I.D.'s Recent Experience. Agency for International Development, Evaluation Paper 5.
- Rifkin, S.B. (1973) "Public Health in Dhina - Is the Experience Relevant to Other Less Developed Nations?" From Social Science and Medicine, v. 7, p. 249-257. Great Britain.
- Rossmiller, George E., et.al. (1972) Korean Agricultural Sector Analysis and Recommended Development Strategies, 1971-1985. Ministry of Agriculture and Forestry of the Government of the Republic of Korea, and Michigan State University.



- Rueda-Williamson, Roberto (1973) Mechanisms to Formulate and Coordinate National Food and Nutrition Policies and Programs (unpublished). Pan American Health Organization.
- Schaefer, Kalmann (1973) Nutrition Strategy Analytic Requirements (unpublished). U.S.A.I.D., Office of Nutrition.
- Selowsky, Marcelo (1971) "Infant Malnutrition and Capital Formation." Was presented at the Research Workshop on Problems of Agricultural Development in Latin America, Caracas, Venezuela.
- Smith, Victor E. and Hossein Yaghoobi-Rahmatabadi (1972) Agricultural Improvements and the Income Potential of Nigerian Agriculture. Michigan State University Economics Workshop Paper No. 7202.
- \_\_\_\_\_, (1972) "Efficient Resource Use for Tropical Nutrition - The Nigerian Case" (unpublished).
- \_\_\_\_\_, (1970) "Selecting Agriculture Activities for Nutrition and Income" (unpublished).
- Stickney, R.F. P.C. Abbott and J.G. Chamberlin (1973) "Systems Approach to Nutrition Planning: Preliminary Considerations." In Cuenod, M.A. and S. Kahne (eds.) Systems Approaches to Developing Countries. Pittsburgh, Pa.: Instrument Society of America, p. 109-116.
- Suttor, Richard E. (1973) Linear Programming Analysis of Nutrient Production Capacity of the Colombian Agriculture Sector, LA/DR/SASS, U.S.A.I.D.
- Taba, A.H. (1970) "Nutritional Problems in the Weaning Period." Journal of Tropical Pediatrics, v. 16, n. 4, Monograph No. 11, p. 212-242.
- U.S. Agency for International Development (1973) The A.I.D. Nutrition Program Strategy. Washington, D.C.
- \_\_\_\_\_, (1973) "Office of Nutrition-Research Rationale and Program" (internal memo). Washington, D.C.
- \_\_\_\_\_, (1973) An Overview of the Nutrition System of the Philippines. Washington, D.C.
- \_\_\_\_\_, (1973) Planning National Nutrition Programs: A Suggested Approach Volume I - Summary of the Methodology. Washington, D.C.
- \_\_\_\_\_, (1973) Planning National Nutrition Programs: A Suggested Approach Volume II - Case Study. Washington, D.C.
- Williams, Cicely D. (1962) "The Etiology of Malnutrition." From Nutrition Reviews, The Lancet, v. 31, n. 11.



## CHAPTER 4

### SPECIFIC NUTRITION INTERVENTIONS: UNPLANNED AND EVALUATED

#### A. INTRODUCTION

At the outset of this project it was our intent to ascertain what people were doing in the field of applied nutrition, what they thought about the projects they had worked on, and what sort of planning was being used by them both in theory and in practice. A preliminary search of the literature was undertaken to familiarize ourselves with the main sources of information available. Using these sources as a starting point, a more thorough search was then initiated to obtain the data necessary for our analyses.

It was found that the nutrition literature is heavily weighted for research data of use primarily to individuals planning an intervention, rather than those who are trying to evaluate what has already been done. For example, the Institute of Development Studies has produced six annotated bibliographies of village surveys conducted throughout the world. These contain information relating to geographic and demographic data, a guide to the availability of information on various aspects of socioeconomic life within the villages surveyed and a brief summary and evaluation of each survey. While the type of literature relating to village nutrition was interesting, it did not tell us very much about how people were applying that information to the improvement of nutritional status at local, regional and national levels in developing countries. It is noteworthy that the Institute is also concerned with the design of village studies -- in general, how one proceeds to operate effectively within the context of the village milieu -- and this too is of importance in the planning of nutrition intervention in LDC's.



We subsequently narrowed the search of the literature to those studies which included a nutrition intervention and (hopefully) an attempt to evaluate its effect on the nutritional status of the target population. In addition, we were looking for papers with some insight into the planning that had gone into the selection of the particular intervention and of the program for execution. Our search of the journal literature was necessarily limited by the constraints of time and personnel. We therefore limited ourselves to the most likely sources of information and surveyed the most recent six years of each journal which had previously shown promise. For those journals which had sufficient useful information to warrant further investigation, additional volumes were searched until it was apparent that the amount of information to be gained was no longer worth the effort of searching. A list of the journals searched is included with the references at the end of this chapter.

It was concluded from such efforts that, in fact, the published literature reporting on nutrition intervention schemes is at best limited, very scattered and of rather uneven quality. The most concentrated source of project information is the FAO documentation, but intensive investigation of the accessibility of UN project reports as related to the Expanded Program of Technical Assistance series and the United Nations Development Program series, for example, revealed that these are generally unavailable in the United States. In fact, the only way to obtain such reports is to order them directly from Rome, and even then, many are restricted or not released. The variable quality of those that are available makes ordering them sight-unseen an expensive and disappointing task. This procedure is also rather time-consuming, and in fact, most of our time was spent attempting to locate and obtain usable materials to fulfill our project objectives. We found this chaotic state of the literature counter-productive and discouraging, to say the least.



The chapter which follows focuses on the two most commonly encountered forms of community based nutrition projects. These are the Applied Nutrition Program (ANP) as advocated by United Nations experts over the years, and the Nutrition Rehabilitation Center (also known as Mothercraft Centers) as conceptualized by Bengoa and others. In both cases an attempt has been made to present the concept first, how in theory each program type should be planned and executed, followed by a brief, selective look at what comes across in the available literature regarding the operation of such programs in practice. Not surprisingly, discrepancies have been discovered, and an attempt is made to highlight these and offer some explanation of the underlying problems.

In all fairness it should be said that we realize that it is easier to criticize the work of others than to go and do something about the problem itself. We offer our apologies to anyone who may feel that we may have misrepresented, albeit unintentionally, the facts about such programs. But at the same time, we challenge those persons to put their thoughts into print. We have observed that the lack of a readily accessible, coherent body of literature candidly discussing the successes and failures of applied nutrition interventions in the field has probably resulted in the repetition of mistakes in both program planning and execution more than anyone cares to admit. We hope that this report will help to open up lines of communication more so than they are at present, rather than make those concerned defensively silent.

#### **B. THE APPLIED NUTRITION PROGRAM: DEFINITION**

Within the last twenty years there have been undertaken a multitude of pilot programs and schemes involving various aspects of practical nutrition intervention. But food distribution programs, mothercraft centers, school feeding programs and the like are not in and of themselves applied nutrition programs as defined by FAO/WHO in the late 1950's and 1960's.



The Report on the Joint FAO/WHO Technical Meeting on Methods of Planning and Evaluation in Applied Nutrition Programs (1966) defined the ANP in the following manner:

"comprehensive...interrelated educational activities aimed at the improvement of local food production, consumption and distribution in favour of local communities, particularly mothers and children in rural areas in which the guiding principles are coordination among different agencies and institutions and the active participation of the people themselves."

The Joint WHO/UNICEF and FAO/UNICEF Policy Committees of 1967 clarified this definition somewhat in suggesting that the ANP might be defined as:

"coordinated educational activities between agriculture, health and education authorities and other interested agencies with the aim of raising the levels of nutrition of local populations, particularly mothers and children in rural areas."

Within recent years recognition of the problem of socio-cultural malnutrition in urban populations of developing nations would suggest that the restriction to rural areas be dropped (Gokulanathan and Verghese, 1969), but in any case the unique characteristic of the ANP as formulated was the concept of coordinated effort at the national, state and local levels. Hundley (1966) stated of the ANP that "The programme must be consistent with, complementary to, and supportive of national goals in health, agricultural production, economics, export-import, social and educational policies."

#### COORDINATION OF THE ANP

The coordination of the ANP with on-going programs for economic development and the formulation of food and nutrition policy is clearly seen in Johnston's and Greaves' (1969) four stage model for the establishment of food and nutrition policy:

- (1) Identification of the main nutritional problems from the appraisal of the current food and nutrition situation;
- (2) Appraisal of the nutritional implications of any agricultural development plans within the context of economic and social development plans;



- (3) Indicating desirable trends in food consumption, in the short, medium and long term;
- (4) Formulating a food and nutrition policy, and the programmes and other means to put such policy into effect.

The ANP, which is included in stage 4, is thus a means of implementing national nutrition policy, and the design of the ANP reflects the data and information collected in stage 1.

#### DESCRIPTION OF THE ANP

Latham (1972) has summarized some of the other distinguishing characteristics of Applied Nutrition Programs. They are as follows:

They are coordinated at all levels.

They are essentially educational activities developed through different channels to reach a stated objective.

They involve several disciplines, including health, agriculture, education and community development.

They use the self-help approach -- always involving community participation.

They use the positive method of learning by doing.

They are directed to the family, and reach members of the family not only in the home, but in schools, health centres, clubs and organizations, and through the mass media.

They cover all levels -- so linking national food and nutrition policy with field activities at regional, community and family levels.

Their ultimate objective is to raise the levels of nutrition of the population. This will involve both food production and food consumption.

Ekenes (1969) has pointed out that the ANP is neither a relief program nor a curative program for the sick and malnourished. Rather, it is a preventive program designed to teach people how to become self-sufficient and to stay healthy. She maintains that one must reach all members of the family, as well as those at risk, in order to prevent disease and malnutrition among the most vulnerable groups.



It would be an impossible task to describe all of the interventions included in every ANP that has been carried out. Latham (1972), however, has compiled a rather comprehensive list of the kinds of activities appropriate to ANP's. This list is included here to help convey some idea of the kinds of activities that are generally within the scope of the ANP.

*Increasing production and use of vegetable protein*

Increasing ratio of cereal to root production;  
Improving varieties and yields of cereals;  
Increasing indigenous legumes;  
Introducing new legumes;  
Improving production of crops with fertilizers, rotation, pest control, mechanization, improved seed, hybrid varieties, irrigation.

*Horticulture*

Increasing production of vegetables and fruits;  
Home and community gardens and orchards;  
School gardens and orchards;  
Urban schemes of fruit and vegetable growing including allotments and backyard gardens;  
Production of improved seeds;  
Demonstration projects;  
Horticultural teaching;  
General methods of improving production (see under "vegetable protein").

*Extension*

Agricultural extension and education;  
Home economics extension and education.

*General methods, which include increasing availability of calories*

Improved cultivation methods — ox ploughing, tractors, crop rotation, fertilizers and composts, erosion control;  
Irrigation including bore holes, dam construction, etc.;  
Improved seeds, i.e., hybrid and other high yield varieties, high nutrient varieties;  
Food storage and pest control;  
Food protection and processing;  
Improved transport and marketing chains.



## COMMUNITY DEVELOPMENT

Nutrition education of the public — using talks, demonstrations, mass media, learning by doing;  
Homecraft teaching: food storage in the home, food preservation and processing (canning and bottling, cheese-making), cooking methods to maintain nutritive value, family budgeting;  
Nutrition as part of adult literacy programmes;  
Organization of women's groups, youth clubs, community centres;  
Instruction in weaning foods and toddler diets in collaboration with the health services;  
Cottage industries related to food products.

## HEALTH

Nutrition surveys and investigations;  
Recording clinical and anthropometric data in clinics, schools, etc.;  
Preventive measures against infectious diseases;  
Training health personnel in nutrition;  
Food hygiene in markets, shops, eating places, institutions;  
Supplementary foods for young children, pregnant and lactating women;  
Nutrition and cookery demonstrations at maternal and child health centres, antenatal, postnatal and child welfare clinics with emphasis on diet during pregnancy and lactation, breast-feeding and weaning practices, and child feeding;  
Nutrition rehabilitation centres;  
Under-five clinics;  
Nutrition and health education for hospitalized patients and out-patients;  
Nutrition education of the public.

## EDUCATION

Breakfast and/or midday meals;  
Catering for boarders;  
School gardens (horticultural activities);  
Animal production (poultry, rabbits, pigeons, guinea pigs, etc.);  
Food and nutrition education in the classroom and through the medium of the above activities;  
Food and nutrition in home economics, health education, science;  
Introduction of nutrition education into curricula of primary, secondary, and teacher training schools;  
Food and nutrition in out-of-school activities, youth clubs, cooperatives, etc.;  
Food and nutrition activities in parents' associations;  
Community participation in food and nutrition activities in the school.

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COMMUNITY SYSTEMS FOUNDATION



## ACRICULTURE (INCLUDING LIVESTOCK PRODUCTION AND FISHERIES)

### *Increasing production and use of animal protein*

Milk production and milk processing;

Poultry: hens, ducks, geese, etc.;

Fish ponds;

Fishing: ocean and internal waters;

Small animal production: guinea pigs, rabbits, etc.;

Meat production: cattle, goats, sheep, etc.;

Activities related to the above: disease control, feeding schemes (e.g., controlled grazing; preparation of animal and poultry feedstuffs), watering places.

## COOPERATIVES

Cooperative marketing of staple food crops;

Cooperative marketing of dairy and poultry products;

Use of cooperatives for improving agriculture -- supply of fertilizers, tested seed, insecticides, setting standards for produce, extension work; etc.;

Cattle and similar cooperatives;

Retail cooperatives: general stores, butchers, dairies, etc.

## COMMERCE AND INDUSTRY

Manufacture or production of low-cost, protein-rich food supplements for children;

Industrial processing of other foods: canning of meat, fish, horticultural products; drying milk; manufacture of fish meal, meat powder, etc.;

Enrichment of milled cereals and other foods with protein, amino acids, minerals, vitamins;

Salt iodization;

Feeding schemes for workers;

Production of animal feedstuffs;

Consumer information by means of mass media (daily or weekly food market reports).

## TRANSPORT AND COMMUNICATIONS

Improving channels of transport and marketing of food;

Improving communications and access to mass media;

Improving means of transport for farmers and farm produce (e.g., improving roads); making available cheap carts for farmers, bus services, commercial vehicles, refrigerated transport.

## GENERAL

Legislation to permit the establishment of a nutrition committee or other nutrition services, to ensure enrichment of cereals, iodization of salt, fluoridation of water; to control the advertising of weaning foods, carbonated beverages, etc.



Hundley (1966) has listed one additional characteristic of the ANP which distinguishes it from many other nutrition efforts. He points out that the ANP is not in itself an objective; that is, it is not solely a project which, having been brought to a successful conclusion, is subsequently forgotten. The ANP is rather a means of modifying family food consumption patterns and production in order to improve the nutritional status of the country as a whole. Thus, by definition, "It should prove able to spread ultimately over all areas of a country in need of it at a cost within the financial means of developing countries".

### PLANNING AN ANP: THE ORTHODOX APPROACH

To date FAO has published two volumes on the planning and evaluation of applied nutrition programs. These, along with other detailed reference works on the planning, execution and evaluation of surveys and the formulation of policies relating to food and nutrition provide the would-be planner with a veritable arsenal of theory and methodology. The problems arising when this body of theory is translated into practice will be discussed in a subsequent section.

Our intent here is to provide in capsule form what FAO considers to be the orthodox approach to planning an ANP. For this purpose, Appendix 3 of the Manual on Food and Nutrition Policy is perhaps the most succinct yet comprehensive statement we have been able to find on the subject. Because of its brevity, it is included here in toto:

In 1957 FAO, WHO and UNICEF began to encourage governments to start what have become known as applied nutrition programmes; such programmes are now in operation in some 77 countries. It is hoped that governments will be able to extend their scope and coverage and, if possible, to make them nationwide. Applied nutrition programmes have been defined (72) as comprehensive types of interrelated educational activities aimed at the improvement of local food production, consumption and distribution for the benefit of local communities, particularly of mothers and children in rural areas. Their guiding principles are coordination among different agencies and institutions, and the active participation of the people themselves. The programmes are designed primarily to stimulate rural families to adopt practices which can make the best use of locally available or potential food resources. Similar programmes in urban areas are now being considered; they include education in basic nutritional principles, and in the nutritive value of foods, aimed not only to give information but principally to motivate action. They include demonstrations of the production and preparation of protective foods, through school and community gardens; increased field production of nutritionally valuable crops, raising of poultry and small animals, and of fish culture to increase protein supplies; and home food preservation and improved methods of food storage.

Applied nutrition programmes include food, nutrition and related surveys, both in order that relevant facts may be established from which problems may be identified and on which specific and detailed objectives and practical projects can be based, and also to provide baseline data for the evaluation of progress. The importance of evaluation as a positive built-in feature of these programmes, to function as a kind of servo-mechanism, enabling the programmes to be continually modified, has been increasingly recognized. Evaluation has been defined in this context as "the systematic attempt to provide data as the basis for programme planning and to assess, by organized procedures, progress toward previously established objectives" (72).

The first stage in the planning and development of any applied nutrition programme should be a feasibility survey, to determine whether a programme is practicable and actually needed in relation to the food and nutrition problems prevailing in various parts of the country, and to identify possible locations for future activities. This reconnaissance should be made in the wide perspective of the country's larger economic and social development and should in general conclude with the formulation of broad strategic objectives, taking into account not only established needs and availability of total resources but also the aspirations and resources of the proposed beneficiaries themselves. The second stage involves the collection of baseline data, for the purposes both of evaluation and of detailed tactical planning, and at this time specific objectives of the various activities to be undertaken in the programmes should be established by each of the participating agencies and departments. At the same time, criteria should be agreed upon by which progress in the development of the plan can be measured. Information will be required on food consumption patterns, socio-cultural-economic conditions and nutritional status, as discussed in Chapter 3; local agricultural practices, such as cropping patterns; and the specific local problems which influence levels of food production and consumption.

It is particularly important to discover the chief needs of the people themselves, and to identify the effective local leadership, and the major motivating forces in the community. It should be recognized that the expressed wish of the people may not in the first instance be concerned with food at all but rather with a general desire to improve their levels of living, which may find concrete expression in a desire, for example, to build better houses, or to bring electricity to the village, or to construct a good road to the nearest town. In these situations experience has shown the wisdom of enlisting local support and enthusiasm by actively encouraging such programmes of self-help and so fostering a community spirit which can gradually be turned toward agricultural and nutritional objectives, as the need for these is recognized by the people themselves. Programmes imposed autocratically from "above" have less likelihood of achieving lasting success than those which arise from "below," and the aim of applied nutrition programmes should be to effect changes in people's behaviour which do not relapse when the initial stimulus provided by the programme is withdrawn. So the programme may well be preceded by activities of a more immediately popular nature, such as road building perhaps, which would be sponsored by the relevant government authority and would not feature in the applied nutrition programme as such.

During the planning stages, which might last about a year, the recruitment and initial training of staff would normally take place. Because of the great shortage of qualified workers in most developing countries, training will usually occupy a prominent place in applied nutrition programmes, and will encompass extension and community development workers, health personnel, teachers and administrators. Some of these, especially perhaps supervisory staff, may have to receive part of their training abroad, but it is important that it be practical and related as closely as possible to the actual tasks to be performed locally. While much benefit and stimulation can be derived by visiting other areas and seeing how problems are tackled elsewhere, part at least of all training should be done locally, so that practical experience can be had of local conditions.



The third stage of an applied nutrition programme is that of actual programme operations in a pilot zone. Any fellows who had been in training elsewhere should be ready to take up the key posts in the programme for which they had been trained, and the completion of training of all personnel to work in the pilot zone would take place at the beginning of this stage. Adjustments would be made in the administrative, logistic and technical functioning of the programme, and educational and promotional materials revised if necessary. Careful evaluation is important, as the fourth and final stage of a programme is the expansion to new zones, based on the experience gained in the pilot area, and taking into account possible differences that may exist with regard to the readiness for change, or to variations in economic, social and cultural conditions which might call for further investigation.

Problems of organization and coordination have been considered in Chapter 6. But it is well to emphasize here the supreme importance of ensuring a consistency of view among the various participating departments. Only through full cooperation will most benefit be obtained. Thus maximum crop productivity can only be expected if all the important contributory factors are combined and if they complement each other; for example, soil and water conservation practices; use of manures and fertilizers; timely planting and thinning; control of pests and diseases; use of improved genetic varieties; optimum plant density, etc. In some situations improvement in soil fertility may depend on the integration of livestock into the farming system. An illustration of this principle is given in Chapter 6.

Applied nutrition programmes may vary widely in their scope, from such simple community self-help programmes as that conducted in Italy between 1954 and 1961, involving a single extension worker in a poor peasant community in Tuscany, to an extended operation like the applied nutrition programme in India, which began in 1959 in the state of Orissa and has now spread to all the states in the country, and is included in the fourth five-year plan. This programme, which pays special attention to the vulnerable groups, tries to develop coordinated and comprehensive education and training in applied nutrition and to improve local diets through making more effective use of locally produced protective foods.

As an example of an unusually ambitious venture mention might be made of the Andean Indian Programme. It is stated (73) that this programme has as its ultimate aim "to raise the living standards of these people, to integrate them into the life of their nations, to bring them hope for the future, and to give their countries the full strength of their hitherto untapped human resources." It is thus a programme for overall development in which applied nutrition activities are integrated. The programme became operational in 1954, and is now being implemented in Argentina, Bolivia, Chile, Colombia, Ecuador and Peru. Coordinated by ILO, it involves FAO, WHO, UNICEF and Unesco, and receives assistance from many governments and also nongovernmental organizations. To quote again: "...Many changes already are perceptible in the communities reached by the programme. Improved agricultural techniques are beginning to increase the yield of land under cultivation; cooperative activity is emerging; new skills are being put to use in trades and homes as well as on the land. Above all, perhaps, whole communities have learned that they are able through their own efforts to do things not previously regarded as possible." This last statement echoes a comment made on a programme begun in 1958 in an isolated rural area in Puerto Rico where improvements were aimed not only at food and nutrition but also at housing, roads, and electricity and water supplies: "The most important change, and the reason for the improvements, is the disappearance of hopelessness and the development of a new spirit..." Such are the effects which a successful applied nutrition programme, in its more limited scope, may hopefully achieve.



The preceding constitutes what is for the most part a description of the idealized ANP as conceived of by FAO. A survey of the actual project reports, and interviews with individuals who have been associated with ANP's, suggests some of the practical problems which arise in the field.

### REALITY VISITED: COORDINATION?

Individual reports and personal communications suggest that coordination and cooperation are sometimes less than ideal. The following passage, taken from the Manual on Food and Nutrition Policy, considers what would appear to be a not uncommon situation. The scheme referred to in the quotation is the establishment of a National Food and Nutrition Committee comprised of senior officials from the various ministries or departments participating in the ANP:

"The scheme outlined here may be regarded as ambitious, though it is difficult to envisage how else the degree of coordination and mutual awareness that is clearly desirable can be achieved in practice. But it would be well to recognize that, however satisfactory a scheme may be on paper, its ultimate success depends on the personalities no less than the capabilities of those who have to operate it, and it would be unrealistic to deny that personal antipathies and departmental rivalries may hinder, if not sabotage, effective action. While strenuous attempts should therefore be made to implement such a scheme, attention should also be paid to providing expert and authoritative nutritional advice, within relevant ministries or departments and, where appropriate, to building up a nucleus of trained workers."

While not unique among ANP's, the ANP in Lesotho (Prosper and Lexander, 1973a.) serves as a case in point:

"The first approach towards meeting the short and long term objectives was the constitution, in 1961, of a Permanent Bureau of Nutrition (P.B.N.) for planning, coordination and overall responsibility for supervision of programmes related to nutrition.... The PBN has unfortunately not made effective use of all its vested powers for policy, planning and coordination and supervision of all programmes related to nutrition. Since 1967 there has been

a lack of collaboration between all the various Ministries concerned. Some of them have sent no representative to the meetings and there has been a misconception of the role of the PBN as an authority for supervising all nutrition activities in the country. There is still in existence a shadow of the original PBN which meets on special occasions -- such as the arrival of an evaluation team for the ANP. An attempt to reorganize the PBN was undertaken in 1969/1971...but so far there have been no concrete results from this effort."

### EVALUATION?

This evaluation was carried out more than ten years after the inception of the ANP in Lesotho and after more than 4 million dollars had been spent. In contrast to the idealized model of an ANP, the evaluation of the Lesotho project continued:

"The lack of statistical frames, simple field records, baseline data and fixed criteria for the proper selection of the ANP areas which was discovered does not only mean that a proper evaluation is impossible but also that a proper planning of the programme becomes difficult and that a continuous follow-up of activities started cannot be carried out. Some of the practical difficulties that are encountered in the field work at present can be derived from the non-existence of these basic data. Important decisions have to be based on personal opinions and when all staff but one is withdrawn from a pilot area to be posted in another area, nobody knows if the women of the area being deprived of its staff have really reached the level of knowledge in nutrition which would be required (in actual fact no definite targets have been fixed), if the knowledge thought to be achieved has been put into practice and if a continuation of the programme in that area is secured through local leaders given only a little support. In addition to the above-mentioned lack of basic data also a general policy for the nutrition programme in the country was discovered to be missing. This fact, together with some other ones, has been expressed in the last annual report from the Nutrition Unit. Naturally, the lack of such a policy is reflected in the planning of the programme and in the selection of previous and new areas. The absence of a general policy

also means that the Nutrition Unit does not have any guidelines on how to allocate its resources.

"The fact that only rudimentary field records exist also implies that the Unit has been left too long without very much administrative support. None of the senior staff of the Unit has got any training in administration and all of them are technical officers.

"Linked to the organizational and administrative problems faced by the Nutrition Unit is the great difficulty encountered when trying to coordinate the activities of different institutions involved in one way or another in the implementation of the nutrition programme. The existing Permanent Bureau of Nutrition is supposed to be the coordinating body with the Nutrition Unit acting as the main responsible executive body. However, it has been noted that the Bureau faces a lot of difficulties and the lack of an executive officer recognized by the member organizations and given full powers to identify and analyse problems and look for solutions and finally after approval of the Bureau implement decisions is a serious drawback for the operations of both the Bureau and the Nutrition Unit. The already mentioned lack of a detailed policy is also seriously reflected in the meetings of the Bureau and this deficiency is to some extent responsible for unnecessary arguments and jealousy. Obviously very much could be gained if a proper policy was formulated and coordinated plans of operation were pinpointed for the member organizations."

Perhaps owing to the difficulties encountered in obtaining materials for review, the bulk of the literature surveyed regarding ANP's was in the form of informal evaluations written by experts visiting the various programs for that purpose. In some cases the evaluation was little more than a list of the "achievements" of the project under evaluation (e.g., Issawi et al., 1964), which in fact resolved to a description of the activities carried out. There was no way of determining from such reports whether or not the execution of those activities had actually resulted in any significant improvement in the nutritional status of the target population.



## ORGANIZATION?

The absence of adequate baseline data upon which to establish a program of self-evaluation, and indeed the absence of any sort of plan for meaningful self-evaluation seem to be recurrent problems among the various ANP's surveyed. The lack of coordination among agencies coupled with what appears to be a general lack of systematic record-keeping, would indicate that for the most part ANP's often result in heavily burdened field workers left to their own ingenuity to either carry through or not as problems arise. The following is taken from an evaluation of the ANP in Swaziland (Prosper and Lexander, 1973b.):

"It was found that in actual fact the most essential part of the project which was Nutrition Education is now completely forgotten. A year after the termination of the plan of operations for the ANP most of the Government Officials could not remember its existence and significance. The field officers trained during the project are doing a very successful work in forming women's groups in the rural areas but unfortunately, the main emphasis of their work is on handicraft and cookery demonstrations of sophisticated dishes such as cakes, jellies, tripe and onions, etc. No nutrition component is included during the time the women are gathered together either for the handicraft sessions or the cookery demonstrations which the team considered as a waste of a good opportunity to practice nutrition education. The absence of basic data on the rural development areas was selected for the project implementation, together with the lack of any other field records led the team to decide that any attempt to carry on a questionnaire survey on food practices, as requested in the terms of reference, would have been a waste of funds."

A problem related to that of evaluation described by the team sent to Libya to assess the school feeding and nutrition education program (Issawi et al., 1964) was the program inspectors were not executing their duties properly:



"The lag in the nutrition education program is mainly due to the very limited number of visits made by Assistant School Feeding Inspectors to the Schools.

"Shortage of Transportation may be accepted as a partial reason, but the main cause -- to my mind (Dr. Rasheed Barakat) -- is lack of incentive among the Assistant Inspectors and reluctance of the Director General to force the issue due to his heavy burden."

#### PLANNING: PRACTICE VS. THEORY

It would seem that the approach to applied nutrition planning suggested by FAO is not necessarily that which is utilized. In Libya, after almost a decade of ANP operation, there was still no national food and nutrition committee or policy. The same report stated:

"In the near future the plan of the Government of Libya to organize a National Food and Nutrition Committee or Council and to establish a National Food Policy should be realized. It is essential that a policy of support for the present program of School Feeding and Education in Nutrition should form a basic part of the National Food Policy of the country."

The sequence of events in Korea also stands in contrast to the planning approach put forth by FAO experts. The evaluation of the ANP in Korea (McRoberts and den Hartog, 1973) reported the following:

"To date the Applied Nutrition Programme in Korea has functioned as an individual agency enterprise. Its future expansion as an integral part of... village social and economic development will be highly dependent upon an appropriate inter-agency, inter-ministerial, collective and co-ordinated approach. Such action...will be best considered through a national food and nutrition committee and the development of a national food and nutrition policy."

At the time of the evaluation, the Korean ANP had already been in operation for five years, and was apparently a success; but minimal baseline survey data had been collected owing to budget and personnel



limitations. One of the recommendations of the evaluation team was:

"That a concise, programme-related baseline survey be conducted in all pilot and volunteer villages of the Applied Nutrition Programme, and that agriculture, health, education, and planning agencies initiate a cooperative and coordinated plan for a National Food Consumption and Nutritional Status Survey."

It is suggested that, rather than the planning approach advocated by the UN experts, many of the ANP programs followed a "run for daylight" model whereby the people making decisions in the field mainly relied upon an intuitive understanding of the situation, and upon their previous experience, to constantly reassess program efforts and to modify those efforts when contingencies arose.

#### ALTERNATIVE APPROACHES

Robson's "district team" approach (1962) at Maposeni, Tanganyika, which more recently has been referred to as an "epidemiological" approach (Robson et al., 1972), considers the environment and the target population as a dynamic system. Planning within such a system focuses on the underlying and interacting causes by which conditions of health are affected, and sets as its objectives restoration of the system to a state of equilibrium. Planning thus focuses as much on the process of intervention as on execution of the specific intervention(s) decided upon. In summation of the approach taken at Maposeni, the following was stated (Robson, 1962):

"Little new has been found out about the basic problem of malnutrition, except that it is not a problem which can be dealt with by any one specialist. It is not simply a medical, agricultural or educational problem. It is one which involves the total social situation and environment in which the sufferers live and, as such, it needs to be tackled by a team of officers. It is also a problem to which there can be no set answer; at best there can be a set approach, but the solution will always depend on the peculiar circumstances of each particular problem area."  
(underlining added)

In the classic nine-part Guatemalan village study (Scrimshaw et al.) published in the Archives of Environmental Health during the years 1967-69, two villages were selected. In one village children received medical care, and in the other they received dietary supplementation. A third village served as a control, with no intervention being made save the collection of data for comparative purposes.

This study was conducted in a scientific manner to provide as much data as possible to formally evaluate the two interventions. Among the many conclusions drawn from the study was one which in substance supports the epidemiological approach:

"The demonstration of a multifactorial causality had brought recognition that a program for control necessarily includes measures against a variety of factors. Eventually had come understanding that prevention and control, based on ecological grounds and directed toward a multifactorial causative complex, attained maximal effectiveness only when all indicated measures were applied concurrently. To single out individual elements for special attention, or to apply them in succession or indiscriminately, is to fail of full achievement. A truly integrated health program is required, with a common approach to diseases having an interlocking and interacting effect.

"A public health approach based on concerted action against major factors, social as well as biological, can be expected to give better results than measures against any one singly, or in succession, even those as important as malnutrition or infectious disease."

Kreysler's (1970) report on a village study in Tanzania approaches this same principle from a somewhat different perspective. Having defined the nutritional problems and general health problems of the community from preliminary surveys of food habits, demography, health and sanitation conditions, and local beliefs regarding infection and disease, the program personnel took the problem to the village elders and asked for their views on what might be done.

Kreysler concluded "that the nonauthoritarian approach was one main factor for the continuity-minded development spirit that came into existence in this village". The most significant effect of going to the village elders may have been that by doing so, the socio-cultural aspects of the problem were thus included in the formulation of a solution, and resistance to change was thereby minimized.

The epidemiological approach to what Scrimshaw called a "multifactorial causative complex" may explain the unorthodox planning observed in some of the ANP's. By its very nature it is a learning process; the causal relationships (which include culturally specific factors) cannot be totally planned for a priori. The model is therefore a heuristic device developed in the field; as the situation changes, so must the model. What is consistent throughout is the approach to learning what the problems are and how best to deal with them. Thus both the target group and the project personnel should be learning from their respective efforts.

The "Dona Elena" project, initiated by Lydia Roberts and others in the 1950's in Puerto Rico, was a community development project in which a multitude of interventions were made. It is very difficult to say which interventions were responsible for whatever success the project enjoyed, and it has been suggested by some that the "social uplift" that went along with activities such as cleaning up the exteriors of the houses, may have been as important as any of the specific interventions themselves.

This is entirely possible, inasmuch as it is suggested that the kinds of problems applied nutrition-community development programs seek to eliminate and prevent are socio-cultural as well as biological in origin. It would seem that, even without the kind of planning suggested in the FAO Manual for the Planning and Evaluation of Applied Nutrition Programs, were one to attempt an intelligent shotgun approach to intervention, at least some aspects of the



program would be likely to have some positive effect. But, clearly, such an approach is not likely to be one of the more efficient ones. In theory, the epidemiological approach can maximize efficiency by searching the causal network for those points where interventions will prove most effective with a minimum of effort.

### C. NUTRITION REHABILITATION CENTERS: DEFINITION

Nutrition Rehabilitation Centers are another facet of the public health orientation to community development. The concept of the NRC was first proposed by Bengoa. He has defined the NRC as (Bengoa, 1964):

"a centre organized, either with sleeping accommodations for children, or similar to day nurseries or kindergartens where malnourished children either attend for a few hours each day or are kept overnight, the objective of which is to educate the mothers through the nutritional rehabilitation of the children."

In concept, children can be either admitted upon discharge from the hospital where they have received initial treatment for severe malnutrition and related infections, or they may be admitted directly if they suffer from malnutrition only to a mild or moderate degree.

### ECONOMICS OF NRC's

It has been demonstrated that the NRC is more cost-effective than the hospital for the same type of treatment delivered on either an in-patient or out-patient basis (Cook, 1971; Schneideman et al., 1971; Robinson, 1971; Stanfield, 1971). In developing nations this is of critical importance as can be seen from the statement of Sadre et al. (1973) on the fate of the hospitalized malnourished child in Iran:

"Because of the high cost of hospital treatment, malnourished patients are returned to their environment without much improvement in nutritional status, a fact that obviously conspires against their survival. A chance for further recovery should be given to the discharged patients, at a fraction of the hospital cost, at Centres for Nutritional Rehabilitation, where mothers can also learn good feeding practices."

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### A COORDINATED EFFORT

Polak (1965) has proposed a progression for the severely malnourished child under treatment. Having achieved initial recovery at the hospital, the child is discharged to the NRC where care continues at a lower cost while the mother simultaneously receives nutrition education. Upon release from the NRC, the child continues rehabilitation under the supervision of a rural or urban health center. In this way, as the patient's health improves the cost of care decreases, encouraging continued attendance on the part of the child and mother.

### APPROACH TO PLANNING

In theory, NRC units are planned around the following principles:

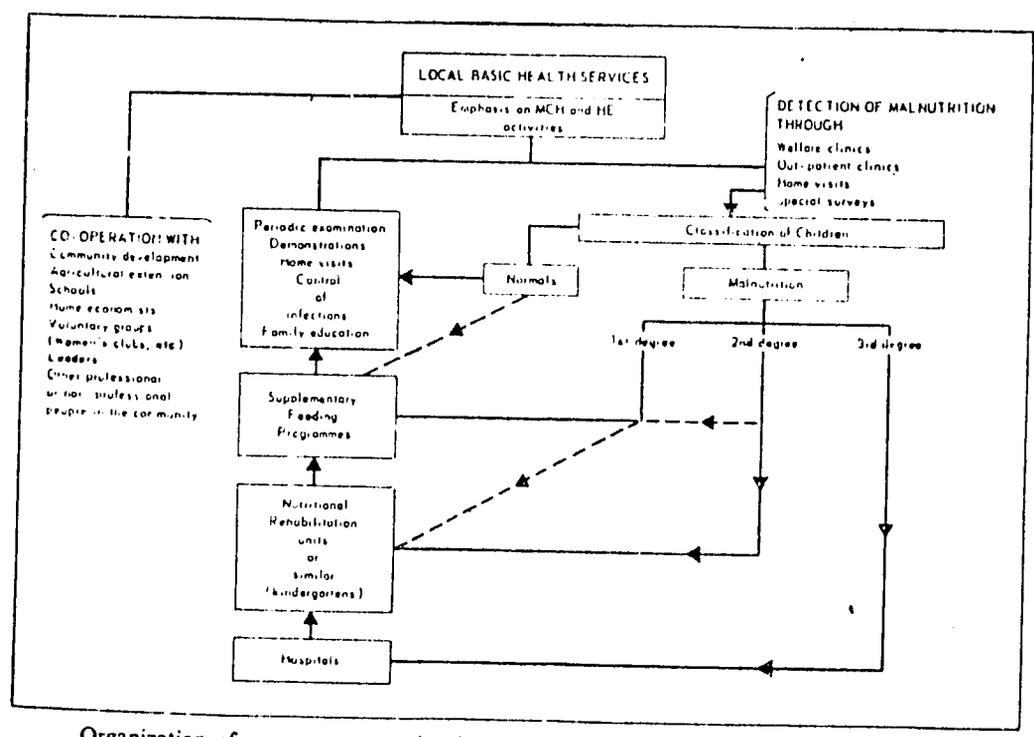
- (1) admissions are restricted to children at risk with mild or moderate degrees of malnutrition, and to those discharged from the hospital following initial recovery from severe malnutrition;
- (2) such NRC units are under the supervision of medical personnel, and are attached to either a hospital or health center;
- (3) emphasis is on the education of the mother, or other relative responsible for the feeding and care of the child;
- (4) the child remains in the NRC for as long as it takes for the mother to become reasonably well educated in healthful feeding practices utilizing locally available foodstuffs.

Repeatedly it has been emphasized that the NRC cannot be considered in isolation from a more encompassing approach to the problem of malnutrition. Bengoa (1967) has stated:

"The essential thing is that the programme established for the rehabilitation of malnourished children, whatever its nature, should be considered merely as one link in the long chain of activities that have to be organized for the control of child malnutrition ....The expansion of maternal and child health services; the development of new sources of protein; education of the public in nutrition; training of professional and auxiliary staff; certain supplementary feeding programmes, accompanied by education of the mothers;

co-ordinated programmes of applied nutrition, with the participation of the ministries of health, agriculture and education and with the objective, inter alia of promoting production of protective foods; the raising of the living standards of the population through community organization; and finally, a national economic and social development policy covering agricultural production -- these too are links in that chain, into which the NRC's or other nutritional rehabilitation programmes must be incorporated.

The integration of the NRC into this larger plan can be seen from the following figure taken from Bengoa (1967):



Organization of a programme at local level of protection of young children from malnutrition



## PRACTICAL CONSIDERATIONS

A drawback to the NRC is the small number of patients it is capable of effectively treating at any one time. It has been suggested that for maximum attention to each patient's needs, a unit restrict its admissions to no more than about thirty children. However, Beghin (1970) has pointed out that the low cost of NRC's should overcome this difficulty by permitting the creation of many more units than would be possible for either hospitals or regular health centers:

"we cannot...endorse the position that nutrition rehabilitation centers must necessarily be part of a health center....Much less expensive and sophisticated than the health center, the nutritional rehabilitation center can be created where cost or other considerations would not justify creating a Health Center...the number of Rehabilitation Centers should and can be much higher than the number of Health Centers, and, therefore, provide wider coverage. Then beneficiaries would not be selected because of proximity to a Health Center, but because they are recognized cases of malnutrition representing a known proportion of a much wider population. The correct application of these three fundamental aspects -- low cost, coverage, and selectivity in choosing the children -- brings about the substitution of a geographical selection based on the proximity of the Health Center, by an epidemiological selection based on a quantitatively known risk factor."

The Mulago NRC, somewhat more sophisticated than most other NRC's, (Schneideman et al., 1971), attempted to realize community outreach in the initial planning phases of the unit:

"It was realized that leadership, the selection of staff, adequate financial support and liaison with existing government activity in nutrition work were essential. In order to become established and to build up a good reputation amongst the local population the unit had to provide manifestly excellent treatment and to have a programme of education based on local realities and knowledge."



In addition to the rehabilitation of the children and the education of their mothers in correct feeding practices, the unit set as an objective the education of the mothers in teaching methods, "so that on their return to their villages they could in turn act as village educators and thus contribute towards the prevention of protein-calorie malnutrition in the rural areas". In addition, they hoped to use the unit to train medical students, paramedical personnel and staff in nutrition rehabilitation work inasmuch as there was clearly no previous experience in this field. Regarding community outreach and the NRC, the Mulago team concluded (Schneideman et al., 1971):

"A child with kwashiorkor needs not only treatment... but also rehabilitation to ensure a continued improvement in nutrition...especially for the next few years. This involves educating the mother and changing her food habits, both of which are closely related to the local ecology and...her culture. Community education thus becomes an essential background to the rehabilitation of individual cases. Working solely with the individual case is...hardly justifiable in an area where a high proportion of all children in the first four years of life have some degree of protein-calorie malnutrition. The nutrition rehabilitation centre therefore, more than any other type of rehabilitation centre, has to move its activities out into the community and establish liaison with many related government ministries to attain as large a geographical coverage as possible."

#### CRITICISM

Beaudry-Darisme and Latham's (1973) evaluation of the performance of NRC's in general has criticized them for in practice seemingly to focus upon the rehabilitation of the child while neglecting the education of the mother. It is suggested also that the role of the father in determining family feeding practices has been overlooked by the NRC approach which tends to focus on the mother. Furthermore, they maintain that follow-up of discharged patients has been inadequate and recommend the "welding" of an under-five clinic onto each NRC. Finally, they say that in practice education has

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tended to stress foods which are economically unrealistic, such as animal protein, instead of inexpensive, locally available, protein-rich foods such as legumes. These criticisms, and others, result in their making the following observation:

"The conclusion can be reached that Nutrition Rehabilitation Centers are, in general, having a favorable effect on the growth of a majority of children while they are being regularly fed at the center, but that they are having rather small effect on these children after they return home."

Based on the above, it would seem reasonable to suggest that NRC's are suffering, as are ANP's and other community development programs, from an as yet unbridged gulf between the realm of theory and that of practice. In all fairness, however, the NRC is still highly experimental as an approach and should be given more time before any final assessment is made. Perhaps more attention should be given to the collection of hard data from which a more definitive assessment may be made in the future.

#### **D. OTHER FORMS OF NUTRITION PROGRAMS**

##### **ENRICHMENT, FORTIFICATION, SUPPLEMENTATION**

Despite the fact that the ANP is a preventive, community based intervention while the NRC is curative and focuses on a selected group at risk within the community, both have in common the priority they place on education to effect change in those aspects of village life which are associated with the occurrence of malnutrition.

There are other approaches to nutrition intervention, however, which are not education oriented. The development of protein-rich weaning foods is an important, although controversial approach to the elimination of protein-calorie malnutrition in young children (Popkin and Latham, 1973). Chopra's survey of enrichment and fortification of foods in Latin America (1974) gives some



appreciation of the extent of such efforts in the Western Hemisphere to enrich and fortify foods commonly consumed and to create new dietary supplements designed to eliminate malnutrition among children. Of course, such efforts are increasing throughout the world at this time.

This "food technology" approach to the problem of malnutrition does not fit our concept of applied nutrition per se. However, certain applications of supplementary feeding may be considered applied nutrition, although the distinction is sometimes a hard one to make. The literature contains many reports of small-scale feeding trials such as the testing of Nutriene V at the Nutrition Education and Rehabilitation Center near Recife, Brazil (Vieira de Mello et al., 1973). Nutriene V, a plant protein mixture, was tested there on thirty children suffering from second and third degree malnutrition. One would probably call this a clinical trial rather than a pilot program, despite the author's conclusion that this mixture was now ready for expanded production and usage because of its demonstrated effectiveness in the recuperation and maintenance of normal growth. On the other hand, such national programs as the introduction of INCAPARINA in Guatemala, or the use of riboflavin enrichment of flour in Israel, probably would qualify as applied nutrition programs. Some efforts, however, are not so clearly defined. For an example, Bailey (1963) describes a hospital feeding trial in New Guinea of a peanut protein mixture which is in the process of being expanded to include a village level feeding trial.

Hofvander and others have been using dietary supplementation in rural Ethiopia (Hofvander, 1970; Hofvander and Eksmyr, 1971), but it is not clear that this is a village-level, supplementary food feeding program. Prior to the inception of this program in the village of Ijaji, Ethiopia, the Ethiopian Nutrition Institute spent three years in efforts designed to recognize and define the nutrition problems prevailing in the country. A socio-anthropological survey indicated



that Ijaji was representative of the living conditions of a considerable portion of the population of the Ethiopian Highlands. Experience from other Institute programs involving nation-wide education and information dissemination, and a supplementary food scheme also, were drawn upon in the planning of the Ijaji program. The interventions decided upon included, of course, supplementary foods given to the children. In addition, children were given free medical care and various immunizations, parents were given health education. Various other agricultural, economic, and social interventions were made as well. The program operated for two years during which time careful clinical evaluations of the children were made at regular intervals. The following conclusion was drawn:

"An appreciable average improvement of the children's general nutritional status occurred in the course of the two-year study.

"A marked reduction in various intestinal and skin-scalp infections was observed. This improvement can be explained by specific treatment and health education, although the impact of the latter is not clear. In addition, the improvement of the children's nutritional status may have contributed."

This particular project has been considered in some detail, because it probably represents a generalized, public health-community development program carried out at the village level in which rather positive results were obtained -- although it is not clear to what extent the individual interventions were responsible for the improvement. The program also involved school feeding and dietary supplementation, but this aspect of the program was somewhat confounded by all the other interventions carried out simultaneously.

#### **RELIEF PROGRAMS**

There have been many food relief programs executed, particularly following natural and man-made catastrophes. It has been decided to omit these from consideration in this chapter, because such efforts are by design temporary, stop-gap interventions. They



hold interest for us only insofar as they represent a highly specialized form of crisis planning applied to nutrition, and will be considered as such elsewhere in this report.

#### **E. GENERAL OBSERVATIONS**

1. A search of the literature has revealed that there are many reports available which describe the interventions made in applied nutrition programs. Very few of these, however, adequately evaluate the effect of those interventions on the target populations. For the most part these program descriptions omit any discussion of the planning that took place either before or during execution of the program.
2. With respect to ANP's it is fairly clear that many of the projects did not develop according to the guidelines laid down in the formal literature on planning and evaluation of ANP's, because at the time of the reported evaluation essential preliminary components such as baseline surveys were still nonexistent. Because planning is rarely reported on, often it is not possible to know what alternative approaches were taken or the rationale behind them.
3. Theory seems to predominate over practice in the applied nutrition literature. That is to say, what ought to be done is discussed more frequently and openly than what is, in fact, done. It is hypothesized by us that most planning of the formal type takes place before going into the field. The informal planning that takes place when contingencies arise in the field is culturally demoted; it is called "coping" and is not considered an important part of the planning process. Therefore, it rarely receives consideration in the literature. Because of this state of affairs, this learning process which actually in large part determines the success or failure of a project is not developed as a tool either systematically or efficiently. More important, there is no way for those proficient at "coping" to share their expertise with others. Thus, the same



mistakes are continually made in ignorance, and successful acts of "coping" are attributed to the formal planning process which thus becomes further entrenched. The Guatemalan village study conducted by Scrimshaw and others is one of the few exceptions in this respect. It is hoped that in the future there will be others which analyze what took place in the field and its impact on the success of the program.

4. Theories of communication and diffusion should probably be tested for cross-cultural applicability before programs are built upon them. We suggest that the imposition of western theories for planning and evaluating applied nutrition programs on non-Western peoples is in some ways a rather ethnocentric approach to the problems of others. It may be that planning is more of a culturally relative phenomenon than we allow for, and that the breakdown observed between the theory and practice of ANP program interventions is at least in part the result of the target population and the locally recruited project workers being either unable or unwilling to conform to the expectations of Western (i.e., culturally foreign) planners regarding program participation and operations.

Burkhalter's (1974) study of Papago "planning" is an important example of how the native approach works, because it produces a plan in keeping with the target group's understanding of how things work. In the case of the Papago, planning is very much a conscious process of making theory explicit in terms which the Papago can translate into action.

Both experience in small villages outside of the U.S. and the anthropological literature lead us to believe that new ideas do not "erase" old ones. Thus, attempts to communicate new approaches and new ideas often result in subtle confusions of intent and meaning which can have serious consequences at the most unexpected of times. It is our belief that the theoretical approaches to planning and



evaluating nutrition programs often make assumptions about the psychosocial states of target populations which may not be justified or productive.



## REFERENCES: SPECIFIC NUTRITION INTERVENTIONS

- Anderson, M.M. (1965) Report to the Government of Thailand on Nutrition Education and Training Program. Rome, Italy: FAO, EPTA Report 1978.
- Ascoli, Werner, et. al. (1967) Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964, IV. Deaths of Infants and Pre-School Children, Archives of Environmental Health 15: 439-449.
- Autret, M. and A.G. van Veen (1955) Possible Sources of Proteins for Child Feeding in Underdeveloped Countries. American Journal of Clinical Nutrition, 3 (3):234-243.
- Bai, K. Indira (1973) Applied Nutrition Programme as Media for Mass Communication in Rural Areas Surrounding Tirupati, Environmental Child Health, (Special Issue) pp. 152-161.
- Bailey, K.V. (1963) Malnutrition in New Guinean Children and its Treatment with Solid Peanut Foods. Journal of Tropical Pediatrics, p. 35-43.
- Ballweg, John A. (1972) Family Characteristics and Nutrition Problems of Pre-School Children in Fond Parisien, Haiti, Environmental Child Health, p. 230-243.
- Beaudry-Darisme M. and M.C. Latham (1973) Nutrition Rehabilitation Centers - An Evaluation of Their Performance. Environmental Child Health, p. 299-332.
- Behar, Moises, et.al. (1968) Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964. Archives of Environmental Health, 17:184-827.
- Beghin, Ivan D. (1970) Nutrition Rehabilitation Centers in Latin America: A Critical Assessment. American Journal of Clinical Nutrition, 23(11):1412-1417.
- Bengoa, Jose M. (1964) Nutritional Rehabilitation Programmes. Journal of Tropical Pediatrics, 10(3):63-64.
- \_\_\_\_\_ (1967) Nutrition Rehabilitation Centres. Journal of Tropical Pediatrics. 13:169-176.
- Bennett, F.J. and J.S. Lutwama (1966) Organization of MCH Services in Developing Regions, The Journal of Tropical Pediatrics, p. 16-21.
- Burkhalter, Barton R. (1974) The Papagos 3-Level Model of Political Process and Health Improvement. A Culture-Specific Intervention Which Reduced Infant Gastroenteritis. Proceedings of the Fifth Modeling and Simulation Conference (in press).



- Cantor, Sidney M. Associates, Inc. (1973) The Tamil Nadu Nutrition Study. Volume II, Section C, Part 1. Nutrition Intervention: A Study of Take Home Dry Food as a Distribution System. Part II Exhibits and Tables.
- Chopra, Joginder G. (1974) Enrichment and Fortification of Foods in Latin America. American Journal of Public Health 64 (1):19-26.
- Cook, R.J. (1971) Is Hospital the Place for the Treatment of Malnourished Children? Journal of Tropical Pediatrics 17(1):15.
- Drake, W.D. (1974) Report of a Visit to Dona Elena, Puerto Rico. (unpublished memo). Community Systems Foundation.
- Ekenes, Kari (1969) Report to the Government of India: The Applied Nutrition Programme. Rome, Italy: FAO, UNDP Report 2642.
- Fernandez, Nelson A., et.al. (1969) Nutrition Survey of Two Rural Puerto Rican Areas Before and After a Community Improvement Program, The American Journal of Clinical Nutrition, v. 22, n. 12, p. 1639-1651.
- Gokulanathan, K.S. and K.P. Verghese (1969) Socio-Cultural Malnutrition. Journal of Tropical Pediatrics, 15:119.
- Gordon, John E., et.al. (1968) Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964, VI. Acute Diarrheal Disease and Nutritional Disorders in General Disease Incidence. Archives of Environmental Health, 16: 424-437.
- Guggenheim, K., A. Brzezinski, Judith Ilan, and B. Kallner (1959) Nutritional Evaluation of Flour Enrichment with Riboflavin in Israel. American Journal of Clinical Nutrition, 7:526-531.
- Guzman, Miguel A. et.al. (1968) Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964, VII. Physical Growth and Development of Pre-School Children. Archives of Environmental Health, 17:109-118.
- Harland, P.S.E.G. (1966) The Mulanda Project. The Journal of Tropical Pediatrics.
- Hofvander, Y. (1970) Evaluation of a Supplementary Food Programme to Children in an Ethiopian Village. Proceedings of 8th International Congress of Nutrition Prague, 1969, Excerpta Medica, Amsterdam, p. 597-600.
- \_\_\_\_\_, and R. Eksmyr (1971) An Applied Nutrition Program in an Ethiopian Rural Community. American Journal of Clinical Nutrition, 24:578-591.

- Nutrition Reviews, (1969) Dietary Iodine and Goiter in Ceylon, v. 27, n. 4, p. 108-110.
- Oomen, H.A.P.C., et.al. (1968) Health Problems in Pre-School Children. Journal of Tropical Pediatrics. Based on Inter-congressional Plenary Session No. 3, at the VIIIth International Congresses on Tropical Medicine and Malaria, September 7th - 14th, at Tehren, Iran.
- Orr, Elizabeth (1972) The Use of Protein-Rich Foods for the Relief of Malnutrition in Developing Countries: An Analysis of Experience. Tropical Products Institute.
- Pettifor, Andrew (1972) Predicting Local Responses to Development Plans, Ph.D. Dissertation, Stanford University.
- Plough, Irvin C., et.al. (1963) A Nutrition Survey of Three Rural Puerto Rican Communities. Boletín de la Asociación Médica de Puerto Rico, v. 55, n. 12-A.
- Polak, H.E. (1965) Rehabilitation of Children Suffering From Protein-Calorie Malnutrition. Paper presented at the WHO Inter-regional Seminar on Treatment and Prevention of Protein-Calorie Malnutrition in Early Childhood, Kampala.
- Popkin, B.M. and M.C. Latham (1973) The Limitations and Dangers of Commerciogenic Nutritious Foods. American Journal of Clinical Nutrition, 26: 1015-1023.
- Pradilla, Alberto (1973) Nutritional Effects of a Simplified Health System in a Semiurban Community (Candelaria, Colombia). (unpublished) Community Systems Foundation.
- Prosper, M.S. and A. Alexander (1973a) Joint UNICEF/FAO Evaluation of the Applied Nutrition Programme in Lesotho 15 September to 23 October 1972. Rome, Italy: FAO ESN:MISC/73/3.
- \_\_\_\_\_ (1973b) Joint UNICEF/FAO Evaluation of the Applied Nutrition Programme in Swaziland, 23 October to 20 November 1972. Rome, Italy: FAO ESN:MISC/73/2.
- Ratsimamanga, A.R. and P. Boiteau (1970) Some Experiments in Nutritional Education in Africa and in Madagascar. Proceedings of the 8th International Congress of Nutrition, Prague, 1969. Excerpta Medica, Amsterdam 1970, p. 575-576.
- Ravenscroft, Catherine (1966) The Role of Nutrition in the Commission Para el Mejoramiento de Comunidades Aisladas (C.M.C.A.) in Puerto Rico, and Some Implications for Other Development Projects. Department of Nutrition, Cornell University, Ithaca, New York. (unpublished report).

- Hundley, J.M. (1966) Assessment of Applied Nutrition Projects. UNESCO.
- \_\_\_\_\_ (1966) Assessment of Applied Nutrition Projects: Addendum 1: Assessment of Applied Nutrition Programmes in Five Countries Visited. UNESCO.
- Issawi, A., M. Khatib and M. Pont-Flores (1964) An Assessment of the School Feeding and Nutrition Education Program. Report to the Government of Libya. Rome, Italy: FAO.
- Johnston, B.F. and J.P. Greaves (1969) Manual on Food and Nutrition Policy, Nutritional Studies No. 22. Rome, Italy: FAO.
- King, Maurice, et.al. (1972) Nutrition for Developing Countries. Nairobi: Oxford University Press.
- Kreysler, J. (1970) Health, Water Supply and Self-Reliance in Mayo Village (Uhuru Na Magi). Journal of Tropical Pediatrics.
- \_\_\_\_\_ (1970) Rational Development of an 'Under-Five' Clinic Network, The Journal of Tropical Pediatrics, p. 48-52.
- Latham, Michael C. (1967) Some Observations Relating to Applied Nutrition Programs Supported by the U.N. Agencies. Nutrition Reviews, v. 25, n. 7, p. 193-197.
- \_\_\_\_\_ (1972) Planning and Evaluation of Applied Nutrition Programmes. Rome, Italy: FAO Nutritional Studies No. 26.
- McRoberts, M.R. and A.P. den Hartog (1973) Joint FAO/UNICEF Review of the Applied Nutrition Programme in the Republic of Korea, 15 September to 13 October 1972. Rome, Italy: FAO ESN: MISC/73/5.
- Malhotra, Mridula (1966) An Investigation into the Acceptance of the Applied Nutrition Programme in a Selected Village of Punjab M.S. Dissertation, Delhi, India: Delhi University.
- Morley, David (1973) Paediatric Priorities in the Developing World. Butterworth, London.
- \_\_\_\_\_ (1973) The Spread of Comprehensive Care Through "Under-Fives" Clinics. Transactions of the Royal Society of Tropical Medicine and Hygiene, 67(2):155-170.
- Namboze, Josephine M. (1973) A Rural Nutrition Rehabilitation Project at Kasangati Health Centre. Environmental Child Health, p. 45-52.
- Nutrition Reviews, (1967) Planning and Evaluation of Applied Nutrition Programs, v. 25, n. 5, p. 132-134.



- Roberts, Lydia J. (1963) The Dona Elena Project, Department of Home Economics, The University of Puerto Rico, Rio Piedras, P.R.
- Robinson, D.C. (1971) The Nutrition Rehabilitation Unit at Mulago Hospital, Kampala: Further Development and Evaluation 1967-1969. Journal of Tropical Pediatrics, Monograph 13, p. 35-42.
- Robson, J.R.K. (unpublished) "Nutrition in the Songea Ngoni" Case No. 14, School of Public Health, University of Michigan, Ann Arbor.
- \_\_\_\_\_, G.A. Carpenter, M.C. Latham, R. Wise and P.G. Lewis (1962) The District Team Approach to Malnutrition: Maposeni: Nutrition Scheme. African Child Health, p. 60-75.
- \_\_\_\_\_, F.A. Larkin, A.M. Sandretto and B. Tadayyon (1972) Malnutrition: Its Causation and Control. New York: Gordon and Breach.
- Sadre, Mahin, Gonzalo Donoso and Habib Hedayat (1973) The Fate of the Hospitalized Malnourished Child in Iran. Environmental Child Health, p. 28-30.
- Schneideman, I., F.J. Bennett and I.H.E. Rutishauser (1971) The Nutrition Rehabilitation Unit at Mulago Hospital, Kampala: Development and Evaluation, 1965-1967. Journal of Tropical Pediatrics, Monograph 13, p. 25-34.
- Scrimshaw, N.S., et.al. (1967) Nutrition Infection Field Study in Guatemalan Villages, 1959-1964. I. Study Plan and Experimental Design. Archives of Environmental Health, 14:657-662.
- \_\_\_\_\_, (1967) Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964 II: Field Reconnaissance, Administrative and Technical; Study area; Population Characteristics; and Organization for Field Activities. Archives of Environmental Health, 14: 787-801.
- \_\_\_\_\_, (1967) Nutritional Infection Field Study in Guatemalan Villages, 1959-1964. III. Field Procedure, Collection of Data and Methods of Measurement. Archives of Environmental Health, 15: 6-15.
- \_\_\_\_\_, et.al. (1968) Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964. V. Disease Incidence among Pre-School Children Under Natural Village Conditions, With Improved Diet and With Medical and Public Health Services. Archives of Environmental Health, 16: 223-234.
- \_\_\_\_\_, (1969) Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964. Archives of Environmental Health, 18: 51-62.



- Stanfield, J.P. (1967) Organisation of MCH Services in Developing Regions. The Journal of Tropical Pediatrics, p. 59-62.
- \_\_\_\_\_ (1968) The 'At-Risk' Concept. The Journal of Tropical Pediatrics, p. 201-204.
- \_\_\_\_\_ (1971) The Luteete Family Health Centre: Nutrition Rehabilitation as Part of Total Rural Development: An Initial Experience. Journal of Tropical Pediatrics, Monograph 13, p. 67-82.
- Vieira, de Mello, A., et.al. (1973) The Testing of Nutriene V, a Plant Protein Mixture, in the Recuperation of Undernourished Children. American Journal of Clinical Nutrition, 26: 1024-1029
- Wadsworth, G.R. (1971) International Work in Nutrition: Applied Nutrition Programmes. Journal of Tropical Medicine and Hygiene, p. 211-215.
- Welbourn, Hebe F. and Grace De Beer (1964) Trial of a Kit for Artificial Feeding in Tropical Village Homes. Journal of Tropical Medicine and Hygiene, 67: 155-159.
- WHO (1966) Joint F.A.O./W.H.O. Technical Meeting on Methods of Planning and Evaluation in Applied Nutrition Programmes. World Health Organization Technical Report Series, 340.
- Wray, Joe D. and Alfredo Aguirre (1969) Protein-Calorie Malnutrition in Candelaria, Colombia: Prevalence; Social and Demographic Causal Factors. The Journal of Tropical Pediatrics, v. 15, n. 3, p. 76-98.

#### JOURNALS AND COLLECTIONS SURVEYED

- American Journal of Clinical Nutrition, Volumes 1-26.
- American Journal of Public Health: 1974 (Jan-Sep), 1973, 1972, 1971, 1970.
- American Journal of Tropical Medicine and Hygiene: 1974 (1-4), 1973, 1972, 1971.
- Archives of Environmental Health: 1973, 1972, 1971, 1970, 1969, 1968, 1967.
- British Journal of Nutrition: 1973, 1972, 1971, 1970, 1969, 1968.
- British Journal of Preventive & Social Medicine: 1973, 1972, 1971, 1970, 1969, 1968, 1967, 1954, 1953.
- British Medical Journal: 1974, 1973. (Published on a weekly basis).
- Diffusion Documents Center (Everett Rogers).
- East African Medical Journal: 1974 (Jan-Mar), 1973, 1972, 1971, 1970.



- Environmental Child Health: Volumes 1-19.
- Indian Journal of Medical Research: 1972, 1971, 1970, 1969, 1968.
- Indian Journal of Medical Science: 1974 (Jan-Feb), 1973, 1972, 1971, 1970, 1969.
- Indian Journal of Pediatrics: 1972, 1971, 1970, 1969.
- Indian Medical Association Journal: 1972, 1971, 1970.
- Indian Medical Gazette: 1954, 1953.
- Journal of the American Dietetic Association: 1973 (July-Dec), 1972, 1971, 1970.
- Journal of Hygiene: 1974 (Jan-June), 1973, 1972, 1971, 1970, 1969, 1968.
- Journal of Pediatrics: 1974 (Jan-June), 1973, 1972, 1971, 1970.
- Journal of Tropical Medicine and Hygiene: 1957-1968, (Jun-Dec)1969, 1971.
- London School of Tropical Medicine and Hygiene Catalogue
- Medical Journal of Australia: 1973 (Published on a weekly basis).
- Medical Journal of Malaysia: 1973, 1972, 1971, 1970, 1969, 1968.
- National Library of Medicine Catalogues
- New Zealand Medical Journal: 1972, 1971, 1970, 1969, 1968.
- Nutrition Reviews: 1974, 1973, 1972, 1971, 1970, 1969, 1968, 1967, 1966 (1960 not available in library).
- WHO, UNESCO Catalogues