AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

1. SUBJECT CLASSIFICATION

A. PRIMARY: Education

B. SECONDARY: General Education

2. TITLE AND SUBTITLE

The impact of participant training on the attainment of development goals: the methods and procedures for assessment of impact

3. AUTHOR(S)

Schubert, J.G.

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1976	128 p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS

American Institutes for Research, 3301 New Mexico Avenue, Washington, D.C. 20016

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*

(In report No. 5, Final Report)

9. ABSTRACT

A report on the assessment materials used in studying the impact of participant training on the attainment of development goals in Ghana and Thailand. This study is part of the second phase in the development of a methodology useful for conducting impact assessments. This second phase was designed to test the methodological design in live, operational settings and to produce an assessment package that local evaluators could use for impact assessments of other training activities. This "assessment package" consists of two main tools: 1) the instruments that were used to evaluate the impact that former AID participants had on their country's national goals, and 2) suggested procedures for local evaluators who will use these instruments to conduct impact assessments. Among the sections of this report are those on the Practical Applications of the Methodology; Issues of Sample Selection (a list of the criteria used in selecting the samples for the impact assessment of participant training); Training the Interviewers (a step-by-step procedure to prepare the interviewers responsible for data collection); Data Collection Procedure; and Data Classification and Analysis.

10. CONTROL NUMBER	11. PRICE OF DOCUMENT
PN-AAB-653	
12. DESCRIPTORS	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/CM/otr-C-73-201 Res.
	15. TYPE OF DOCUMENT

AID 590-1 (4-74)

AIR 47200-FR

THE IMPACT OF PARTICIPANT TRAINING ON THE ATTAINMENT OF DEVELOPMENT GOALS

Report No. 5 FINAL REPORT: THE METHODS AND PROCEDURES FOR ASSESSMENT OF IMPACT

JANE G. SCHUBERT

March 1976

Submitted to: Office of International Training, U.S. Agency for International Development, Washington, D.C. 20523

Contract No: AID/CM/otr-C-73-201, Work Order No. 6, Project No. 926-11-995-031-61

AMERICAN INSTITUTES FOR RESEARCH / 3301 New Mexico Avenue, NW, Washington, DC 20016

PREFACE AND ACKNOWLEDGMENTS

This report consists of assessment materials used to conduct a study of the impact of participant training on the attainment of development goals in three countries. This product is part of a second phase in the development of a methodology useful for conducting impact assessments. The first phase was a feasibility study to determine whether techniques could be devised for measuring the effectiveness of participant training in terms of the impact of returned participants on the development of their countries. This second phase was designed to test the methodological design in live, operational settings and to produce an assessment package outlining procedures that local evaluators could use to adopt this methodology to impact assessments of other training activities.

This report consists of the following:

Prologue, which briefly reviews the Phase I research and summarizes the methodology resulting from that effort.

I. Introduction describes the overall purpose of this report within the context of the entire project. It states some basic assumptions about the person who will apply this methodology to a local impact assessment.

II. Practical Applications of the Methodology suggests the nature of the assessments to which this methodology can be applied in practical settings. Three major types of follow-up studies are included.

III. Issues of Sample Selection lists the criteria used in selecting the samples for the impact assessment of participant training. Each criterion is accompanied by a rationale for inclusion in a sample selection.

IV. Training the Interviewers presents a step-by-step procedure for preparing the interviewers who will be responsible for the data collection.

V. Data Collection Procedures offers the results of field experience in the form of a suggested approach

to organizing and collecting the data. It describes possible situations that may arise in this process and suggestions for handling them.

VI. Data Classification and Analysis describes both the administrative techniques used to classify the data plus some substantive issues that can arise in the classification. Ways in which these issues were addressed in the field are also included.

VII. Bibliography presents some sources of practical interest that may be helpful to the field evaluator in conducting an impact assessment. These are general references in the area of training and program evaluation.

This specific report received substantial contributions from local personnel in each of the three countries who so generously gave of their time and energy. Individuals in USAID, the government, and private agencies supplied generous support in the time-consuming tasks of locating and contacting former participants to arrange schedules and conduct interviews. The local interviewers tested the readiness of the procedures for use by personnel not involved in the design of the original methodology. Their experiences with this methodology offered invaluable feedback for the preparation of this report; these data supplied the basis upon which many of the suggestions are made.

TABLE OF CONTENTS

		Page
	PREFACE AND ACKNOWLEDGMENTS	i
	PROLOGUE	1
	The Methodological Problem of Phase I	1
	The Approach Taken	3
	The Field Studies in Ghana and Thailand	4
	The Catalog of Participant Achievements	6
	The Impact-Producing Characteristics	9
	Attributions to Participant Training	10
	Prototype Indicators for Impact Assessment	11
I.	INTRODUCTION	15
II.	PRACTICAL APPLICATION OF THE METHODOLOGY	17
III.	ISSUES OF SAMPLE SELECTION	21
IV.	TRAINING THE INTERVIEWERS	27
	Interviewer Selection	27
	The Training Session	29
V.	DATA COLLECTION PROCEDURES	33
	Scheduling Interviews	33
	Conducting Interviews	34
	Oral Interviews	34
	Written Interviews	35
	Recording Data	36
VI.	DATA CLASSIFICATION AND ANALYSIS	39
	Administrative Procedures	39
	Substantive Issues	40
	Ensuring Reliability	44
	Uses of the Data	44
VII.	BIBLIOGRAPHY	47

APPENDICES

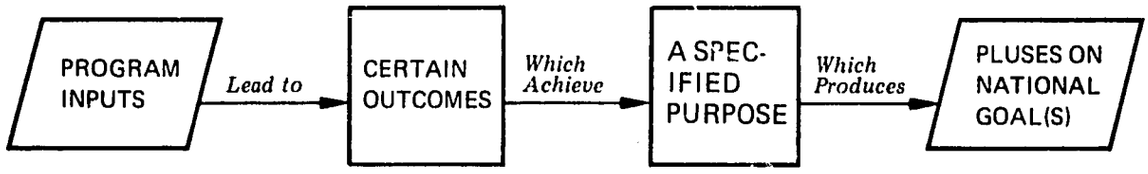
	Page
Appendix A. Catalog of Participant Achievements	A-1
Appendix B. Impact-Producing Characteristics	B-1
Appendix C. Attributions to Training	C-1
Appendix D. What Is a Critical Incident?	D-1
Appendix E. The Interviewer Preparation Unit	E-1
Appendix F. The Interviewee Materials	F-1
Appendix G. Illustrative Critical Incidents	G-1
Appendix H. Sample Probe Questions	H-1
Appendix I. Sample Tabular Data	I-1

PROLOGUE: THE PHASE I FEASIBILITY STUDY

In March 1974, the American Institutes for Research submitted its report on Work Order No. 3 of Contract AID/csd-3377*. The scope of Work Order 3 was essentially that of a feasibility study. The question which the study addressed was whether techniques could be devised for measuring effectiveness of participant training in terms of the impact produced by returned participants on the development of their countries. The answer was in the affirmative and took the form of a prototype methodology for carrying out such impact-oriented assessments. The course of the Phase I development will be recapitulated as a prologue to the work to be presented in this report.

The Methodological Problem of Phase I

In AID's Logical Framework, the input-impact relationship is displayed as a sequence of four kinds of events, as follows:



The "rationale" of any type of technical assistance activity can be conveniently displayed in this manner as a guide to planning or impact assessment. In the case of participant training,

- the inputs might be defined as the learning experiences that are provided to the trainee;
- the outcomes as the new performance capabilities that he acquires;
- the purpose as the greater effectiveness of the operations to which the participant applies these new capabilities when he returns; and
- the increment in national goals as the ultimate payoffs of these more effective operations on the development targets that they directly affect.

*Assessing the impact of participant training on the attainment of development goals. Phase I: Methodological Research. Final Report. Washington, D. C.: American Institutes for Research, March 1974.

In this way, the link between participant training and technical assistance objectives is made explicit.

For general analytic purposes, the simple schematic is sufficient. But, for the derivation of specific indicators of impact that one might use in an actual field assessment, it is too abbreviated a representation. One reason for this is that the flow from the achievement of the immediate outcomes to their eventual impact on national goals normally consists of a linked chain of many, many specific events. It is conceivable, perhaps, that a trainee in geology could come back to his country and promptly discover unknown oil deposits that change the economy overnight. But, more typically, an action he takes on the basis of his newly acquired skills will trigger a change in some procedure that will in turn have some modest effect that will in turn cause another person to change his behavior that will in turn . . . etc., etc., etc.

A second complexity that must be considered is that the participant is obviously not the only player who gets into the act. Other elements (people, laws, customs, etc.) interact with the things that he does or tries to do. And these other elements can transmit, increase, decrease, or block the impact of the participant's action.

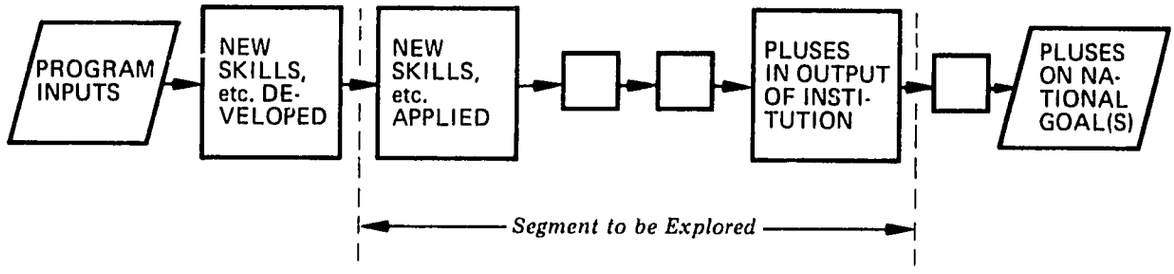
The upshot of these complexities is to create a tug-of-war between the two basic requirements that have to be met in impact assessment, of not only identifying the <u>contributions</u> that have been made to national goals, but of also <u>attributing</u> these contributions to a specified input, such as participant training.

If the checklist used for assessment counts an event such as "participant introduced an evaluation questionnaire into the courses that he is teaching of the type used in the training workshop that he attended" as an indicator of impact, for example, there is no problem in attributing this outcome to his training. But there is a real problem in claiming tangible impact in support of any national goal. If, on the other hand, the indicators are limited to such ultimate outcomes as "developed a new method of sericulture which doubled the amount of silk produced," there can be no

question concerning the importance of the contribution, but there may be great difficulty in attributing part or all of the change to a specifiable facet of the participant training.

The Approach Taken

The AIR approach was based on two strategic decisions. The first of these was that we would concentrate the search for suitable indicators within a fixed segment of the long chain of events that links the training inputs to the ultimate goal of national development gains. The earliest event that we would consider as a potential indicator for purposes of assessment would be an application of a skill or attribute the participant acquired in training to the actual operations of the institution to which he is presently assigned. The most distal event that we would consider as a potential indicator would be a visible change in the output of this institution, in terms of the quality of the services or products that it provides. In schematic form, the following segment would be the one on which we would focus our search:



Events to the right of this segment, we felt, would be too far removed from participant training to permit credible attribution, while events to the left would be too tentative to be counted as contributions. As a rock-bottom minimum, the returned participant would have at least to have applied the presumed training outcome to the improvement of internal job operations.

The second strategic decision was that we would look for indicators in this segment with a search process precisely opposite to that used in earlier participant follow-up studies. Instead of beginning with the outcomes of the training program and looking for their effects in or on the institution, we would begin with the identification of visible improvements or achievements, and then trace these "backward" to their antecedents, if

any, in the training experiences the participant had received. Our first cast of the net would try to surface any and all events that might prove serviceable as indicators for assessment, without reference to their relationships to participant training.

In accordance with these decisions, we proposed a three-step process for developing the indicators required. Step 1 would be to obtain from a sample of former participants and their supervisors, reports of specific improvements that have occurred in the output of the institution or in its operations since the participant's return. Step 2 would be to seek from the same respondents such evidence as they might be able to cite concerning the relationships, if any, of these achievements to experiences during participant training. Step 3 would be to deduce from these data the types of achievements that most effectively straddle the contribution-attribution dilemma, and to fashion these into prototype indicators for impact assessment.

The major product of Phase I was to be the master list of indicators; detailed procedures for applying them in operational assessments would be developed in a later phase, provided that the initial task could, in fact, be accomplished.

The Field Studies in Ghana and Thailand

In accordance with the basic study design, the first stage of the data collection process concentrated on the contribution part of the problem. The two major objectives of the survey in Ghana were:

1. To devise a data collection procedure that is efficient and effective in cataloging tangible improvements in the output or operations of the institutions to which returned participants have been assigned, and
2. To apply this procedure to a sufficiently large sample of participants and institutions to identify the kinds of improvements that are most likely to occur and be noted.

One hundred people, at levels at or above senior officer, were interviewed.*

*Several data collection approaches were used, but we will be concerned here only with the one which proved most effective; the details are available in the cited Phase I report.

Each participant was asked to report and describe events in which he or she participated (or observed) which were illustrative of his or her major achievements. Reports that did not describe a specific event or that did not meet the minimum criterion of representing a tangible improvement were dropped from the data base. This left a total of 292 usable reports as the major outcome of the study in Ghana. Except for such information as the interviewees volunteered about training antecedents, nothing was learned about the attribution characteristics of the potential indicators that had been assembled.

Overall, the Ghana study demonstrated that returned participants effect a variety of improvements in the output or operations of their institutions, that these impacts can be cataloged by a simple interviewing technique, and that the kinds of impacts that emerge from these data occur with sufficient frequency to be potentially useful indicators for impact assessment. The outcomes, in brief, demonstrated the feasibility of the basic idea.

The design of the Thailand research was based directly on the findings in Ghana. Its two major objectives were:

1. To assemble additional reports of participant achievements, so as to amplify and enrich the set of potential indicators developed in Ghana, and to check the generalizability of these indicators to other cultural settings, and

2. To assemble the best possible information about the antecedents of the achievements reported, to determine which of them reasonably could be attributed to participant training.

In view of the limited information that had at that stage been assembled about the attribution problem, the latter was the crucial objective.

Three types of questions were asked each interviewee. The first was totally unstructured questions about specific achievements since returning from training. The second set of questions asked for achievements, if any, in a number of specified areas that reflected the kinds of impacts most often reported in Ghana. The third set of questions asked for attribution comments on each of the achievements the participant had reported.

A total of 200 additional reports of specific participant achievements was assembled from 34 interviewees. This was approximately double the rate of reports per interviewee that had been achieved in Ghana, and was no doubt attributable to the additional "triggers" to recall that the structured questions derived from the Ghana findings provided.

The kinds of impacts reported confirmed both the comprehensiveness and the generalizability of the catalog of potential indicators developed in Ghana. The Thailand reports produced no indicators that did not fit within one of the categories derived from the Ghana data, and all but one of the Ghana categories reappeared in the Thailand sample. This suggested that the catalog was reasonably complete and that further data collection was not likely to expand it.

Adding the Thailand reports to those collected in Ghana did much to sharpen the categorization, however. With a combined sample of 500 reports, the nature of the potential indicators could be delineated much more precisely, and the initial catalog was modified in a number of important respects. The information on attribution collected in Thailand represented a significant addition to the data base. For, unlike the fragmentary attribution comments assembled in Ghana, each of the achievements reported in Thailand was accompanied by an explicit statement of its probable antecedents.

Overall, the Thailand research confirmed the generalizability of the data collected in Ghana, permitted a more precise definition of the indicators that can be applied in assessments, and established the linkages between achieved impacts and experiences during participant training. In conjunction with the Ghana findings, they provided the raw data for the development of prototype assessment procedures.

The Catalog of Participant Achievements

Each of the 492 reports collected in Ghana and Thailand described a certain segment of the impact sequence that was described earlier as a chain of discrete, successive events. Some focused on outcomes at or near the point of impact on national goals. Some reported more intermediate

accomplishments in improving the output, capacity, or operations of the institution in which the former participant works. Some were reasonably broad segments, extending from the point of impact all the way back to participant training; some revealed only a few links of the chain. Each showed a slice of one of the sequences whereby impacts occur, and the main task in the analysis of the data was to sort these slices in accordance with the sequence from which each was snipped, and then to fit the pieces together.

As a first step, we sorted the reports on the basis of the nature of the impact that was the end product of the participant's input or action. In each report we identified the final event of the segment described, and then we grouped the reports that ended in similar types of achievements. We obtained 20 separate groupings, as shown below.

IMPACT ON DEVELOPMENT TARGETS

1. Influenced development strategies or emphases, or a specific investment decision

2. Introduced a new agricultural, industrial, or commercial enterprise in the country

3. Developed a local capability for an activity formerly dependent on external resources

4. Discovered a solution or a more promising approach to a significant development problem

5. Stimulated the more widespread adoption of a preferred practice or other desired public response

IMPACT ON INSTITUTIONAL OUTPUTS

6, Initiated a new service or program

7. Raised standards of products or services provided

8, Changed rules or procedures to be more responsive to needs of clients

9. Avoid disruption of service by timely action, despite difficulties or risk

10. Performed task that required special effort or skill

11. Improved or expanded dissemination programs, techniques

IMPACT ON OUTSIDE SUPPORTS

12. Expanded institution's authority, status, or charter

13. Developed more effective working relationships with local agencies or sources of external aid

IMPACT ON INTERNAL OPERATIONS

14. Introduced or expanded the use of analytic, data-based management aids

15. Introduced cost- or time-saving measures, ideas

16. Imposed tighter structure or controls on staff or vendor performance

17. Improved the allocation or organization of responsibilities and functions

18. Upgraded the caliber, capabilities, or morale of the staff

19. Upgraded physical facilities or equipment

20. Improved record-keeping or information retrieval systems

These twenty categories (defined and illustrated in the Phase I report) range from highly dramatic impacts to achievements that do no more than set the stage for impact. But the data suggest that these latter events should not be discounted as indicators of tangible development gains. For impact is a sequence of events and an adequate assessment procedure must tap in at varying places in the chain.

These twenty categories constituted the project's answer to the contribution half of the contribution-attribution problem. But, as end-points of the reported segments, they provide no information about their antecedents, and consequently establish no links to participant training.

The Impact-Producing Characteristics

To identify the various paths the participants took to bring about these 20 kinds of achievements, we reexamined the reports from this point of view. We found that 464 of them specified the path as well as the result, and from each of these extracted the "impact-producing characteristic," which we defined as the specific skill, attitude, or other resource that the participant brought to the situation to effect the impact reported. Then we categorized the reports a second time, in accordance with these characteristics, and obtained fourteen groupings, listed below.

A. Technical capabilities, sophistication

B. Awareness of other possibilities, approaches

C. Appreciation of nature and magnitude of inputs required

D. Acceptance of new or expanded objectives

E. Commitment to principles, convictions

F. Willingness to take responsibility, act

G. Data orientation

H. Goal orientation

I. Efficiency orientation

J. Skill in human relations

K. Familiarity with equipment

L. Familiarity with workable operating routines

M. Access to external sources of information or help

N. Credibility and credentials

If each of these fourteen characteristics could produce each of the 20 types of achievements, there would be a total of 280 separate sequences for which indicators could be developed. But many of these theoretically conceivable sequences are too remote or improbable to be useful for impact assessment. In the existing data base, 111 of the 280 possible sequences were reported, 70 of them two times or more. These 70 sequences were prime

candidates as appropriate foci for impact assessment. But one final question had to be answered: Which of them typically are initiated by an experience provided by participant training?

Attributions to Participant Training

Three hundred and fifty-four (354) reports contained sufficient information to permit attribution decisions. On the basis of the attribution information contained in the reports, they were classified into five groups, representing decreasing attributability to participant training. The resulting classification is shown below.

I. Reasonably clear-cut links to training

(a) Specific technique or theory applied
(b) Specific practice or model adopted
(c) U. S. source or product applied
(d) Practical job experience cited
(e) Incidental skill learned
(f) Credentials applied
(g) Before-after changes observed

II. Probable links to training

(a) Technical background cited
(b) U. S. work style cited
(c) Timing of the event
(d) Requirement for technical knowledge
(e) Conformity of approach to U. S. standard

III. Possible links to training

(a) Claim of increased self-assurance
(b) Claim of attitude change

IV. Doubtful links to training

(a) Personal characteristics
(b) Clever ideas

V. No links to training

In the data base of 354 reports, nearly 80 percent were classified in Categories I and II.

This analysis added a third dimension to the classification of the reports. At this stage each had been allocated to:

a. one of twenty categories of achievements,

b. one of fourteen categories of impact-producing characteristics, and

c. one of five categories of attributability,

representing three "points" of the impact sequence that it described. An example of a report and its classification is given below.

ILLUSTRATIVE REPORT

Solved problems of cotton spoilage by setting up research study that identified six fungicides as effective cures for the causal disease. Three of these fungicides are now being used and are giving good results.

Credits U. S. journals for information on the specific fungicides that it would be most promising to try.

Classification:

Impact Category	4: Discovered solution to significant problem
Characteristic	M: Access to external sources of information
Atrribution	Clear-cut; use of U. S. sources

Reports of this type, classified along three dimensions, were the basis for the development of prototype indicators.

Prototype Indicators for Impact Assessment

Table I summarizes the impact sequences which were most frequently attributable to participant training. There were 36 clear-cut sequences (indicated by X in Table 1) and six which appeared promising (indicated by ? in Table 1). From this analysis, 39 prototype questions were derived, such as

(7) Have you had any success in encouraging your country's farmers (or other client groups) to invest more time or energy in a particular operation, by convincing them that this is important?

and

(13) Have you had occasion to detect a technical error or shortcoming that no one else caught, and that you had to take special steps to correct?

Table I

Combinations Most Frequently Attributable to Participant Training

	A : Tech./Soph.	B : Possibilities	C: Requirements	D : New Goals	E : Convictions	F : Take Resp.	G : Data Orient.	H : Goal Orient.	I : Efficiency	J : Hum. Rel.	K : Equipment	L : Routines	M: Sources	N: Credentials
1: Development Decisions				X										
2: New Enterprises		X												
3: Local Capabilities		X												
4: Discoveries/Solutions	X												X	
5: Public Adoption	X	X	X									X		
6: New Programs	X	X	X											X
7: Higher Standards	X		X								X		X	
8: Client Needs				X										
9: Timely Actions						?		?						
10: Demanding Tasks	X												X	
11: More Dissemination	X	X											X	X
12: Institutional Charter														
13: Outside Relations														
14: Data-Based Aids							X							
15: Cost Savings												X		
16: Tighter Controls	X		X				X					X		
17: Organiz. Structure												X		
18: Better Staff	X		X							?		X	X	
19: Equipment											X			
20: Record-Keeping	?		?								?			

These 39 questions formed the master list; it was suggested that actual assessments would use a subset composed of those most appropriate for the sector being assessed. It was also suggested that further development of the procedures might be accomplished in the context of actual assessments; the central objective of the feasibility study had been accomplished.

I. INTRODUCTION

This "assessment package" consists of two main tools: 1) the instruments that were used to evaluate the impact that former AID participants had on their country's national goals; and 2) suggested procedures for local evaluators who will use these instruments to conduct impact assessments.

The original methodological research was conducted in two countries, where 134 people were interviewed and 492 critical incidents collected. The methodology resulting from that study was field-tested in three other countries, where sizable numbers of former participants held a variety of positions in both the government and private sectors. A total of 364 participants were interviewed; almost 3,000 critical incidents came out of those interviews. The field assessments in these three countries were led by research teams from AIR/Washington, assisted by local personnel. In one country, virtually all of the interviews were conducted by local staff.

By design, the role of the local personnel gradually increased with each field assessment so that the outcome would be an "assessment package" ready for use by a local evaluation team. The inputs of these personnel occurred during three stages. In Stage 1, local personnel participated in the field assessments in several ways: by joining a member of the research team in conducting interviews, by using their familiarity with local conditions to facilitate the establishment of contacts with former participants, and by testing the readiness of the procedures for use by personnel who had not actively participated in the developmental research. Their feedback was used in the revisions made prior to subsequent studies in live, operational settings. In Stage 2, these resulting modifications were further tested by a larger cadre of local personnel who were responsible for most of the data collection in one of the later country studies. Stage 3 occurred when this group suggested additional procedural changes; the outcomes of those suggestions are integrated into this "assessment package."

It is assumed that the application of the suggested procedures will be the responsibility of one individual. Several assumptions have been made about that key individual; that he or she:

- knows the purpose of the evaluation and the intended use of the results,
- has some previous training and experience in planning and conducting program evaluations,
- has a sufficient technical background in evaluation to understand the methodology (by studying the Prologue),
- is able to make on-site modifications in the procedures as may be required by local conditions,
- has the capability to train interviewers to collect data, and
- can work within the partly structured format of the materials to plan and conduct an impact assessment.

This report is not a textbook; individuals with little or no experience in assessment will have difficulty applying its contents. But in every country with which we are familiar, there <u>are</u> people with adequate training and experience. The point is simply that such people must be identified; not everyone can manage the activity.

The sections which follow offer suggestions about each of the elements with which the director of an impact assessment should be concerned. Many suggestions are the consequences of the research teams' field experience. It is expected that some modifications may be necessary to meet field-specific conditions; the suggestions are not intended as prescriptions.

II. PRACTICAL APPLICATIONS OF THE METHODOLOGY

The most important requirement for any evaluation study is that, before planning begins, there be a clear statement of why the evaluation is to be conducted. Vaguely defined objectives concerning the intended use of the results interfere with planning, with keeping the evaluation on target, and with producing useful outcomes. One substantial measure of the success of any evaluation is the extent to which the results are actually used. The outcomes of the evaluation must have some demonstrable influence before the evaluation can be considered successful, regardless of the degree of technical sophistication in either the design or the execution of the study.

One of the most popular justifications for conducting evaluations is that the outcomes will be used in "decision-making." If true, the justification is sufficient. But what the evaluator must ask is: 1) Who is to make the decision?; 2) What is the range of realistic options?; and 3) When is the decision to be made? Answering these questions is a process that requires more time to unravel than many are willing to invest. But the investment is necessary to increase the probability of the results being put to use.

Given questions to which someone really wants answers, the problem becomes one of designing a study around the methodology which will produce a sound field assessment that has potential for producing operationally useful results. Some types of assessments for which this methodology is appropriate are presented below:

1. Diagnostic assessments. A nation or a Ministry might wish to examine a specific training activity to determine its strengths and weaknesses as a basis for modifying the activity. For example, a study might concentrate on the training of mechanical engineers. By gathering evidence which demonstrates both the nature of the impacts the graduates are achieving and the specific linkages to training, the strong points are revealed. The interpretation

of omissions (training elements not linked to impact) is less straightforward; a specific course may permit an impact without being directly linked to it. Basic math might be one example. The findings are used to identify aspects of the training where alternative approaches should be considered.

In early diagnostic assessments, the goals against which performance is compared will be based on the outcomes expected by the designers and/or planners of the activity. Subsequent studies may permit the development of more objective norms as accumulated findings identify the types and patterns of impacts that occur. Repeated assessments serve an essential monitoring function; this function might be satisfied with quite small samples.

2. Comparative evaluations. A nation or Ministry might want to test specific hypotheses about particular program characteristics. A comparative evaluation may focus on alternative patterns of implementation as short- versus long-term programs, degree versus non-degree, practical versus academic, etc. Or, the value of foreign, as opposed to local, training might be the focus.

Comparative evaluations can be an integral part of the entire training program, planned and designed whenever programs and/or changes are introduced. They can also be applied, retrospectively, to any aspect of the program that has changed in any way, or for which changes are being considered, for various participant groups. These studies would be conducted by selecting comparable groups of respondents that are representative of the various treatments, then documenting their achievements.

3. Basic programming characteristics. Studies of this type might be of interest to one country, but would also be of value to multi-national organizations (as AID, World Bank, major foundations, and regional organizations).

These studies would transcend the boundaries of a single kind of training activity and aim for policy guidance on basic programming characteristics that affect most or all of the separate training activities that comprise the program. They would be similar in intent to the worldwide survey of participant training that was launched some years ago and would be undertaken from time to time to provide an overview of the program as a whole. For example, an organization such as ASEAN might sponsor a comparative evaluation to ask the question: Should we train agricultural specialists in academic institutions or in a vocational college? How do the benefits educational technologists receive from traditional classroom instruction differ from those received in a short-term session such as a workshop?

Studies of this type do not require a new design but can be constructed from the previous designs used in the other two types of studies. General characteristics and common formats could be aggregated to answer Type 3 questions.

In summary, this methodology can be applied to measure numerous elements of training activities or complete packages of training activities. Use of the procedures will obviously depend on the user's requirements, and these must be explicitly stated. The methodology provides a framework within which an evaluator can determine: 1) if a real impact has been made, and if so, the nature of the impact; 2) the characteristics that enabled the impact to occur; and 3) whether the impact is attributable to the training activity.

III. ISSUES OF SAMPLE SELECTION

Once the objectives of an evaluation have been formulated in explicit terms, it will usually be possible to identify the population of former participants from which samples are to be selected. For example, suppose that the evaluation is to assess the outcomes of two modes of training of agricultural research specialists. Mode #1 might be an uninterrupted academic program leading to the Ph.D. from a U. S. university. Mode #2 might be a program with two years of U. S. university-based graduate work, followed by one year on-the-job in the home country, followed by one additional year writing the Ph.D. dissertation at the university.

The populations of former participants trained in Modes #1 and #2 should be specifiable from records. The problem then is to draw samples from these populations which will provide meaningful estimates of the impact which <u>will be realized</u> if the Ministry chooses to use but one of these modes in the future. Straightforward random sampling will seldom be the optimal solution, despite the inferential power attendant to the method. The participant populations are likely to be small, and the evaluator must consider the factors which might produce invalid estimates from random samples. He must carefully review the ways in which the populations may differ, before depending on the randomness of sampling. In the example being considered, the evaluator should review the populations to see if they differ on such factors as:

- <u>Time of training</u>. The elapsed time between completion of training and the evaluation can affect identification of the antecedents. Tracing the linkages between the impact and the training will be easier for the former participant who completed training a short time ago, such as a year. But for a former participant whose training program ended twelve years ago, it will be difficult to establish direct linkages between impact and training. The particular skills and knowledges acquired in training merge with the accumulated knowledge

gained from practical work experience. The contribution of training thereby becomes obscured.

- Present job level. The population might range from Directors of Ministries to administrative assistants and Bureau Chiefs to junior researchers. Job levels will influence not only whether one can achieve impact but the magnitude of the impacts achieved. The opportunity for impact will differ; a Minister of Finance will certainly be in a stronger position to affect change than a staff accountant. A junior researcher's primary responsibility may be to perform support services on a supervisor's research project rather than conduct experiments on his own; so the level of the supervisor's job provides a climate more suitable for achieving impact.

- Length of time with present agency. The spread of employment among the potential respondents may vary from one month to 25 years. An individual who is a recent hire may not be in a functional position to bring about a change. Additional time served in an agency could alter this opportunity. A long-term employee may use both experience in the agency and level of position to achieve impact. The reverse may also be true; a recent hire may be a new Director and therefore able to bring about change.

- Sex. Many cultures offer more opportunity to males than to females. A comparative evaluation of two training activities, each populated predominantly by one sex, might be meaningless because of such differential opportunity. Home economics training in some countries may have almost all female enrollees; in the real world this must be taken into account if the findings of a study are to be practically applied. In the health field, more women than men could serve as extension workers, who visit rural clinics to advise families on family planning. In the same program, the administrators who receive training may be male rather than female.

Each of the above is a potential source of invalidity; each can produce differences between samples which are unrelated to the true differences between training modes. The objective of sampling is not simply to represent

a population; the true objective is to select samples which will permit a valid conclusion to be reached regarding the issue which the evaluation is designed to test. An example may be useful. Imagine two participant populations with the following current compositions.

Present Job Level	Pop A	Pop B
GS 16-18	187 (15%)	56 (6%)
GS 14-15	499 (40%)	224 (24%)
GS 12-13	437 (35%)	606 (65%)
GS 6-11	125 (10%)	47 (5%)
Totals	1,248 (100%)	933 (100%)

Random samples drawn from these two populations will approximate the distribution of job levels found in the populations: Sample A will have a higher average job level than Sample B. Since higher job levels are associated with more impact, Samples A and B will differ, and this difference cannot properly be attributed to a difference in mode of training.*

Most textbooks would recommend that random samples be drawn and the confounding variables be treated by appropriate multivariate statistical designs. One would then have estimates of the variance associated with (a) job level, (b) training mode, and (c) the interaction of level with mode. There will be situations where this generally recommended approach is the optimal one, but there will be many more, in the real world, where it will not be feasible. The principal reason for this is that there will often be many extraneous factors which are known to influence the amount of

*In the example, it is assumed that the difference in job level distributions is a function of one population being older and having been trained earlier; if the difference were a function of different modes of instruction, it would produce valid variance, and random sampling would be appropriate.

impact. Statistical control, through complex multivariate designs, would require very large samples, and this will often be precluded by practical constraints. It will then be preferable to select deliberately nonrepresentative samples which provide experimental control of the unwanted sources of variance. In the example, we might decide to randomly select ten people from each of the eight cells by applying different sampling ratios to each cell, as in the following table.

Level	Pop A	Pop B
GS 16-18	5.3% = 10	17.8% = 10
GS 14-15	2.0% = 10	4.5% = 10
GS 12-13	2.2% = 10	1.7% = 10
GS 6-11	8.0% = 10	21.3% = 10

The general suggestion is that a "common sense" approach to sample selection be adopted. Since factors other than the one to be studied can influence the outcomes, these factors must be controlled. When there is no requirement to "represent" the population, the simplest solution is the preferred one.

For other evaluations, there may be other disturbers of validity. The length of the training program, for example, may contribute variance which is independent of the formal characteristics of the program. There may be reported impacts which are attributed to "fluency in English." Fluency is more likely to be developed by participants with lengthy, rather than short-term, training programs. As in all cases, the evaluator must decide whether the variance attributed to fluency is valid or invalid, and this can be determined only with reference to the specific objectives of the study.

There may also be practical constraints which influence sample selection. These include:

- Geographic constraints. There may be realistic limitations on travel time and/or cost. Central cities will have the highest density of former participants, but there may be good reasons for sampling in provincial or rural areas. Despite the desirability of a geographically dispersed sample, some participants may be so isolated as to make their inclusion unreasonable; certainly it would seldom be prudent to spend a day of travel for one interview;

- Opportunity constraints. Some ministries or some agencies may occupy positions of power (temporary or permanent) which provide great opportunity for impact. It may therefore be necessary to modify a sample so that differential opportunity does not bias the results. One approach, suitable in some assessments, is to balance each agency's representation in each sample to be compared. Obviously, there will be many cases where this approach is not possible. On occasion, the only choices are to (a) avoid a particular agency, or (b) adjust the results on the basis of opportunity.

- Cost constraints. Budgets are always limited and necessarily influence sample selection. Costs will be one determiner of sample size, geographic dispersion, and the intensity of follow-up to locate hard-to-find members in a sample.

There are always compromises in the real world, and sample selection does not escape this reality. There are trade-offs between sample size and geographic representativeness, between time and costs, between precision and "best estimate" outcomes. To repeat the theme of this section: Sample selection is governed by the use to which the results are to be put and not by rigid adherence to scientific principles.

IV. TRAINING THE INTERVIEWERS

The following materials will be needed during the training; copies of each appear in the Appendix.

- The Critical Incident Approach. A description of the data collection procedure. Each interviewer should receive a copy prior to the first training session.

- The Interviewer Preparation Unit. An orientation unit that allows the interviewers to become familiar with the critical incident approach by providing an opportunity for practice in identifying the elements of an incident, gathering the incidents, and writing the reports. Each interviewer should receive a copy prior to the first training session.

- The Interviewee Materials. These items are presented to the interviewee (respondent) at the beginning of the interview. They explain what type of information the interviewer is seeking, and offer a list of categories from which the respondent selects those in which he or she can cite some examples of achievement.

- Illustrative Critical Incidents. Critical incidents collected during previous impact assessments of participant training can be used by the leader of the training session to help the interviewers gain experience with critical incidents.

Interviewer selection. The success of the study is dependent upon the adequacy of the data collection; virtually all the data used in the study will be gathered by the interviewers. The preparation of the interviewers is, therefore, crucial to the data collection effort. Obviously, the capability of the interviewers is a key ingredient to the evaluation. Some factors to be considered in choosing interviewers to maximize the adequacy of the data collection are:

- Education. A bachelor's degree in the field of psychology or education, or equivalent work experience should be a minimum requirement.

- Work experience. Prior interviewing experience is very desirable; in the absence of such experience, evidence that the individual is able to think and respond quickly during an interview. Having elicited a statement of impact, an interviewer needs to follow through with appropriate questions to collect complete data on each reported event.

- Knowledge of substantive content. If the respondents represent a highly specialized field, such as engineering, some terms may arise during the interview that will require clarification by the interviewer. Knowledge of the field would be helpful but is not a necessary requirement in collecting incidents.

- Personal factors. The local trainer must judge the importance of such factors as age, sex, neatness, etc. In some cultures, female interviewers may be at a disadvantage; in others they may be preferred.

The number of interviewers required for the study depends on: 1) the number of incidents targeted for collection, 2) the amount of time available for collecting the data, and 3) the number of incidents each interviewer can collect in one interview.

Our experience suggests that two or three scheduled interviews (one hour) per day per person are reasonable, including travel to and from the interview, the actual interview, and the time required to complete the data cards.* We have tried tighter scheduling, up to five interviews per day per person. This schedule was unsatisfactory because the interviews become abbreviated to meet the next appointment or the write-ups are postponed until another time and then not documented as thoroughly as they should be.

* Do not underestimate this task; data cards should be completed each day because details of the incidents become hazy as more and more interviews are conducted and the critical incidents collected.

The number of incidents collected per interview will naturally vary on the part of both the interviewer and the respondent. An interviewer should average five to eight comprehensive incidents per interview. More experienced interviewers can collect more incidents, perhaps 10-15 per interview. Individuals just learning this technique should not be expected to average more than five to eight incidents per interview; the emphasis should be on quality rather than quantity.

If the target is to gather 1,000 incidents in 30 days, about 33 incidents must be gathered each day. This means that six or seven interviews should be conducted each day; if one person can interview only two people per day, then three or four interviewers will be necessary to complete six or seven interviews per day. Within this structure, three or four interviewers are adequate. Viewed another way, plan to collect the 1,000 incidents in ten days. One hundred incidents need to be collected per day, twenty interviews conducted, and ten interviewers needed.*

The training session. Allow two days for the training/orientation session.** The purpose of this session is to familiarize the interviewers with the methodology of the study, with the interview format, and with the reporting procedure, and to provide an opportunity to practice using the procedures prior to the actual data collection. If possible, prior to the first session, distribute copies of The Critical Incident Approach and the Interviewer Preparation Unit to all interviewers. Ask them to complete the exercises before the first session; by so doing, more training time is available for practice.

---

* These time estimates do not include contacting the respondents and scheduling the interviews.

** This may vary by number of interviewers. Less than 10 trainees will probably not require this much time.

The format suggested below is based upon the experience of the research teams in conducting on-site training sessions and the suggestions of local interviewers who participated in the sessions. Time devoted to each segment of the training should be at the discretion and choice of the leader, whose decisions ought to be based on the specific needs of the group. Other modifications may be necessary to meet field-specific conditions. Before beginning a training session, the leader must be thoroughly familiar with the proposed assessment, especially the methodology, and all the materials which the interviewer will use.

- Begin by briefly discussing the methodological design which is to be applied in this impact assessment. The Prologue to this report is the primary reference; a more thorough explanation of the taxonomy appears in the Appendix. Answer any of the interviewers' questions about the methodology. Additional questions will arise later as the interviewers become more familiar with the program. But some questions can be resolved at the outset.

- Carefully explain the objectives of the planned study, the anticipated use of the outcomes, and the specific role of the interviewers in the assessment. Answer any questions.

- Review the materials distributed to the interviewers in advance. Does anyone have questions about the material covered in the assignment? Go over the exercises which the interviewers completed in the materials. It will probably be necessary to review them very carefully, especially the concept of a critical incident and the elements of an incident. Take as much time as required for the group to grasp the fundamental concepts.

- Interview one of the interviewers about his or her own job. Elicit only one critical incident, then end the interview. Discuss every aspect of this incident with the group until the elements of the incident are clear to everyone. Have each member record the incident on a data card; review each person's work and provide feedback on individual performance.

- Conduct a second interview with another group member. Ask the trainees to listen for the incidents reported during the interview; they should note the reports they hear. Conduct a brief interview; terminate the interview when you have elicited about four or five reports.

- Ask the interviewers to identify the incidents reported during the interview. Discuss the incidents which were not identified by all interviewers. Review the questions asked during the interview. Different questions (probes) are used to identify the behavior, the consequences of the behavior, the enabling characteristics, and the attribution factors. The probes are vital to the successful collection of critical incidents.* Interviewers should learn (or have available during the interview) key probes for eliciting information about each element of an incident. Sample probes are included in the Appendix.** As the trainees practice interviewing, allow some time for group discussion about the adequacy of the probes; add the new probes to the existing list.

- Conduct a third interview with one other member of the group; have the interviewers identify the incidents as before. Repeat the procedure until you are confident that the interviewers understand. (They

---

* The methodological development included some prototype questions for each of the 20 impact categories. The highly structured questions focused on the impact sequences; each question was constructed to elicit information about a specific type of achievement. The original intention for the field assessments was to compile a set of selected questions in an interview format. Some number of formats would be created; they could be used on a rotating basis so that achievements would be collected in all of the impact categories. Some of the questions are complex. Our first attempt at applying this technique was unsatisfactory because too many "on-the-spot" changes needed to be made when a respondent did not understand the question. We believe the suggested procedure is preferable so therefore did not include the questions in this report. These questions appear in the Phase I report referred to in the Prologue.

** Each interviewer should have a copy of the probes.

will be given time later to practice interviewing one another.)

- When the incidents have been identified, ask each member to complete a data card for one of the incidents. The group should all write about the same incident. When all members have completed their cards, have one member read his or her card. Allow the group to comment. Provide feedback to maximize the usefulness of the exercise. A good data card is one which the incident can be clearly understood without having to ask additional questions. Practice completing these data cards as necessary until the interviewers record all the appropriate information about the incidents.

- Have the members practice interviewing one another. The interviewer should now use the interviewee materials (discussed in the following section). Have one pair practice at a time; the rest of the group should listen for incidents, then record them on the data cards. Everyone should have some practice interviewing and being interviewed. Discuss the strengths and weaknesses of each interview among the group, plus the probes, types of incidents, etc.

- Practice the interview sessions and data documentation as time permits. Sample incidents appear in the Appendix. They can be used for any remedial or drill work required.

The materials and exercises addressed here focus on oral interviews, conducted one-to-one. It is also possible to collect written incidents, using group procedures. This approach requires no formal training, but the individual responsible for collecting written incidents must be familiar enough with the interviewee materials to be able to respond to questions that arise during the session. The written procedures are described in the next section.

At the conclusion of the training session, the interviewers should be prepared to begin conducting interviews. Conducting the actual data collection effort is discussed in the following section.

V. DATA COLLECTION PROCEDURES

Data collection consists of (a) scheduling the interviews, (b) conducting the interviews, and (c) recording the data. Numerous administrative details arise during this phase of the study that require a substantial amount of time. One way to facilitate the management of these details is to assign the responsibility to one individual who can:

- construct the list of potential respondents for each sample,
- schedule the interviews,
- maintain a master chart of all the respondents who have been interviewed,
- send any advance material to the interviewee which is deemed appropriate, and
- compile master tables of the relevant background data on each respondent.

Scheduling interviews. Field experience in impact assessment leads to the following suggestions:

- One person in each agency should be the primary contact between the evaluator and the respondents within the agency. This facilitates scheduling and ensures no duplicate contacting of any respondents. The initial agency contact should be a senior official who can authorize employee participation in the assessment. Often, a deputy of this official is assigned to notify agency personnel about the assessment and to arrange the interviews. Give the agency contact sufficient information to set up the interviews, such as names or other pertinent information about the persons to be interviewed, length of the interview, and time for the interview.
- After establishing the verbal contact, send a follow-up letter to the senior official outlining the study and repeating the necessary information for scheduling the interviews. This is both a courtesy and an aid to the agency; it also clarifies the requirements for conducting the interviews.

- If possible, prior to beginning the interviews in an agency, meet with all respondents to explain the study and why they were selected to participate.

- Allow 1 to 1 1/2 hours per interview. This will vary, often depending on the nature of the respondent's job and the specific functions of the job.

- Try to arrange a meeting place where the interview can be conducted privately and without interruption.

- Oral interviews should be conducted on a one-to-one basis; the exception to this occurs if two people conduct the interview.*

- Be sensitive to the desires of senior agency officials who often prefer to be interviewed by a senior member of the project. The project leader may conduct these interviews. These officials usually have little free time and may only be available for a half-hour interview.

Conducting interviews. Most interviews will be oral, but some occasions may require written interviews. For example, if an agency restricts your visit to only one day and there are too many respondents to interview, collecting written incidents is an alternative method that can be used.

Oral interviews. The following procedure is suggested for conducting the interviews:

- Begin the interview with a brief introductory statement explaining the purpose of the interview and why the respondent was selected. (This is helpful even if a general briefing meeting was held.)

- Gather the background/demographic data on the respondent that will be recorded on the data card, if these data have not already been gathered from records.

---

* Inexperienced interviewers sometimes want to conduct their early interviews in pairs; it increases their confidence and also results in more complete data collection.

- Ask the respondent to summarize his/her job in a few sentences.

- Give the respondent a copy of the interviewee materials. These materials consist of two items: 1) a definition of a critical incident, and 2) a list of "areas of impact." Each assists the respondent in the interview. The critical incident material shows examples of the kind of information the interviewer would like to collect and the "areas of impact" list allows the respondent to select the categories within which he or she can cite achievements. This list also contributes to a more efficient interview because it is not necessary for the interviewer to probe for the category of impact, just the dimensions of the incident. Allow the individual a few moments to read the materials and complete the "areas of impact" page. Answer any questions.

- Examine the items marked on the "areas of impact" page; ask the participant for specific examples of impact in the first area marked.

- Probe for comprehensive data on the reported incident to ensure that all elements of an incident can be described.

- For the first area marked, ask if there are other examples which can be cited. When no further reports are forthcoming, go on to the next area marked.

- Repeat the above sequence until all marked areas have been covered. Collect as many complete critical incidents as possible.

- If time permits, review the "areas of impact" list and attempt to collect additional incidents from areas not originally checked. Ask if there are other important events which were not covered in the list; collect any incidents reported.

Written interviews. Written interviews can be collected from almost any size group. Experience suggests that people hesitate to invest the amount of time consumed by writing many incidents. As a result, more incidents are produced per person in an oral interview. But the written procedure should produce more incidents per unit of interviewer time than does

the one-on-one oral interview. A suggested procedure for written interviews follows:

- Begin the meeting with a brief introductory statement explaining the purpose of the study, why the interviewees were selected, and the procedures for collecting data.

- Distribute a copy of the interviewee materials on written interviews to each participant. Answer any questions.

- Ask each member of the group to read the materials and complete the parts as instructed. Provide assistance as requested.

- Be certain that all background data are completed on the forms.

- Observe the members as they record their incidents to ensure they report their incidents properly (only one incident per sheet).

- Collect all materials as the participants finish.

Recording data. All incidents collected in an oral interview must be recorded on a data card; written incidents do not require transfer to a card unless it is administratively convenient to do so.

- Each interview should have an assigned number that is recorded on the data card.

- Incidents should be numbered consecutively within interviews. For example, Interview #1 may produce five incidents, so a card reads: Interview #1; Incident #1, or #2 . . . . #5. Begin again with Interview #2; Incident #1, etc.

- Record all data on the respondent -- position, agency, date and length of training, place, program. These data can be transferred to the master chart compiled by the administrative officer.

- Fully describe specific elements of each incident. Write these descriptions as early as possible following each interview, preferably on the same day. The individual responsible for supervising the data collection should review these data cards on a daily basis and provide immediate feedback to maintain quality standards in the data collection.

In the early stages of the data collection, it is desirable for the interviewers to meet together to share their interviewing experiences. These meetings provide an opportunity for them to clarify any issues that may have arisen and for the leader to suggest any necessary corrective action.

The interviewer is not responsible for classifying the data; this should be done by the director of the project or another qualified individual. Details for this task are explained in the next section.

VI. DATA CLASSIFICATION AND ANALYSIS

This section addresses two aspects of data analysis: 1) the administrative details of classification, and 2) substantive issues which arise in classification and analysis.

Administrative procedures. Classification is a judgmental process; it consists of reading an incident report and deciding, on the basis of its content, the content category in which it belongs. The data must therefore be classified manually; once the incidents have been sorted, it is possible to use a computer for data tabulation. Classifying these data is time-consuming; early sorting is a learning process. As categories become more thoroughly understood, classification time is reduced. The following procedures are used:

- Classify each data card in three ways -- by impact, by enabling characteristic, and by attribution. Use the guidelines included within each categorical description. Classify each of the categories separately; that is, all of the impacts should be classified before classifying the characteristics. This increases the consistency of categorizing the incidents because knowledge of each item in the taxonomy grows and concentration is not interrupted.

- Recheck the classification of the incidents, especially the ones classified at the beginning. The assignment of incidents to categories may not be as consistent for this early group as for later incidents, when the taxonomy is more familiar.

- Sort the cards by impact category; keep the piles intact until the data analysis is completed.

- Retain the piles by impact category; within each category, arrange the cards in order of the enablers. For example, Category #1 would contain data cards arranged from A to N.

- Using the same piles, arrange the cards by attribution within each enabling characteristic. When completed, each pile of reports should be organized in order. For ten cards in Category I, the following is a correct ordering:

1. 1AIa	6. 1EV
2. 1AIb	7. 1GIIa
3. 1AIII	8. 1KIa
4. 1BV	9. 1MIII
5. 1DV	10. 1NIa

- Organize the findings into tables as illustrated in the Appendix. The basic analysis is a frequency count of the number of incidents in each category; cross tabulations show combinations of categories and reveal impact-characteristic sequences. A three-way matrix showing the distribution of incidents by impact category, by characteristic, and by attribution shows the full range of the most dominant impact sequences. Further breakdowns of the data by one or more background variables may also be of interest. But these higher order breakdowns require a very large number of incidents. Interpretation of the data is based on the pattern of frequencies among the cells.

Many substantive questions will arise when the data are being classified. Situations which frequently occur are discussed below.

Substantive issues. Critical incidents are objective reports of actual events; the classification is, by nature, subjective. Creating the original taxonomy is an empirical process which rests on the discriminative judgment of "alike or different." The taxonomist reading his second report judges it to be "alike" or "unlike" the first one he read. Each incident in turn is judged to be "like" one or more previous incidents, or "unlike" all of them. Each judgment of "unlike" introduces a new category in the taxonomy.

Read the following example, #5 in the 20 impact achievement categories:

> 5. Stimulated the more widespread adoption of a preferred practice or other, desired public response. The reports in this category describe achievements in the participant's role as an "agent of change," particularly in rural locations. The majority of them report improvements in agricultural practices, nutrition, health, and sanitation. Other reports describe improvements in manufacturing processes, and still others cite gains in the payment of taxes. In the latter area, the primary technique used to effect the change is that of enforcement; in the other areas, it is one of teaching and demonstration.

The first sentence is an attempt to define the category. The illustrations that follow come from the reports comprising the first set of incidents; they are by no means exhaustive. None of the new incidents may be identical to these illustrations, yet fit into this general category.

In Phase I, as described in the Prologue, the reported incidents were classified into three sets of categories:

- 20 categories of participant achievements;
- 14 impact-producing characteristics; and
- 5 levels of attribution to participant training.

This final outcome was the result of an iterative process; many alternative sets of categories were tried out before an apparently satisfactory set was established. We believe that this set is exhaustive; e.g., it includes all of the types of impact which participants achieve. The set represents our judgment of the level of specificity that will lead to useful indicators for impact assessment.

Issues arise in applying new incidents to a taxonomy. Questions such as the following may emerge:

- <u>Multiple classification</u>. Sometimes a report does not fit neatly into one category. There may be several explanations for this; a report may contain more than one incident or the report may appear to belong in more than one category. The following abstract of an incident illustrates the first situation:

  Identified cause of cattle disease that he had worked on extensively prior to training but was unable to handle, then traveled on his own initiative to a rural area where he knew the cattle were suffering from a disease. He correctly diagnosed the disease and instructed the local vet on treatment procedures.

This "incident" is really two incidents; the first is the identification of the cause of the cattle disease. The second is a separate set of behaviors -- visiting a rural area, diagnosing the cattle disease, and suggesting treatment procedures. Each of these would be classified differently. The first incident fits Category #4 -- discovered solution to significant problem; the second most appropriately fits Category #7 -- raised standards of services provided.

This abstract of an incident illustrates the second situation:

> Introduced method of studying amount of traffic and speed on road, so as to be able to predict maintenance requirements and keep road in better condition.

This report appears to fit into more than one category -- #14 (introduced data-based management aids) or #6 (introducing a new service or program). To which category should the incident be assigned? Based on the information above, a clear choice is difficult; a rationale for selecting either one of the categories can be made. More information is required, so examine the thrust of the impact -- is the emphasis on the introduction of a new method into an agency or that the maintenance activities on roads have improved because of the data collected on traffic and speed? If it's the former, then Category #6 is the choice; if the latter, then Category #14. Perhaps the enabling characteristic will provide a clue -- a reliance on technical

sophistication suggests a #6, whereas a dependence on the use of data for planning and decision making suggests #14 as a reasonable choice.

- Non-incidents. It is possible to have a reported event that is not a critical incident. Some of the reports submitted by the interviewers will probably not have "made a difference." Often individuals substitute their job functions for activities that resulted in a single impact; these are not strong enough to be an incident. A participant who reports that he records proceedings of semi-annual meetings attended by Ministers of all government agencies and then distributes copies of these proceedings to each of the attendees has not recounted a critical incident. The function may be important or even essential, but it could be performed by many different people; no critical event is involved. Keep the "difference" criterion in mind, especially when considering the addition of more categories.

- Missing elements. Sometimes an interviewer may forget to obtain an element of a critical incident -- often the enabling characteristic or the attribution factor. The introduction of visual materials into school health programs, which resulted in documented improvements in child health care one year later, was reported by a participant who said that he learned these techniques in the U. S. The report did not include evidence concerning how the development was brought about. Check with the interviewer; if the data are not in the interviewer's notes, then perhaps the conversation can be recalled and the missing data included. If one of these elements cannot be retrieved, it is still possible to use the remaining elements of the incident. In the evaluation report, some mention of this occurrence should be made because the totals for the several sets will not agree.

- Unique incidents. Incidents may be encountered which do not seem to fit any categories of the taxonomy. A closer examination of the incident will produce one of two outcomes: 1) the taxonomy may be expanded to include a new cluster of incidents, or 2) a more thorough critique of the incident will clarify the category to which the incident may be assigned. If an incident does not fit one of the existing categories, do not create a new category to accommodate one incident.

New categories should be created only if a cluster of similar incidents emerges from the data. A reexamination of seemingly unique incidents may reveal appropriate placement in the original taxonomy. For example, joining a professional organization is not listed within any of the impact categories. A rationale for including it in Category #10 could be that because technical competence is a primary criterion for society membership, increased credibility and status may accompany the membership and result in some additional outcomes. Publishing articles in a professional journal does not appear in the taxonomy, but can be classified within Category #11, the dissemination of information. Remember that the examples included within each description of a type of category illustrate reports from the original set of incidents; you add your own illustrations that further define each of the categories.

Ensuring reliability. Assignment of specific incidents should be checked for reliability to reduce chance error and demonstrate consistency. Classification of incidents is subjective, and it is important that all individuals who classify the data have a consistent frame of reference. Reliability checks may be conducted in several ways. One recommended practice is to have a small set of incidents classified independently by all the people who will be involved in the classification task. When each completes the classification, the group should compare the results and discuss any discrepancies. Repeat the process. The purpose of this procedure is to ensure a common frame of reference so that the results of classification will be independent of the particular individuals who do the classifying. If only one individual is classifying the incidents, a suggested procedure would be for the individual to classify the data, then reclassify the same data a few days later and compare the results. Repeat the process as necessary until the assignment of incidents to a category is consistent.

Uses of the data. The data may be organized in any way that suits the specific objectives of the assessment. For example, identifying differential impact from individuals with certain backgrounds may be important in

determining selection criteria for various training activities or training programs.

The basic analysis is a frequency count of the number of incidents in each category. An aggregate of the specific impacts shows which of the impacts have been consistently achieved, which have been sporadic, and which have not appeared at all. For example, in a particular study the largest number of reported achievements may be in Category #1, influenced development strategies; the lowest in Category #18, upgrading staff morale. Such a finding is of diagnostic value in assessing the nature of training outcomes. The achievements may also be grouped by the four subsets of impact, one approach to documenting the patterns of achievement.

An aggregate of the enabling characteristics produces a similar type of information, the consistent appearance of some characteristics, and the relative absence of others.

More detailed information emerges from cross tabulations that show the frequency of various combinations of categories from the different sets. Sequences of enabling characteristic-impact reveal the mechanisms used to produce a class of impact. Some of these sequences are fairly obvious. For example, in Category #10, which requires the use of a special skill, many incidents may be achieved because a participant possessed a technical capability, Characteristic A. But other sequences may be unexpected, and their appearance produces new insights into the nature of training outcomes. For example, if the sequence of N-6 (credentials as the enabler for the introduction of new programs) appeared frequently, it would suggest further inquiry into the nature of the enabler. It might be a matter of a degree, or of foreign training, or some combination of factors.

Data may also be aggregated according to the specific training experiences cited as antecedents of the impacts reported. For short-term

monitoring of participant training, these sequences may be useful; in the longer term, the attribution linkages become less important. It is unreasonable to expect that clear-cut linkages to training will survive twenty years of on-the-job experience.

The complete three-way matrix of impact-enabler-level of attribution is of little practical value for a specific study. For one thing, the matrix is so large (5 x 20 x 14 = 1400) that most of its cells will be empty in most studies. Its potential value depends on an accumulation of studies; aggregating over a large number (10,000 incidents, for example) may indicate new sequences which deserve study. In Phase I, 39 sequences seemed to merit special attention and most of these were verified in Phase II. In addition, three new sequences appeared frequently in both sectors studied (see Report #4). It seems clear that for a specific assessment, a small number of three-way sequences will account for most of the incidents.

VII. BIBLIOGRAPHY

This section includes some general references in evaluation methods and procedures as well as some technically specific sources that may be useful in the planning and management of an evaluation project.

Adams, G. S., & Torgerson, T. L. Measurement and evaluation in education, psychology, and guidance. New York: Holt, Rinehart & Winston, 1964.

American Institutes for Research. Evaluation research, strategies and methods. Pittsburgh: Author, 1970.

Bonjean, C. M., Hill, R. J., & McLenore, S. D. Sociological measurement, an inventory of scales and indices. San Francisco: Chandler, 1967.

Campbell, D. T., & Stanley, J. C. Experimental and quasi-experimental designs for research. Chicago: Rand-McNally, 1966.

Carroll, S. J., Jr., Paine, F. T., & Ivancevich, J. J. The relative effectiveness of training methods -- expert opinion and research. Personnel Psychology, 1972, 25, 495-510.

Catalanello, R. F., & Kirkpatrick, D. L. Evaluating training programs -- the state of the art. Training and Development Journal, 1968, 22, 2-9.

Cicero, J. P. Behavioral objectives for technical training systems. Training and Development Journal, 1973, 28, 14-17.

Cochran, W. G. Sampling techniques. (2nd ed.) New York: Wiley, 1963.

Cohen, D. K. Politics and research: Evaluation of social action programs in education. Review of Educational Research, 1970, 40, 213-238.

Flanagan, John C. Measuring human performance. California: American Institutes for Research, 1974.

Glock, C. Y. (ed.) Survey research in the social sciences. New York: Russell Sage Foundation, 1967.

Gorden, R. L. Interviewing: Strategy, techniques, and tactics. Homewood: Illinois: Dorsey Press, 1969.

Harmon, P. A. Classification of performance objective behaviors in job training programs. Educational Technology, 1968, 8, 11-16.

Harris, C. W. (Ed.) Problems in measuring change. Madison: University of Wisconsin Press, 1963.

Issac, Stephen & Michael, William B. Handbook on Research and Evaluation. San Diego: Robert R. Knapp, 1971.

Kaplan, A. The conduct of inquiry: Methodology for behavioral science. San Francisco: Chandler, 1964.

Madge, J. The tools of social science. Garden City, New York: Doubleday, 1965.

Miller, D. C. (2nd ed.) Handbook of research design and social measurement. New York: McKay, 1974.

O'Leary, V. E. The Hawthorne effect in reverse: Effects of training and practice on individual and group performance. Journal of Applied Psychology, 1972, 56, 491-494.

Remmers, H. H., Gage, N. L., & Rummel, J. F. A practical introduction to measurement and evaluation. New York: Harper-Row, 1965.

Scriven, M. The methodology of evaluation. In Perspectives of Curriculum Evaluation. American Educational Research Association Monograph, No. 1. Chicago: Rand McNally, 1967.

Sheldon, E. B., & Moore, W. E. (Eds.) Indicators of social change: Concepts and measurements. New York: Russell Sage Foundation, 1968.

Suchman, F. A. Evaluative research: Principles and practice in public service and social action programs. New York: Russell Sage Foundation, 1967.

Sudman, S. Reducing the cost of surveys. Chicago: Aldine, 1968.

Thorndike, R. L., & Hagen, E. Measurement and evaluation in psychology and education. (2nd ed.) New York: John Wiley & Sons, 1971.

Trow, M. Methodological problems in the evaluation of innovation. Los Angeles: University of California, 1969.

Webb, E. J., Campbell, D. T., Schwartz, R. D., & Sechrest, L. Unobtrusive measures: Nonreactive measures in the social sciences. Chicago: Rand-McNally, 1966.

Yamane, T. Elementary sampling theory. Englewood Cliffs, New Jersey: Prentice-Hall, 1967.

APPENDIX A

CATALOG OF PARTICIPANT ACHIEVEMENTS

CATALOG OF PARTICIPANT ACHIEVEMENTS

Each of the 492 reports collected in Ghana and Thailand described a certain segment of the impact sequence that we represented schematically in an earlier Section as a chain of discrete, successive events. Some focused on outcomes to the far right of the chain, at or near the point of impact on national goals. Some reported more intermediate accomplishments in improving the output, capacity, or operations of the institution in which the former participant works. Some were reasonably broad segments, extending from the point of impact all the way back to participant training; some revealed only a few links of the chain. Each showed a slice of one of the sequences whereby impacts occur, and the main task in the analysis of the data was to sort these slices in accordance with the sequence from which each was snipped, and then to fit the pieces together.

As a first step, we sorted the reports on the basis of the nature of the impact that was the end-product of the participant's input or action. In each report, we identified the final event of the segment described; and then we grouped the reports that ended in similar types of achievements. We obtained 20 separate groupings, as cataloged in Table 1.

As in any process of categorization, the number of groupings derived could have been larger or smaller than the 20 that we developed, depending on the level of specificity that is applied to the grouping procedure. For assessment purposes, great specificity offers the advantages of precision in formulating indicators that faithfully reflect not only the thrust but only the nuances of the reports, while more generality offers the advantages of operational utility in producing indicators that are applicable to a large number of different situations. Striking the appropriate balance between specificity and generality is always a matter of judgment; these 20 groupings represent our judgment of the level of specificity that will lead to useful indicators for impact assessment.

Table 1:

Catalog of Types of Participant Achievements

	No. of Reports
IMPACT ON DEVELOPMENT TARGETS	
1: Influenced development strategies or emphases, or a specific investment decision.	19
2: Introduced a new agricultural, industrial, or commercial enterprise in the country.	10
3: Developed a local capability for an activity formerly dependent on external resources.	10
4: Discovered a solution or a more promising approach to a significant development problem.	37
5: Stimulated the more widespread adoption of a preferred practice or other, desired public response.	27
IMPACT ON INSTITUTIONAL OUTPUTS	
6: Initiated a new service or program.	39
7: Raised standards of products or services provided.	42
8: Changed rules or procedures to be more responsive to needs of clients.	21
9: Avoided disruption of service by timely action, despite difficulties or risk.	25
10: Performed task that required special effort or skill.	25
11: Improved or expanded dissemination programs, techniques.	29

Table 1 (continued):

Catalog of Types of Participant Achievements

	No. of Reports
IMPACT ON OUTSIDE SUPPORTS	
12: Expanded institution's authority, status, or charter.	12
13: Developed more effective working relationships with local agencies or sources of external aid.	12
IMPACT ON INTERNAL OPERATIONS	
14: Introduced or expanded the use of analytic, data-based management aids.	30
15: Introduced cost- or time-saving measures, ideas.	21
16: Imposed tighter structure or controls on staff or vendor performance.	37
17: Improved the allocation or organization of responsibilities and functions.	23
18: Upgraded the caliber, capabilities, or morale of the staff.	48
19: Upgraded physical facilities or equipment.	17
20: Improved record-keeping or information retrieval systems.	8
Total Reports	492

The first subset of achievements consists of impacts in which the ultimate development gain is immediately apparent. Each of these five categories goes beyond the improvement of the output of the institution, and is at least one step closer to impact on national goals than the furthest point of the impact sequence that we had thought we could reasonably explore. This subset includes the most "dramatic" achievements.

1) Influenced development strategies or emphases, or a specific investment decision. The achievements of this type that were reported include a few sweeping policy changes, such as the introduction of the metric system and right-hand drive in Ghana; and a variety of specific policy decisions, such as building a new airport, resurrecting a project to construct a nuclear reactor, or changing the mechanisms for marketing agricultural products abroad. There also are reports of actions to promote new policy directions, notably in the areas of ecology and conservation.

2) Introduced a new agricultural, industrial, or commercial enterprise in the country. Examples of this type of achievement include a major investment in shallot farming (with a high rate of return), a new soap manufacturing industry, and the licensing of private charter companies to carry air cargo. This is the only one of the categories reported only in Ghana, perhaps because the sample in Thailand did not include institutions that do this.

3) Developed a local capability for an activity formerly dependent on external resources. These achievements are similar to the preceding, but differ from these in that the emphasis is on saving costs and reducing dependencies rather than initiating new entrepreneurial ventures. Examples include the development of skills in instrument calibration, so that this need no longer be done abroad; the purchase of machinery for producing replacement parts that had been imported; the establishment of a local center for teaching skills for which trainees had been sent overseas. Reports of the increased utilization of existing facilities and specialists so as to phase down the magnitude of external inputs are also included.

4) Discovered a solution or more promising approach to a significant development problem. The majority of the achievements of this type that were reported consist of agricultural innovations: improved hybrids, more effective fertilization compounds or practices, numerous countermeasures to pests and disease. But the reports also cite innovative approaches to broad, national development problems, such as new anti-inflationary measures, or new solutions to improving the economy of impoverished regions. A number of advances in health care are also included.

5) Stimulated the more widespread adoption of a preferred practice or other, desired public response. The reports in this category describe achievements in the participant's role as an "agent of change," particularly in rural locations. The majority of them report improvements in agricultural practices, nutrition, health and sanitation. Other reports describe improvements in manufacturing processes, and still others cite gains in the payment of taxes. In the latter area, the primary technique used to effect the change is that of enforcement; in the other areas, it is one of teaching and demonstration.

The second subset of achievements pertains to improvements in the quality of the institution's products or services, and in their delivery to client populations. The development impact of these improvements is clear, even when not documented explicitly in the reports, and the six categories in this second subset also represent fairly ultimate impacts in the sequence from participant training to national development goals.

6) Introduced a new service or program. Many of the achievements reported in this category consist of the establishment of the "first ever" service of this type in the country. Examples include a unit for poultry research, a new medical curriculum, greatly expanded banking services to include processing and marketing in addition to the provision of loans. Other reports describe expansions of ongoing programs, such as the inclusion of up-to-date market prices in the radio programs for farmers.

7) Raised standards of products or services provided. The reports in this category describe three major types of participant actions. The first is to correct a shortcoming or mistake, ranging from wrong proportions of feed mix to an airport runway that is not constructed to minimum international standards. The second is to raise output specifications, to construct a sturdier building or wider road, or to make more realistic appraisals of needs in granting loans. The third is to do more than the task requires, as a precautionary measure, such as replicating field agricultural research in green-houses not subject to unexpected weather problems, or assigning back-up maintenance personnel to critical air traffic control equipment.

8) Changed rules or procedures to be more responsive to needs of clients. The essential characteristic of these improvements is that the actions taken are not "necessary" to the implementation of the program, but do make its output more convenient or helpful for users. Examples are the introduction of a decentralized distribution system to reduce travel time for the buyers, a change in tax regulations to permit more liberal payment schedules, a more anonymous family planning referral system to safeguard the privacy of the clients.

9) Avoided disruption of service by timely action, despite difficulties or risk. The contributions of the achievements in this category lie in what did not happen, as a result of the participant's intervention. In most of the reports, something goes wrong, such as the late arrival of seed or an unexpected shortage of certain critical items, and the participant figures out some way around it. In others, he cuts the normal red tape to assure timely action.

10) Performed task that required special effort or skill. In these reports, the participant is given a specific assignment, such as preparing sections of the national development plan or designing a new terminal building or forecasting fertilizer demands, and does it competently and/or on time. Only a few of the reports indicate that the participant was the only one at the institution who could have done this, but it is clear in all of them that the institution could not produce this kind of output without specialized manpower resources.

11) Improved or expanded dissemination programs, techniques. This category includes three types of actions. The first is the introduction of a new dissemination program, such as a seminar series, or an outreach "home visitors" program. The second is the application of new kinds of dissemination techniques, such as mass media or visual aids. The third is a special effort on the part of the participant himself to reach wider audiences, such as extending personal invitations in addition to the routine announcements.

The third subset of achievements establishes necessary pre-conditions for improvements in services or expansion of scope. In both of these categories, the participant increases the potential of the institution by drawing on other agencies for additional support or resources. Such accomplishments are one step further removed from national development goals than the preceding achievements, but nevertheless reflect necessary and therefore important contributions.

12) Expanded institution's authority, status, or charter. The most frequent type of report in this category describes a successful attempt by the participant to persuade government to upgrade the institutional status of his activity, or to split it off as a separate organization. Other reports describe extensions of institutional authority, by gaining permission to expand the base of the program, such as the introduction of family planning courses in nurse training, or by gaining additional enforcement power through new rules or legislation.

13) Developed more effective working relationships with local agencies or sources of external aid. This category includes two major kinds of actions. The first is gaining additional support or negotiating better terms with external assistance agencies, including AID. The second results in partnerships or more frequent interactions with other local agencies, or the pooling of resources.

The final subset of achievements effect improvements in the institution's internal operations. The seven categories of impact in this set are scattered over a large portion of the impact sequence, from reasonably ultimate gains, such as cost-reduction, to improvements of institutional resources many steps removed from development goals. But even the latter of these emerge from the data as playing a significant development role, as elaborated at the end of this Section.

14) Introduced or expanded the use of analytic, data-based management aids. Most of the reports in this category describe the use of empirical, objective data in making decisions about maintenance practices, inventories, personnel, or other management actions. Others describe the introduction of new feedback systems, such as pre-implementation surveys of local conditions, a requirement for detailed progress reports, or the collection of pre-project baseline data to permit later impact assessments. The use of data as an aid to planning or decision-making is the central thrust of these reports.

15) Introduced cost- or time-saving measures, ideas. Most of the reports in this category describe steps that the participant takes to reduce waste, ranging from the salvage of re-useable materials to the elimination of agricultural projects in areas that physically cannot sustain them. Others describe fairly imaginative program improvements, such as targeting vaccinations on the age-groups in which the disease is most likely to occur, or replacing overqualified technical personnel with more junior people who can perform the tasks equally well.

16) Imposed tighter structure or controls on staff or vendor performance. The reports in this category include three major types of actions. The first is the introduction of control mechanisms, such as time-cards, to promote more diligent and honest performance. The second is the adoption of closer monitoring practices, through personal inspection or systematic quality checks. The third is the enforcement of standards through disciplinary measures and related techniques.

17) Improved the allocation or organization of responsibilities and functions. The majority of the reports in this category describe structural changes, to eliminate duplication, or to amalgamate activities that depend on frequent interactions. Another sizeable subgroup describes changes that allocate responsibilities so clearly that each unit is absolutely accountable for progress and shortfalls in a fixed, specified set of institutional objectives.

18) Upgraded the caliber, capabilities, or morale or the staff. This category includes three types of improvements. The most frequent is the expansion or improvement of internal training programs, to upgrade the skills of the staff. The next most frequent are changes in the conditions of service, to provide greater rewards or reduce dissatisfactions. The third consists of changes in the criteria used for the selection of personnel, or for their placement into specific job assignments.

19) Upgraded physical facilities or equipment. The reports in this category are concerned mainly with the procurement of better equipment, or the more effective utilization of equipment already on hand. Improvements in the institution's physical plant are also included.

20) Improved record-keeping or information retrieval systems. The improvements in record-keeping systems occur in operating agencies, and pertain particularly to the provisions for follow-up of items still pending. Information-retrieval improvements are reported in research institutions and others that depend on library resources.

These twenty categories range from highly dramatic impacts to achievements that do no more than set the stage for impact, as earlier noted. But the data suggest that the latter should not be discounted as indicators of tangible development gains. One of the reports in Category 20 which in and of itself appears to have at best marginal implications for impact, for example, tells of the participant who revised the classification

system used in the institution's library, and reduced the problems that the staff had experienced in locating references relevant to their research. Yet, when this report is coupled with that of another participant who changed a research project on feed substitutes from dry to fresh cassava because he knew from the research literature that the former had already been done, the potential importance of the earlier report is seen more clearly. And when this second report is coupled with yet another of those assembled, in which a participant in fact succeeded in developing an effective feed substitute for chickens, the link between research libraries and national development goals is quite clearly established. Such linkages may be found among all levels of the above categorization, and persuade us that all 20 of the reported achievements reasonably can be considered to be relevant, direct development gains.

The identification of these 20 categories provided an adequate answer to the contribution half of the contribution-attribution dilemma. They represent important, presumably frequent impacts that former participants can and do make, and that therefore may have utility as indicators for follow-up assessments. But, as the end-points of the segments reported, the above categories provide no information about the antecedents of these results, establish no links to participant training. To resolve the attribution part of the problem, the earlier links of the segments are also important, and we turn to these in the following Section.

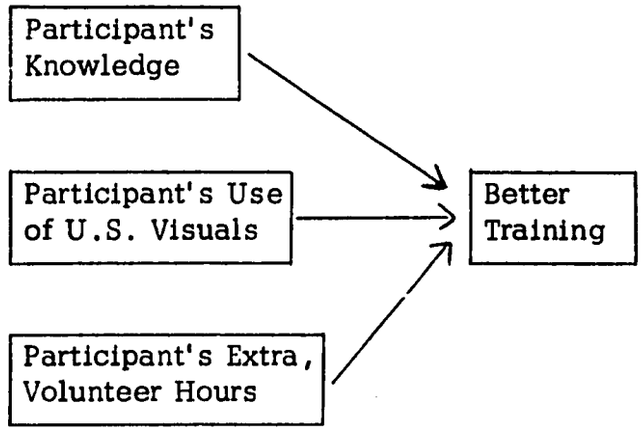
APPENDIX B

IMPACT-PRODUCING CHARACTERISTICS

IMPACT-PRODUCING CHARACTERISTICS

As the second step of the analysis, we further divided the above 20 categories of impacts into the distinct sequences of events that can produce them. For, as in the proverbial itineraries to Rome, the data revealed that there are different paths to each achievement; and that the particular path the participant travels can be a critical factor in the attribution of the outcome to training.

In Category 18, for example, the achievement of producing a better staff training program can be (and actually was) achieved in all three of the following ways:



Though the outcome is the same, the three sequences differ, and it is important to treat them as different in the development of indicators for impact assessment. The reason for this can be seen most clearly by looking ahead to the task of the field evaluator who will be collecting the data.

If the field evaluator is asked to look simply for improvements in staff training programs (i.e., if the above sequences are treated as one rather than three), he will presumably assemble reports of all three types, as did we in the present study. Of these, the most useful to him will be

the reports based on the middle sequence above, since in these the link to experiences in the U.S. is explicit, and he need check no further to document these as impacts clearly attributable to participant training. The next most useful to him will be the reports based on the first sequence above, since he will usually be able to establish that the participant acquired the technical knowledge as the result of training. But he will have to probe further to establish this link. Least useful to him will be reports based on the third sequence above, since these as often as not are likely to show the impact of long-standing personal characteristics rather than participant training, and because identifying those of the set that properly are attributable to participant training would in any event be a most difficult task. Reports of this third type will contain less wheat than chaff.

Such inefficiency in data collection is tolerable, indeed necessary in exploratory research. But it is quite inappropriate in an operational assessment procedure. To be at all efficient, the indicators provided the field evaluator should "zero in" on sequences likely to be productive, like the first two of the above, avoid the high rate of wastage inherent in the third. Indicators based solely on the participant's achievement, such as

- an improvement the participant effected in a local staff training program

are inefficient; indicators that specify not only the result but also the sequence that produced it, such as

- the use of U.S. training materials to improve a local staff training program

provide a much higher proportion of useable data, and are the types of indicators required.

To identify the various paths the participants took to bring about

of view. We found that 464 of them specified the path as well as the result, and from each of these extracted the "impact-producing characteristic," which we defined as the specific skill, attitude, or other resource that the participant brought to the situation to effect the impact reported. Then, we categorized the reports a second time, in accordance with these characteristics, and obtained fourteen groupings, listed in Table 1. The five headings under which they are listed are components of the AID Institution-Building Model (popularly known as the Esman Model), which affords a convenient framework for organizing characteristics that lead to achievements.

Element A: Technical Sophistication. This element was derived from events in which the outcome was mainly attributable to the participant's mastery of theories, techniques, or facts in his field of specialization. In most (but not all) of the reports in which it appeared, formal schooling or "book learning" was the critical factor.

Element B: Awareness of Other Possibilities. This element was derived from events in which the outcome was mainly attributable to the participant's knowledge of or familiarity with additional ways of achieving desired objectives. His contribution lay in a new approach or broadened vistas.

Element C: Appreciation of Inputs Required. This element was derived from events in which the outcome was mainly attributable to the participant's decision to invest additional energy or resources in a certain job objective. It was his appreciation of "what the job takes" that was the critical factor.

Element D: Acceptance of New Objectives. This element was derived from events in which the outcome was mainly attributable to the new organizational values the participant promoted. Most of these values can be characterized as "social responsibility," in such areas as environmental protection or concern for the well-being of clients.

Element E: Commitment to Principles and Convictions. This element was derived from events in which the outcome was mainly attributable to the participant's spirited defense of his convictions. His determination to do what

Table 1.:

Impact-Producing Characteristics

	No. of Reports
PROGRAM	
A: Technical capabilities, sophistication	102
B: Awareness of other possibilities, approaches	25
C: Appreciation of nature and magnitude of inputs required	69
DOCTRINE	
D: Acceptance of new or expanded objectives	24
E: Commitment to principles, convictions	19
LEADERSHIP	
F: Willingness to take responsibility, act	20
G: Data orientation	37
H: Goal orientation	39
RESOURCE MANAGEMENT	
I: Efficiency orientation	38
J: Skill in human relations	19
K: Familiarity with equipment	15
L: Familiarity with workable operating routines	22
LINKAGES	
M: Access to external sources of information or help	26
N: Credibility and credentials	11
Total Reports	464

Element F: Willingness to Take Responsibility. This element was derived from events in which the outcome was mainly attributable to the participant's willingness to stick his neck out and make a decision for better or worse. He was influenced more by the need for decision than by the limits on his authority or the possible risks.

Element G: Data Orientation. This element was derived from events in which the outcome was mainly attributable to the participant's use of data as the basis for planning and decisions. His appreciation of the utility of solid, empirical data was the critical factor.

Element H: Goal Orientation. This element was derived from events in which the outcome was mainly attributable to the participant's determination to get the job done, no matter what. Resourcefulness, disregard for conventions, and willingness to put in extra hours were the characteristics that emerged most often.

Element I: Efficiency Orientation. This element was derived from events in which the outcome was mainly attributable to the participant's concern for efficiency, and alertness to opportunities for savings. His actions were a function not of specialized skills, but of concern for and attention to efficiency as a key job objective.

Element J: Skill in Human Relations. This element was derived from events in which the outcome was mainly attributable to the participant's use of clever psychology, or to his understanding of the rewards and incentives that promote effective performance. The explicit attention he gave to the "human equation" was the critical factor.

Element K: Familiarity with Equipment. This element was derived from events in which the outcome was mainly attributable to the participant's competence in evaluating and using equipment. In a number of reports, his appreciation of high-quality equipment was the deciding factor.

Element L: Familiarity with Workable Operating Routines. This element was derived from events in which the outcome was mainly attributable to the introduction of practices of known merit that the participant "borrowed" from other operations or settings. As a result of his familiarity with the practices of established institutions, he was able to reduce or eliminate the trial-and-error that the develop-

Element M: Access to External Sources. This element was derived from events in which the outcome was mainly dependent on the participant's knowledge of or personal relationships with sources of information or help. In this element, it is not what the participant knows so much as whom he knows that is important.

Element N: Credibility and Credentials. This element was derived from events in which the outcome was mainly attributable to the participant's status in his field. He was able to accomplish his objectives primarily as the result of prestige.

If each of these fourteen characteristics could produce each of the 20 types of achievements, there would be a total of 280 separate sequences for which indicators could be developed. But many of these theoretically conceivable sequences are too remote or improbable to be useful for impact assessment. In the present data base, 111 of the 280 possible sequences were reported, 70 of them two times or more. These 70 sequences were prime candidates as appropriate foci for impact assessment. But one final question had to be answered: Which of them typically are initiated by an experience provided by participant training?

APPENDIX C

ATTRIBUTIONS TO TRAINING

ATTRIBUTIONS TO PARTICIPANT TRAINING

Throughout the preceding discussions, we used the term "participant" to refer to the individual who achieved the impact reported, whether he had in fact had participant training or not. This was convenient, and appropriate to the development of indicators for impact assessment. For any impact that a former participant can produce is a potentially useful indicator that should be considered. But, to evaluate the effects of participant training that the data in fact support, we had to be more precise. For the following analysis, we considered an individual to have had "participant training"

1) if he had received training in the United States, under any auspices whatsoever, or

2) if his overseas training in a country other than the United States was limited to presumably standard degree courses at the university level.

There was no reason to suppose that the impact of training would be different when AID rather than another agency provided the funds, or when a Ph.D. was awarded by London University rather than Harvard. Such fine distinctions would have discarded data for no sensible reason. But when an individual reported no overseas training, or training in another country that consisted of experiences other than presumably standard university courses, he was considered not to have had participant training.

By this criterion, a total of 74 reports described non-participant impacts. These reports were regarded for purposes of this analysis as showing no possible attribution. Though there was nothing in these reports to suggest that these kinds of impacts could never be the result of participant training, the actual antecedents lay in other factors in these particular cases.

An additional 64 reports had to be dropped from the data base for

majority of these were reports assembled in the Ghana study, in which the respondents had not been asked to provide information on antecedents. This left a total of 354 reports that described achievements by individuals who had had participant training, and that permitted reasonable attribution decisions.

On the basis of the attribution information contained in each of these reports, they were classified into five groups, representing decreasing attributability to participant training. The criteria for this classification were as follows:

An achievement was judged to have reasonably clear-cut attributability if it was based on either

- the application of a specific technique, theory, or fact described explicitly in the report, and attributed to a specific, named course;
- the imitation or adaptation of a practice observed in the U.S., and credited by the respondent as having served as the model that prompted this change;
- the use of a (personal or published) source of information or product from the United States with which the participant became familiar during his training;
- skilled performance in an activity in which the participant had actual, practical experience in the United States that he credits for this achievement;
- the application of non-technical skills (such as facility in English) that the participant acquired as an incidental by-product of his stay in the United States;
- the use of the prestige or status that accrued to the participant from the credentials he acquired in the United States (such as the opportunity to participate in decisions from which he was excluded prior to training); or

- a participant behavior markedly different from his behavior prior to training, as reported by an observer who worked with him both before and after training.

Each of these conditions was thought to provide sufficiently credible evidence of a direct link to participant training to permit confident attribution.

An achievement was judged to be probably attributable to participant training if the participant said that it was and

- documented this statement by referring to the broad technical background that he acquired rather than to a specific course, or to the adoption of a general U.S. work style or ethic rather than to the transfer of a specific practice or model;

or when the respondent made no attribution statement whatever but

- the timing of the event as an occurrence that immediately followed the participant's return suggested that the training experience was the most logical stimulus for this action, or

- the nature of the achievement itself indicated that an advanced skill or technique had been applied, or that a standard U.S. practice had been adopted.

When one of these conditions applied, there was presumptive evidence for attributing the impact to participant training, but the link was not quite so convincing as in the preceding set.

An achievement was judged to be a possible outcome of participant training when the participant said that it was but provided no supporting evidence, and the impact-producing characteristic was one on which self-reports seldom provide sufficiently reliable data. This was the case when

- the participant claimed greater self-confidence as the result of his training, and attributed his achievement to such poise or assurance; or

- when the participant claimed a change in attitude or values as the result of his training, and attributed his achievement to such attitudinal or motivational changes.

We did not for a moment doubt that such changes can and do occur as important outcomes of participant training. But without confirming evidence by a dispassionate outside observer, we thought it premature to regard these links as established.

An achievement was judged to be an at best doubtful outcome of participant training when the respondent made no statement of attribution, and the nature of the action itself was likely to be the result of factors other than training. This was the case when

- the action depended on a personal approach or work style that could be influenced by participant training, but is more frequently a long-established individual characteristic, such as imposing close supervision; or when

- the achievement was the result of a clever idea that required no special technical knowledge, did not appear to be patterned on outside practices or models, and could have occurred as readily to anyone else.

Again, any one of these events could have been shaped or influenced by participant training. But, in the absence of data, it seemed best to regard them as doubtful.

An achievement was judged to be unrelated to training when evidence in support of this conclusion was provided. This was the case

- when the respondent cited a factor other than participant training as the essential background or prerequisite to the achievement.

Adopting a practice the participant observed in another local Ministry is an example.

Table 1 shows the distribution of the reports among these five categories and their sub-groupings. It will be seen that nearly 80 percent of the achievements can be attributed to participant training with reasonable assurance. This is hardly surprising, since training is invariably a key factor in skilled job performance, and since the respondents knew that the purpose of the research was a follow-up of participant training (even though we did not ask for training-related achievements in the actual questions). But what is somewhat surprising is that more than half of these confident attributions are based on antecedents other than formal "book learning." The exposure of the participants to American thought and practice emerges from the data as an equally significant antecedent.

This analysis added a "third dimension" to the classification of the reports. At this stage, each had been allocated to

a) one of twenty categories of types of achievements,

b) one of fourteen categories of impact-producing characteristics, and

c) one of five categories of attributability,

representing three "points" of the impact sequence that it described. The reports had in effect been sorted into a three-dimensional matrix of 1400 separate cells.

Table 6 presents these results for the 354 participant reports; and also includes, for comparative purposes, the 66 reports on non-participants

Table 1:

Distribution of Attributions to Training

I:	Reasonably clear-cut links to training		186
	(a) Specific technique or theory applied	71	
	(b) Specific practice or model adopted	73	
	(c) U.S. source or product applied	21	
	(d) Practical job experience cited	4	
	(e) Incidental skill learned	5	
	(f) Credentials applied	8	
	(g) Before-after changes observed	4	
II:	Probable links to training		92
	(a) Technical background cited	27	
	(b) U.S. work style cited	12	
	(c) Timing of the event	5	
	(d) Requirement for technical knowledge	31	
	(e) Conformity of approach to U.S. standard	17	
III:	Possible links to training		33
	(a) Claim of increased self-assurance	13	
	(b) Claim of attitude change	20	
IV:	Doubtful links to training		37
	(a) Personal characteristics	26	
	(b) Clever ideas	11	
V:	No links to training		6
	Total Reports		354

for which there was adequate data to permit categorization. For the non-participant reports, the attribution dimension shows which had had no overseas training at all, and which had been trained in countries other than the U.S.

[redacted]

WHAT IS A CRITICAL INCIDENT?

In the course of any job, there is some opportunity for a person to become involved in activities or events which contribute to the organization's accomplishment of its basic goals. Some of these events may be revolutionary in character, such as an invention of a wholly new process or device for accomplishing some function. Others may be less dramatic, consisting of a clearly better way of doing something, where the "better way" is an improvement to some existing process or instrument. On the pages which follow, we will focus on job events which "made a difference," activities which improved the performance of the organization. We call such events "critical incidents," and their fundamental characteristic is that they have a visible impact on the organization or on the public which the organization serves.

For example, the following reports describe events which clearly made a difference in a developing country:

- I learned that private charter companies in the U. S. are used to transport air cargo. I suggested this to the proper government authorities and licenses for air cargo services are now being granted to private companies.

- I introduced a system for maintaining an up-to-date listing of all pending tax cases which had not been done before, but which I considered essential.

- I developed a new variety of soybean which could be produced commercially and used as an effective meat substitute by low income families.

- I introduced a program which integrated population education into a home economics program for housewives in rural areas.

In all cases, the events described produced a visible, tangible benefit which is open to inspection. One feature of a "critical incident" report is that it always includes a statement of outcome -- the consequence of the event.

A second feature is that the report must always be explicit about what the individual did. The statements should be in terms of behavior; they should describe what an observer would have seen had he been present throughout the activity. For example, the statement:

- I wrote to my former professor to obtain more complete information on the research he recently reported

is in behavioral terms; writing a letter is a behavior that can be observed. Look at the statement:

- I prepared a Procedures Manual for Small Parts Inventory Control.

Preparation can be observed by others. A few more examples follow:

- I developed comprehensive procedures for staff use in processing tax returns.
- I transferred procurement authority for pharmaceuticals to local health stations.
- I devised a system of priorities for granting loans to farmers in the municipalities.

The five preceding statements describe behaviors only, not consequences. The following reports contain both the behavior and the outcome:

- I recommended the purchase of new equipment to improve the accuracy of the chemical analyses carried out in the lab; the equipment is now being used in the lab.

- I designed a poster on forestry which has been disseminated during seminars and in-service training on forest development for subsequent public display.

- I implemented a system of issuing identity cards for airport workers who require access to terminal and restricted areas; this became standard operating procedure in our international airport.

In the first report one could have observed the recommendation (the behavior); the consequence is visible because one can observe the use of the new equipment in the laboratory. The second report also describes a specific action taken, designing a poster; the outcome is that the poster has received widespread public distribution. The third report meets both criteria of observed behavior and visible outcomes; one could see the written implementation order as well as the cards worn or carried by the selected airport personnel.

A critical incident should contain enough contextual information about the event so that the reader can understand what happened without having been present. For example, the statement:

- I answered the request and got the job done

does not communicate the necessary information about the event to the reader. There is no information about the nature of the request, and it is not clear what happened in carrying out the job. A better statement would have been:

- I answered the request that our agency do the bridge construction project and prepared a detailed estimate of the costs involved. The sponsors felt that the bid was one of the most comprehensive they had seen.

The critical incident technique is a procedure for describing activities that "make a difference" in terms of behaviors and their consequences. In the sample incidents presented so far, the behavior has resulted in a positive outcome or desired change. Incidents need not be limited to only behaviors which have a positive outcome. In many instances, circumstances beyond the individual's control may limit the effectiveness of the individual's behavior in bringing about the desired change. Incidents which show effective or ineffective actions by an individual are equally important. For example, the statement:

- I was asked to make a report on the development of a particular airport. I found that the airport site was between two hills and that the valley had no room for future development. I wrote a report that the airport would not be useful after ten years. The recommendation was rejected because money was already invested and to stop construction would create many problems politically

would be considered to be an incident whether or not the individual had been successful in relocating the airport to a more appropriate site.

In summary, a critical incident is an activity that "makes a difference": it must be stated in terms of <u>behavior</u> and must include a statement about the <u>outcome</u> of the behavior. It should be complete enough so that the reader can understand what happened without being present during the activity. Finally, incidents need not be limited to the outstanding successes; outcomes are produced by complex interactions among people, institutions, and broader situational variables which are beyond the individual's control. Some results may not always match the individual's objectives, but these results may still be counted among the outcomes.

APPENDIX I

THE INTERVIEWER PREPARATION UNIT

(A paper distributed to interviewers prior to training; see Chapter IV)

INTERVIEWER PREPARATION UNIT

Your job will be to conduct interviews with some people who have participated in training or other educational programs. The purpose of the interview is to collect information that can be used to determine whether the training experience helped to "make a difference" in helping the country achieve its national development goals.

In order to do this, you will be asking participants for information about what they have done since returning from training that contributed toward "making a difference" in either their job or their personal life. That is, you want to identify those activities that had some visible effect. These activities are called critical incidents. A critical incident is a specific behavior or activity which has produced a clear-cut impact or change. To collect critical incidents from participants during the interviews requires some skills and insights on your part. The purpose of this training exercise is to help you gain these skills and insights.

During the interview you want the participants to give you precise descriptions about certain aspects of their prior activities. It is <u>how the activities are to be described</u> that makes this interviewing situation a little different from most other interviews. A critical incident contains several pieces of information: The first two are: (a) a specific description of what the <u>impact of the activity</u> was, and (b) a specific description of what the individual did; that is, <u>the behavior actually performed</u>. To help you better understand how to report critical incidents, consider the following two abstracts of critical incidents:

1. I checked the drawing plans for the airport runway and discovered that it had only 1 1/2 inches of asphalt instead of 4 inches, as required by international safety regulations for aircraft that would be using the runway. I called the matter to the attention of the Director, and the resurfacing work has been approved.

Note that in this example the report of the critical incident specifically describes the impact made in terms of the visible outcome (the runway will be resurfaced) and what the individual did in terms of specific behavior (studied the runway plans and reported the problem to the Director).

Here is another abstract of a critical incident.

2. I did all of the detailed planning to get the country's first research unit on poultry into operation, doing all of the necessary technical and administrative work.

Again, this report of a critical incident specifically describes what the impact was (the country's first poultry research unit) and the behavior performed to achieve it (carried out detailed technical and administrative planning).

Examine a third abstract of a critical incident.

3. I wrote an auto taxation law that was incorporated under the Korean National Tax Law, which tripled the tax on private vehicles and reduced the tax on mass transit vehicles.

In this case also the impact (changing the automobile tax structure) is specifically described, as is the participant's behavior (wrote the legislation that became National law).

Now, contrast the following description of a job activity with the above three:

4. I made my organization more efficient and effective by hard work and long hours.

Reread the preceding description again. Try to locate what the exact impact was; that is, what specific consequences resulted from the participant's efforts.

It is difficult to tell what the precise impact was because the description of the activity is too general to identify the actual outcome. For example, what does "efficient and effective" really mean? "Hard work and long hours" is insufficient to describe what the participant actually did; it is not possible to tell what behavior was performed.

Following are five descriptions of critical incidents. Indicate with an "X" those descriptions which specifically state <u>what</u> the impact was and the behavior used to achieve it.

_____ 5. My office is able to provide tax information to many more villagers by being open between 7-8 each evening. Using sampling techniques, we interviewed 30% of the families in the village to determine which hours would be most convenient for them and whether they would come.

_____ 6. I decided that if medical supplies were kept at the regional warehouse rather than at headquarters, there would probably be less loss from thefts and water damage.

_____ 7. I doubled the number of staff who can do soil analysis. I taught the necessary skills at three workshops using special instructional materials and laboratory equipment.

_____ 8. I initiated the idea of inviting outside experts to lecture staff as part of in-house training.

_____ 9. I collected the necessary information, then wrote a 100-page booklet, the first of its kind, which outlines National tax provisions and exemptions for all potential foreign investors.

Item 5 is clearly acceptable as an incident. It specifies two actual behaviors

- interviewed a sample of villagers, and
- opened the tax office an extra hour each evening

and also states an outcome

- provided tax information to many more villagers.

Item 6 is not acceptable; it offers an opinion but does not describe either a behavior (something the respondent did) or an outcome. If the report had been

> I established the procedure for keeping medical supplies at regional warehouses rather than at central headquarters. In the year following the action, there has been a significant reduction in loss due to theft and water damage

then there would be no question of what actually occurred, and the report would be acceptable.

You should now be able to analyze items 7, 8, and 9 by answering for each

- What was the behavior (what did the respondent do)?
- What was the outcome (impact)?

Write your analyses below.

For Example 7.

What did the respondent do? _____

_____

What was the outcome? _____

_____

For Example 8.

What did the respondent do? _____

_____

What was the outcome? _____

_____

For Example 9.

What did the respondent do? _____

_____

What was the outcome? _____

_____

Your analyses should be similar to the following:

For Example 7.

What did the respondent do? Conducted workshops using special instructional materials and laboratory equipment.

What was the outcome? Number of staff capable of doing soil analysis was doubled.

Example 7 is an acceptable incident. The analysis of Example 8 leads to a less certain conclusion. Your analysis might be

What did the respondent do? Initiated a program of outside experts as lecturers.

What was the outcome? Outside experts lectured to staff.

What the respondent did is clear enough, but the significance of the outcome is in doubt. We do not know that staff capability was improved by the lectures; we only know that the lectures occurred. The interviewer should have probed for a specific outcome of the lecture series. Example 9 is more clear-cut; your analysis might be

What did the respondent do? Collected appropriate information and wrote 100-page booklet.

What was the outcome? For the first time, foreign investors had a single source of information on tax provisions and exemptions.

An essential part of your interview will be to collect descriptions of job activities that have made some type of significant impact; that is, a difference. In reporting them, you want to make certain you describe specifically (a) what the impact was and (b) what the person did to achieve the impact. It will also be necessary to collect some additional information about each incident. We would like to know (c) how the individual accomplished his activities and (d) where he learned to perform them. You have already identified the impact and the behavior in Examples 1-9. This

information is usually easy to obtain and is frequently stated without too much probing by the interviewer.

The additional information (c and d) may or may not be included in the person's description of his activities. In most cases, you will have to further question the individual for the information you want. The questions you will use are called "probes."

The following is an expanded description of Incident 5.

> My office is able to provide tax information to many more villagers by being open between 7-8 each evening. The problem was that not many people were coming to the office because most of the people worked away from the village during the day. My supervisor thought that being available during the evening might be better. The Regional Office agreed to our being open an extra hour if we could demonstrate that the villagers would make use of it. I selected a sample of 30% of the villagers and interviewed them to determine if evening hours would be helpful to them and whether they would come during those hours. Since I had training in sampling statistics at Cornell University, I was responsible for doing this. We found from the interviews that 7-8 p.m. would be the best hours.

This statement contains all of the elements that are to be recorded for each incident. Once again, the (a) impact is providing tax information to more villagers and the (b) behaviors performed are opening the office in the evening and conducting interviews. The description also contains information about some of the factors that (c) <u>enabled the impact to be achieved</u>. One of these is the support of the supervisor. Another is the Regional Office agreeing to try something different. A third enabler is the respondent's knowledge of sampling statistics. This kind of "enabling" information helps us to better understand <u>how</u> the impact was achieved.

The last element of information to be recorded from the statement is (d) where the individual learned to do what he did. The person said that training in sampling statistics at Cornell University gave him the skills and knowledge needed to select the sample of villagers, conduct the interview, and determine the essential information about the villagers' desires and needs. This is called "attribution" information because it tells where the individual learned to do what he did.

Read the following incidents and try to identify the "enabling" information and the "attribution" information.

10. I doubled the number of staff who can do soil analysis. From my training on the job and work experience, I knew it could be easily taught but did not know how to go about it. The education officer at the Agriculture Research Center said he could provide some training materials and laboratory equipment. The personnel office approved extra pay for those who stayed after work to attend workshops. I conducted three special workshops for interested staff.

We know the impact or outcome was doubling the number of staff who could do soil analysis; the behavior performed was conducting three workshops on soil analysis. Now, answer the following questions.

How did the individual accomplish his activities (the enablers)? ___

_____

Where did the individual learn to do what he did (the attribution)? __

_____

Your answers should be similar to the following:

Example 10.

What are the enabling factors? First, the willingness of the person to pursue a problem (contacting the education officer at the Agriculture Research Center and the personnel office). Second, technical knowledge of soil analysis.

What is the attribution factor? Learning the necessary skills and knowledge from on-the-job training and work experience.

Read the critical incident that follows.

11. I solved the problem of cotton spoilage by setting up research studies that identified six fungicides as effective cures for the causal disease. Three of these fungicides are now being used and are producing good results. I learned about specific fungicides that would be worthwhile to try from U.S. scientific agricultural journals.

Answer the following questions:

What are the enabling factors? _____

_____

What is the attribution factor? _____

_____

Your answers should be similar to the following:

Example 11.

What is the enabling factor? The individual knew what fungicides to try because he had access to external sources of information.

What is the attribution factor? The attribution is incomplete. The respondent cites the use of U.S. agricultural journals, but we do not know how he acquired the practice of reading these journals. If he was trained in the U.S., it is reasonable to infer that the training experience was the source, but we do not know that this is the case.

The other elements of a good critical incident also appeared. The impact or outcome was the reduction of cotton spoilage by using effective fungicides; the specific behavior was the establishment of the research studies.

Look for all four elements of a critical incident in the following:

12. I discovered that a province where I was working did not provide the support to my construction operation that had been promised. So I set up my own camp and arranged a supply system independent of the province to provide fuel, provisions, and parts. I completed the job on time. I knew what to do because I had practical experience working with a state highway construction unit in the U.S.

What is the impact? _____

_____

What is the behavior? _____

_____

What is the enabling factor? _____

_____

What is the attribution factor? _____

_____

Your answers should be similar to the following:

What is the impact? Construction was completed on schedule.

What is the behavior? Established a supply system to provide fuel, parts, and provisions on a timely basis.

What is the enabler? Knowledge of what to do.

What is the attribution? Cites practical experience with a highway construction unit in the U.S.

We will now review these four elements in general terms.

The Impact

This element describes the outcome or result of the activity. It is the end-product of an individual's input or action. Impacts can be a variety of things, such as the introduction of a new commercial enterprise, the introduction of a new service or program, performing a task that required a special skill, introducing cost-saving measures or improving a record keeping system.

The Behavior

This element includes what the individual actually did in order to complete the activity. A wide range of actions comprises this element; they must be behaviors, such as: teaching staff members a special skill, writing a computer program, establishing a working relationship with other divisions in an organization, staying overtime to complete a job, writing a national law, improving a manufacturing process, or telling a supervisor about a new piece of equipment.

The Enabling Factor

There are many ways to achieve impacts; this element identifies the path taken by the participant to achieve an outcome. It answers the question "how." The characteristics included in this element are: special skill that is often the result of academic training, a decision to invest the additional energy that is needed to get a job done, a feeling of social responsibility in areas like environmental protection, using data as a planning tool, a concern with efficiency, an ability to work well with other people, a knowledge of persons outside the organization who can help, or the particular status of the individual in his field.

The Attribution Factor

This answers the question: "Where did the individual learn to do what he did?" The responses in this category range from formal educational training to on-the-job experience. A person may cite a specific course in school, or a source learned about during training, or a procedure observed elsewhere. Alternatively, he may cite general experience on the job or a specific person or a specific article which he read. In some

cases, the respondent will be unable to make an attribution statement; people can not always identify the sources of their skills, ideas, or behaviors.

You will gain more familiarity with critical incidents and the elements of an incident during some practice interviews with your group leader and with other interviewers in your training session. You may be given additional critical incidents and asked to identify one or some combination of the elements on an as-needed basis. You will also be given additional materials which list some possible probe questions to use in gathering the information you need to document a critical incident. As you gain experience in conducting interviews, gathering and reporting the information you need in specific terms will become increasingly easier.

After each interview, the incidents you collected must be recorded. This will probably be done on a data card or some other form which facilitates recording a clear statement of each of the elements of a critical incident.

The following illustrations are examples of incidents recorded on a data card. The essential parts of the incident comprise most of the card; some details may be changed to meet specific requirements of your project. The bottom line (classification) will be completed by someone else; you complete all other data requirements. You will receive more explicit instructions from your supervisor when you begin to conduct interviews.

Date 6-20-75 Interview # 3 Incident # 5

Area # 12 Position Planning & Evaluation Section

Interviewer 1 Agency Bureau of Forest Development

Example 1

Report (events which caused a need for change plus the specific behavior that caused the change)

In order to compile an inventory of national forest resources, the interviewee headed a six-man photo-interpretation unit that was responsible for taking aerial photographs of all forests in the country. He interpreted the photographic data that were assembled.

What was the outcome? The first inventory of all the forest resources in the country was produced. This document is used for planning investments in reforesting the regions.

How was it achieved? The interviewee was the only person in his department who could do aerial photo interpretation.

Attribution evidence? He received special training in Forest Photogrammetry at an American university.

Classification: Impact Category _____ Characteristic _____ Attribution _____

Example 2

Date 6-20-75 Interview # 7 Incident # 6

Area # 5 Position Director

Interviewer 4 Agency Agriculture Credit & Co-operative Institute

Report (events which caused a need for change plus the specific behavior that caused the change)

It was both desirable and necessary to conduct an evaluation of a cooperative development program, but the government could not afford the evaluation. The interviewee suggested that external funding be obtained; he secured the necessary funds.

What was the outcome? The evaluation is currently underway; 50 people staff the project.

How was it achieved? The interviewee knew of more than one way to achieve desired objectives; he wanted the evaluation and needed to locate a funding source.

Attribution evidence? The interviewee said he thought of this idea himself; the result of his own work experience.

Classification: Impact Category _____ Characteristic _____ Attribution _____

You will be given an opportunity to practice writing reports of critical incidents during your training session. As you conduct interviews on one another, write reports of the incidents you collected. Your group leader will provide feedback on your progress.

The remainder of the training session will be devoted to procedures designed to improve your interviewing skills in collecting critical incidents and your documentation of the incidents you collect. The leader of the training session will be responsible for these activities.

APPENDIX F

THE INTERVIEWEE MATERIALS

(A paper distributed to interviewees at the beginning of the interview: See Chapters IV & V)

THE CRITICAL INCIDENT APPROACH

In the course of any job, there is some opportunity for a person to become involved in activities or events which contribute to the organizations's accomplishment of its basic goals. Some of these events may be revolutionary in character, such as the invention of a wholly new process or device for accomplishing some function. Others may be less dramatic, consisting of a clearly better way of doing something, where the "better way" is an improvement to some existing process or instrument. During the interview, we will focus on job events which "made a difference," those of your activities which improved the performance of your organization. We call such events "critical incidents," and their fundamental characteristic is that they have a visible impact on the organization or on the public which the organization serves.

For example, the following report describes an event which clearly made a difference in Ghana.

> I checked the drawing plans for the airport runway and discovered that it had only 1 1/2 inches of asphalt instead of 4 inches, as required by international safety regulations, for aircraft that would be using the runway. I called the matter to the attention of the Director, and the resurfacing work has been approved.

Less dramatic, but of the same fundamental character, is the following report from Thailand.

> I did all of the detailed planning to get the country's first research unit on poultry into operation, doing all of the necessary technical and administrative work.

In both cases, the event described produced a visible, tangible benefit which can be observed. One feature of a "critical incident" report is that it always includes a statement of outcome -- the consequence of the event. A second feature is that the event must always be explicit about what the individual did. These statements should be in terms of behavior; they should describe what an observer would have seen had he been present throughout the activity. For example, in the statement:

> I prepared a Procedures Manual for Small Parts Inventory Control; our down-time for earth moving equipment has been reduced 30% since the new system was installed

both the behavior and consequence are given. The interviewer will be asking you to provide information about both the behavior and the outcome for all of the work activities that you describe.

The activities that you describe need not be limited to only behaviors which result in a positive outcome or desired change. In many instances, other circumstances may limit the effectiveness of a person's behavior in bringing about the desired change. Incidents which show successful or unsuccessful outcomes by an individual are equally important. For example, the statement:

> I was asked to make a report on the development of a particular airport. I found that the airport site was between two hills, and that the valley had no room for future development. I wrote a report that the airport would not be useful after ten years. The recommendation was rejected because money was already invested and to stop construction would create many problems politically

would be classified as an incident whether or not the individual had been successful in relocating the airport at a more appropriate site. In such situations, outcomes are produced by complex interactions among people,

institutions, and broader situational variables which are beyond the individual's control. But the individual tried to "make a difference"; his behavior produced an outcome, an incident.

During the past few years, have you taken specific actions in any of the following areas? Circle the numbers from the areas listed below. You will be asked to give an illustration or example of the specific action.

Have you:

1. developed a new policy for your organization?

2. introduced a new commercial activity in your country?

3. developed procedures designed to improve the quality of the products or services provided by your organization?

4. changed procedures of your organization to better serve the public?

5. improved or expanded the collection and dissemination of information by your organization?

6. obtained increased status for your organization within the bureaucratic structure?

7. developed better working relationships with other organizations?

8. upgraded the capabilities or morale of your staff?

9. upgraded your agency's physical facilities or equipment?

10. discovered a new solution or a more promising approach to a significant technical problem?

11. introduced a new service or a new program or a new technical function to expand the capability of your organization?

12. been assigned to work on a specific task that required a highly specialized skill or knowledge?

13. increased your organization's use of empirical data as a basis for decision-making?

14. introduced specific cost-saving procedures?

This form should be added to the Interviewee Materials when conducting written interviews. Only one incident can be recorded on each form.

This is the___page I have completed (e.g., 1st, 2nd, . . . 10th, etc.). I am responding to number___ from the list of areas.

1. Describe briefly the problem that this change was designed to correct.

2. Describe the specific actions that you took to bring about the necessary change.

3. What evidence do you have that change has occurred or is occurring?

4. What factors in the organization or the situation helped you to bring about this change?

5. What specific things about you made you capable of bringing this about?

6. What specific thing in your background (a specific on-the-job training experience, a formal program of training, participation in a specific activity, etc.) helped you to bring about this change?

To be completed by staff:

Classification: Impact Category ____ Characteristic ____ Attribution ____

Interview #____

ILLUSTRATIVE CRITICAL INCIDENTS

The following illustrative reports were collected by local interviewers who gathered critical incidents for an impact assessment of participant training.

Illustration #1

Report

Recommended and drafted the new barangay zone system for the city which reduced the zone area to a maximum of 50 families. This made it easier for the barangay to meet a quorum. The old system was by blocks of over 200 families which was found to be ineffective.

What was the outcome?

It is now easy for the barangay to meet to transact business. There is closer fellowship and the spirit of brotherhood was evident.

How was it achieved?

He was aware of additional and better ways of achieving his goal.

Attribution evidence?

AID trainee: 1970 in Taiwan: "Planning and Management of Rural Development."

Classification: Impact Category 1 Characteristic H Attribution IId

Illustration #2

Report

Introduced concept of the amnesty in 1974; no suits brought against guilty tax evaders prior to this time. It was necessary because of the vast amount of unreported income and the government needed revenue. Residents now file all assets and liabilities; this creates an open network for monitoring true income. Of approximately 600,000 taxable incomes in this country, 400,000 took advantage of amnesty rather than risk investigation into past records.

What was the outcome?

Those who took advantage of amnesty pay tax no higher than 20%.

How was it achieved?

As Commissioner, the participant directed development of this plan; it became a Presidential decree

Attribution evidence?

Experience; personal resourcefulness.

Impact
Classification: Category 1 Characteristic B Attribution V

Illustration #3

Report

Convinced town mayors of two provinces to set up livestock markets that have proper weighing scales, fences, facilities for storage, standard prices, etc. There were only six livestock markets in these two provinces. Because of this lack of livestock markets, there were no standard prices in buying and selling of livestock,

What was the outcome?

In a span of one year, seven additional livestock markets were set up in these two provinces. This resulted in fair trading (standard prices were set), and thus led to increased income for the town.

How was it achieved?

Contacted town mayors to directly convince them to set up these livestock markets. Persuaded people to help him in this job. Personal initiative and his awareness of his duties as chief of the marketing unit motivated him, too, to undertake this project.

Attribution evidence?

Observation of livestock markets in Texas, experiences in his job as chief of the marketing unit.

Impact
Classification: Category 2 Characteristic C Attribution Ib

Illustration #4

Report

Organized store cooperatives for farm supplies and household needs in the barrios. Cooperative stores in the towns most often did not have in their stocks what the farmers needed. The barrio cooperatives now sell what the farmers need on the farms.

What was the outcome?

It is now easier for the farmers to purchase their farm and household supplies right in their own places. They save a lot in terms of time and money.

How was it achieved?

Familiarity with the operating coops in Taiwan which he believed would work in own country.

Attribution evidence?

Observation and study tours on rural development as AID trainee in Taiwan, 1966.

Classification: Impact Category 4 Characteristic M Attribution Ib

Illustration #5

Report

Introduced removal of registration plates of cars parked in no parking areas. In the past parked cars blocked two lanes causing traffic jams. This was necessary to ease traffic and to discourage parking at no parking areas.

What was the outcome?

Parked cars occupy only one lane; helped ease traffic a little.

How was it achieved?

Concern for efficiency.

Attribution evidence?

His training on revenue administration, U.S. 1959-60.

Classification: Impact Category 5 Characteristic M Attribution Ib

Illustration #6

Report

Developed training courses on agricultural cooperatives for use in SE Asian countries. His agency is the innovator in the area of cooperatives and provides assistance in this area to other Asian countries.

What was the outcome?

The courses were accepted by the international cooperative organization and project has been submitted for funding.

How was it achieved?

Commitment to achieving agency goals for cooperatives.

Attribution evidence?

Observed needs on many trips to SE Asia on business.

Classification: Impact Category 6 Characteristic H Attribution V

Illustration #7

Report

Introduced the use of actual designs for irrigation projects which cover computations and other work necessary to arrive at grades, sizes, and location of irrigation projects. This was necessary because all the details of the project could be viewed on the face of the papers.

What was the outcome?

Came out with the final map which contains the plans, profiles, and specifications which guided construction workers.

How was it achieved?

After coming from Colorado on the inservice training with the U.S. Bureau of Reclamation, informed Division Chief of actual on-the-job training and on observations on ongoing projects in the U.S. Division Chief expected an output from knowledge obtained and assigned him the Agno River Project in 1960.

Attribution evidence?

Inservice training from Colorado, U.S. Bureau of Reclamation, and by the U.S. Reclamation manual.

Impact
Classification: Category 6 Characteristic M Attribution Ia

Illustration #8

Report

Introduced the improvised incubator for seed germination in the nursery. The old incubators used were single flat form. The improvised version is composed of several layers but provided with electric lights for each layer for faster germination or response of the seed. This was necessary to cope with the demands of the consumers.

What was the outcome?

An incubator with around 10-15 layers was being used to germinate seeds to be distributed for the green revolutional program and is still being used at the nursery.

How was it achieved?

With strong determination to be able to cope with the demands of consumers and having in mind the incubators used at Mississipi State University. Devised a way of copying the design because the machine is very expensive.

Attribution evidence?

Masters in B.S. Agriculture at the Mississippi State University.

Impact
Classification: Category 7 Characteristic M Attribution Ic

Illustration #9

Report

In 1962 introduced the purchase of medicine by the use of direct order procurement system. As Chief of the Procurement Division, suggested to the Director that the purchase of medicines to be distributed to various hospitals and health units of the government be done by the individual agencies who have contacts with the private dealers who are issued the Suppliers Identification Certificate (issued by the Bureau of Supply to private dealers who have already been screened to enter into contract with the government agencies and units).

What was the outcome?

Government agencies, hospitals, and health units who need medicines purchase the needed medicines themselves directly from the private dealers; purchases are no longer coursed through the Bureau of Supply and no more excessive paper work. (Recommended to the Director who recommended to the Secretary of the Department of General Services. Memorandum issued to all the hospitals and health units instructing them to do the purchase of medicine from dealers issued the Suppliers Identification Certificate.)

How was it achieved?

He got the idea from the federal schedule of procurement which he deemed workable.

Attribution evidence?

From observation tours in the U.S. of agencies who use the U.S. Federal Schedule of Procurement and as Chief of Procurement Division of the National Economic Council.

Impact

Classification: Category 8 Characteristic M Attribution Ib

Illustration #10

Report

Made on-the-spot changes on construction plan of a dam to conform to changes encountered during construction. During the construction of the Angat Dam came a very hard rain. The river would still overflow inspite of the dam so the size and dimension of the dam needed to be increased and widened.

What was the outcome?

The size of the Angat Dam was increased from its original plan and the dimension widened so that it could resist a heavy downpour of rain or higher tide.

How was it achieved?

After coming from Colorado on the inservice training with the U.S. Bureau of Reclamation, informed Division Chief of actual on-the-job training and observation on ongoing projects and assigned him the Agnat River Project in 1960.

Attribution evidence?

Inservice training from Colorado, U.S. Bureau of Reclamation, and by the use of the U.S. Reclamation manual.

Impact
Classification: Category 9 Characteristic A Attribution Ic

Illustration #11

Report

Designed procedures for "holding and approach to land" procedures (HAL) for Mactan Instrument Landing System (ILS) since Mactan has become an alternate international airport. This HAL was a map with instructions on where to turn, altitudes to maintain, approach procedures, etc. The pilot has a copy of this in his aircraft.

What was the outcome?

The HAL is being used during bad weather when pilots have zero visibility and must fly by instrument.

How was it achieved?

Technical background in Civil Engineering, Statistics, and Air Traffic Management.

Attribution evidence?

Degree in C.E., M.A. in Statistics (both from U.P.) and course in Air Traffic Management in Oklahoma, U.S.A.

Impact
Classification: Category 10 Characteristic A Attribution IId

Illustration #12

Report

Designed an approximately 8 x 11 1/2 inch poster captioned "Objective of Multiple-Use Management and Sustained Yield," which, he said, would help their clients and other readers understand clearly the relation of public forests to national interest. "This is the first of its kind issued by us."

What was the outcome?

The poster was printed in 5,000 copies and disseminated as form of handouts during seminars and inservice training on forest development conducted by the bureau.

How was it achieved?

The designing was done through subject's own initiative. He sought the help of a senior designer who did the final design. He brought it to the director who liked the idea.

Attribution evidence?

Subject brought various samples of posters and handouts given to them during their twelve months' training stint in the U.S. He got the idea from these samples.

Classification: Impact Category 11 Characteristic M Attribution Ic

Illustration #12

Report

Authored a provision in the Philippine forest law which requires forest concessioners to employ forest guards on a graduated scale (the employment of a number of forest guards depending on the size of the tract of land). His experience of witnessing a forest fire caused by the inability of a forest guard to control it led him to this endeavor.

What was the outcome?

In view of its importance, the Director has required that this additional provision be explicitly stated in concessioners' license and contract.

How was it achieved?

Through sheer conviction of the interviewee that this proposed provision is beneficial to concessioners, as it provides security from forest fires.

Attribution evidence?

Participant has specialized training in Forest Management and Silviculture for twelve months in the U.S.

Impact
Classification: Category 12 Characteristic E Attribution Ib

Illustration #13

Report

Developed the idea and secured external funding for an evaluation of cooperative development program. The evaluation would not have been possible without outside money.

What was the outcome?

The project is underway; 50 people are involved, and computers will be used to analyze the data.

How was it achieved?

Used a problem-solving approach -- knew of the need for an evaluation and sought ways to fund it.

Attribution evidence?

Individual approach to problem-solving.

Impact
Classification: Category 13 Characteristic A Attribution V

Illustration #14

Report

Devised a system wherein the workloads of each of the Regional Offices of the Commission could be determined, e.g., pinpoint their peak months for particular activities. The system was a tabular form which contained

information on number of appointments processed in a particular month and whether said appointments were under permanent or temporary status. Importance of system: 1) served as basis for determining personnel complement of the Regional Offices; 2) statistics served as basis for giving civil service examination and the proper amount of time for it; and 3) utilized nonpeak periods of Regional Offices for conducting trainings and audits.

What was the outcome?

The data and statistics taken from the system developed were used as aids in making plans and decisions about personnel and management actions and administering civil service examinations.

How was it achieved?

Technical background in Organization and Management and also Testing Techniques.

Attribution evidence?

Attended a course in Organization and Management at the University of Connecticut and Testing Techniques at the State Personnel Department of Connecticut.

Classification: Impact Category 14 Characteristic A Attribution Ia

Illustration #15

Report

Gathered hydrologic data from Weather Bureau to be able to know if there is enough rain water for a coming year and the years that will follow in areas where they plan to have irrigation systems constructed. Before, these data were not collected, so irrigation systems like dams were constructed that could not be used at all because of lack of rain water.

What was the outcome?

Data gathered are now being used for deciding construction of dams.

How was it achieved?

Familiarity with the use of empirical data for decision-making.

Attribution evidence?

Application of learned techniques in water resources, planning and development, in the U.S.

Impact
Classification: Category 14 Characteristic G Attribution Ia

Illustration #16

Report

Introduced cost-saving measures by drawing up procedures and guidelines which served as basis for fund allocation (distribution) within the organization. This was the first time such measure was introduced and approved and this occurred in 1972.

What was the outcome?

In many ways, unnecessary spending by other divisions was put to stop; divisions with important projects and activities were given top priority in funding.

How was it achieved?

Observed that funds were improperly distributed among the different divisions in the bureau; this prompted him to do something and correct the irregularity.

Attribution evidence?

This particular incident has no relation to his two-month observation tour in Taiwan, Korea, and Japan.

Impact
Classification: Category 15 Characteristic E Attribution V

Illustration #17

Report

Recommended that number of Commission on Audit officers signing vouchers, supporting documents, and other papers (of government agencies being audited) be reduced. In the past, about 8-10 signatures appeared in with papers/documents. This led to a lot of delay and red tape.

What was the outcome?

At present, only 4-5 people in the Commission on Audit sign these papers/documents. Delays were eliminated, and the flow of work became faster.

How was it achieved?

Awareness of such procedures which are being practiced in private auditing firms prompted her to make the recommendation.

Attribution evidence?

Past practical job experience, especially dealings with private corporations.

Impact
Classification: Category 15 Characteristic L Attribution V

Illustration #18

Report

In 1973, imposed the wearing of uniforms for employees. This was necessary to discourage unnecessary leaves for personal reasons during office hours. With the uniform, they could easily be identified, which may be the grounds for an administrative charge against them.

What was the outcome?

All female staff employees are required to be in uniform (still in force at the present time). Unnecessary leaves bring about the accumulation of work to be done and the unnecessary delays in the accomplishment of original task.

How was it achieved?

This was made possible because of his concern for efficiency and that employees would not go out during office hours to do their household chores.

Attribution evidence?

As administrative officer and work experience.

Impact
Classification: Category 16 Characteristic F Attribution V

Illustration #19

Report

Visited different experimental stations to identify problems they had in their projects by interviewing the people there. Learned that the researchers felt neglected by the Director because not much emphasis has been given on research. Arranged for all of them to come to central office for workshop which was sort of a gripe session between administrator and researchers.

What was the outcome?

The specific talent or potentiality of an individual was enhanced toward line of specialization.

How was it achieved?

As Assistant Chief of the Research Division at that time, he was fully aware of the problems in research. He visited experimental stations and did interview work.

Attribution evidence?

Course in Communications taken at Washington, D. C.

Classification: Impact Category 17 Characteristic I Attribution Ia

Illustration #20

Report

Organized and prepared the program of the Groundwater Seminar held for forty hours at National Irrigation Administration. The purpose of the seminar was to keep the staff abreast of the current trends on groundwater development.

What was the outcome?

The seminar was held recently, and the effect hasn't been felt yet. It is expected to increase the participants' knowledge of groundwater development.

How was it achieved?

His position as Assistant Chief of the division.

Attribution evidence?

Attendance at similar seminars in his country.

Classification: Impact Category 18 Characteristic N Attribution V

Illustration #21

Report

Recommended the purchase of heavy equipment to be used partly for improving irrigation systems and partly for rebuilding washed off canals and irrigation dikes.

What was the outcome?

The purchase facilitated the accelerated construction of dikes and canals in Nueva Ecija and Pampanga, as well as the repair of washed off canals resulting from big floods.

How was it achieved?

Through familiarity of participants of the significance of equipment and facilities.

Attribution evidence?

Participant's first employment in the government was in the then Bureau of Public Works and Communications before the outbreak of the Second World War.

Classification: Impact Category 19 Characteristic K Attribution V

Illustration #22

Report

Developed procedures for the control of reports received and processed by the office. In the past there was no exact way of determining whether an audit report submitted was already acted upon and on what date it was received and acted on. This was necessary in order to know what agency has submitted its audit report on time and who was delayed, to call the attention of the delayed agency, and to assign somebody to act on the report to pinpoint

responsibility and to have it recorded in the centralized records to know the action taken, when it was received, what was the action taken, and when the action was made.

What was the outcome?

Since 1965, there is only one record book for recording incoming audit reports of all agencies indicating therein the data received, what action taken, and which action was done.

How was it achieved?

Concern for efficiency so that audit reports received could be acted upon immediately. Also because of his interest for savings; that is, instead of keeping several records using several record books, now the office uses only one book.

Attribution evidence?

His knowledge in management control and audit of government which he learned in Washington, D. C.

Impact
Classification: Category 20 Characteristic I Attribution Ib

SAMPLE PROBE QUESTIONS

Behavioral Questions:

Can you give me a specific example of an action you have taken in this area?

Can you tell me about a time when this happened?

In your opinion, what is the most important thing you have done on your job since your return?

Outcome Questions:

Why did you do this?

What effect did this have?

Why do you feel this made a difference?

Why do you think that this had not been done before?

What indicators do you have that the change occurred?

Enabling Questions:

What do you think enabled you to do this?

How were you able to do this?

Do you feel that this was a commonly used procedure or process?

Had this been done in your country before?

How do you think your supervisor felt about this?

What was your role in getting this done?

Attribution Questions:

Where did you learn about (specific thing)?

Where did you get the idea for this change?

In your background, what things contributed to (specific thing)?

What experiences that you have had led to this?

Where did you get the idea that this is a good thing to do?

APPENDIX I

SAMPLE TABULAR DATA

(See Chapter VI)

SAMPLE TABULAR DATA

The tables on the following pages depict convenient summaries of critical incident data collected during an impact assessment.

Sample 1 shows the frequency distribution of reports by impact category. The righthand column shows the percent of the total number of incidents for each category and for each major subset of impact categories.

Samples 2 and 3 illustrate the same type of information for the impact-producing characteristics and the levels of attribution, respectively.

Sample 4 depicts combinations of impact categories and impact-producing characteristics. The righthand marginals repeat the frequency of reports by impact category; the bottom line marginals repeat the frequency of reports by characteristic. The numbers in the center show the combinations of the two; the combinations with the highest number of incidents are circled. For example, the table shows that 59 participants reported that technical sophistication enabled them to improve or expand dissemination programs.

Sample 5 is a three-way matrix that reveals the combinations of all categories in the impact sequence. Most small studies do not produce enough incidents for this analysis to be helpful or reliable; its potential value exists with a large number of incidents gathered during a major study or an accumulation of the results of small studies.

Sample 6 is a condensed version of Sample 5 and shows high frequency combinations of reports and the percent of those reports attributable to participant training.

Sample 1

Distribution of Reports by Impact Category: Agriculture

Categories	No. of Reports		Percentages	
IMPACT ON DEVELOPMENT TARGETS				
1. Influenced development strategies...	9		.013	
2. Introduced a new enterprise...	6		.008	
3. Developed a local capability...	1		.001	
4. Discovered a solution...	26		.037	
5. Stimulated the widespread adoption...	27		.038	
		69		.097
IMPACT ON INSTITUTIONAL OUTPUTS				
6. Initiated a new service...	22		.031	
7. Raised standards of products...	21		.030	
8. Changed procedures to increase responses to client needs...	12		.017	
9. Avoid disruption of service by timely action...	0		0	
10. Used special effort or skill...	107		.154	
11. Improved dissemination programs...	136		.196	
		298		.428
IMPACT ON OUTSIDE SUPPORTS				
12. Expanded institutional status...	22		.032	
13. Developed working relationships with local or external agencies...	59		.085	
		81		.117
IMPACT ON INTERNAL OPERATIONS				
14. Introduced data-based management aids...	58		.084	
15. Introduced cost/or time-saving measures...	8		.011	
16. Imposed tighter staff controls...	17		.024	
17. Improved organization of responsibilities and functions...	10		.014	
18. Upgraded staff morale...	99		.143	
19. Upgraded physical facilities/ equipment...	26		.037	
20. Improved recordkeeping/information retrieval...	27		.039	
		245		.352
Totals		693		.994

Sample 2

Distribution of Reports by Characteristic: Agriculture

		No. of Reports	Percent
A.	Technical capabilities	188	.271
B.	Awareness of other possibilities, approaches	79	.114
C.	Appreciation of nature and magnitude of inputs required	42	.061
D.	Acceptance of new or expanded objectives	30	.043
E.	Commitment to principles, convicitions	3	.004
F.	Willingness to take responsibility, act	26	.037
G.	Data orientation	69	.099
H.	Goal orientation	26	.037
I.	Efficiency orientation	27	.039
J.	Skill in human relations	49	.071
K.	Familiarity with equipment	31	.045
L.	Familiarity with workable operating routines	5	.007
M.	Access to external sources of information or help	85	.123
N.	Credibility and credentials	33	.048
	Totals	693	.999

Sample 3

Distribution of Reports by Attribution: Agriculture

		No. of Reports		Percentage	
I:	Reasonably clear-cut links to training				
	(a) Specific technique or theory applied	66		.095	
	(b) Specific practice or model adopted	85		.123	
	(c) U. S. source or product applied	47		.068	
	(d) Practical job experience cited	15		.022	
	(e) Incidental skill learned	20		.029	
	(f) Credentials applied	5		.007	
	(g) Before-after changes observed	7	245	.010	.354
II:	Probable links to training				
	(a) Technical background cited	30		.043	
	(b) U. S. work style cited	20		.029	
	(c) Timing of the event	12		.017	
	(d) Requirement for technical knowledge	49		.071	
	(e) Conformity of approach to U. S. standard	3	114	.004	.164
III:	Possible links to training				
	(a) Claim of increased self-assurance	17		.024	
	(b) Claim of attitude change	5	22	.007	.031
IV:	Doubtful links to training				
	(a) Personal characteristics	12		.017	
	(b) Clever ideas	16		.023	
	(c) General education experience	67	95	.097	.137
V.	No links to training		217		.313
	Totals		693		.999

Sample 4

Combinations of Impact Categories and Impact-Producing Characteristics: Agriculture

	A: Tech. Soph.	B: Possibilities	C: Requirements	D: New Goals	E: Convictions	F: Take Resp.	G: Data Orient.	H: Goal Orient.	I: Efficiency	J: Human Rela.	K: Equipment	L: Routines	M: Sources	N: Credentials	Totals
1. Development Decisions	5						1	1					2		9
2. New Enterprises	1	4		1											6
3. Local Cabilities	1														1
4. Discoveries/Solutions	13	4		6		1							2		26
5. Public Adoption	5	8					2	2	2	2	1		5		27
6. New Programs	10	5	1	1			1		1		1		2		22
7. Higher Standards	9	3	3	1		1	2		1		1				21
8. Client Needs	3		1	1			1	1	2	2		1			12
9. Timely Actions															0
10. Demanding Tasks	32	14	3	3			23	2	1	5	3	1	18	2	107
11. More Dissemination	59	11	8	7		2	4	6	1	3	5		9	21	136
12. Institutional Charter			5	5	2	2	2	4	1				1		22
13. Outside Relations	10	6	3	1		1	5	3		8	1		17	4	59
14. Data-Based Aids	16	7	3				19	3	2	2		1	5		58
15. Cost Savings	1	2				1		1			3				8
16. Tighter Controls	1			3		2	4		1	4	2				17
17. Organiz. Structure		2				2	1		4			1			10
18. Better Staff	20	10	11	1	1	11	2	2	1	23	2		9	6	99
19. Equipment	1	1	4			3		1	2		12		2		26
20. Record-Keeping	1	2					2		8			1	13		27
Totals	188	79	42	30	3	26	69	26	27	49	31	5	85	33	693

Sample 5

Distribution of Reports by Achievement, Attribution, Impact-Producing Characteristic:

Agriculture

Achievement & Attribution	A:Tech.Soph.	B:Possibilities	C:Requirements	D:New Goals	E:Convictions	F:Take Resp.	G:Data Orient.	H:Goal Orient.	I:Efficiency	J:Hum.Rel.	K:Equipment	L:Routines	M:Sources	N:Credentials	TOTAL
11:More Dissemination															
Clear-Cut	23	8	3					1	1	1	2		4	10	53
Probable	6		1	1			1	2	1		2			5	19
Possible	4														4
Doubtful	6	1	1	1						1			2	4	16
None	20	2	3	5		2	3	3			1		3	1	43
12:Institutional Charter															
Clear-Cut					1		1	1					1		4
Probable			1												1
Possible				1											1
Doubtful			2	1			1								4
None			2	3	1	2		3	1						12
13:Outside Working Relationships															
Clear-Cut	1	2				1				1			4	1	10
Probable	4		1				1	1		1			2	2	12
Possible							1			1					2
Doubtful	3	1	2				2	2		1	1		3		15
None	1	3		1			1			4			8	1	19
14:Data-Based Management Aids															
Clear-Cut	3	2	1				3		1	1		1	3		15
Probable	3	1					5								9
Possible		1						1							2
Doubtful	3	2					4		1	1			1		12
None	7	1	2				7	2					1		20
15:Cost- or Time-Saving Measures															
Clear-Cut											1				1
Probable		1									1				2
Possible															0
Doubtful								1							1
None	1	1				1					1				4

Sample 6

Percentage of Reports Attributed to Participant Training:
High Frequency Combinations in Agriculture

	A. Tech. Soph.	B. Possibilities	C. Requirements	D. New Goals	E. Convictions	F. Take Resp.	G. Data Orient.	H. Goal Orient.	I. Efficiency	J. Human Relations	K. Equipment	L. Routines	M. Sources	N. Credentials	No. of Reports	% Attrib.
1. Development Decisions																
2. New Enterprises																
3. Local Capabilities																
4. Discoveries/Solutions	57	60													33	58
5. Public Adoption	100	100													18	100
6. New Programs	71	88											100		31	84
7. Higher Standards	88														16	88
8. Client Needs																
9. Timely Actions																
10. Demanding Tasks	59	80					70						76		103	68
11. More Dissemination	49	63	40	13									45	70	133	51
12. Institutional Charter																
13. Outside Relations	57									33			38		44	43
14. Data-Based Aids	55	50					52								53	53
15. Cost Savings									67						9	67
16. Tighter Controls																
17. Organiz. Structure																
18. Better Staff	64	38	50			75				22			67	38	113	48
19. Equipment			50								73				34	68
20. Record-Keeping									33				69		22	55
No. of Reports	231	80	32	8		12	46		18	36	26		84	36	609	
% Attrib.	60	68	47	13		75	61		50	25	73		63	58		59