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TOWARD THE DEVELOPMENT OF AN EVALUATION
DESIGN FOR THE KB-GIZI--FAMILY PLANNING/NUTRITION
PROGRAM--IN INDONESIA

Submitted to:

United States Agency For
International Development

Project No. 489-0249

Under Contract Number IQC-PDC-0262-1-05-3097-00

January 15, 1984

William D. Drake, Ph.D
Robert J. Timmons, Ph.D

Community Systems Foundation
1130 Hill Street
Ann Arbor, Michigan 48104
(313) 761-1357

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(A short term consultancy to assist in the development of a research plan, time schedule and organizational arrangement for both the process and impact evaluation of the KB-GIZI program.)

William D. Drake, Ph.D.
Robert J. Timmons, Ph.D.

Community Systems Foundation
1130 Hill Street
Ann Arbor, Michigan 48104
(313) 761-1357

PREFACE

This paper is in response to a two and one half week consultancy to USAID, Jakarta, beginning December 4, 1983. At the request of Dr. Haryono Suyono, Chairman of the National Family Planning Coordinating Board (BKKBN), Community Systems Foundation staff attended a three-day technical meeting the purpose of which was "to compile an inventory of family planning/nutrition evaluation and operations research studies in Indonesia; to establish research priorities and appropriate methodologies as well as study instruments for the evaluation of the VFP/MCW, USAID project; to explore the technical capabilities of local research groups to carry out these studies; and to develop a working mechanism among the participating groups/agencies in the implementation of this evaluation plan." During the first day's opening ceremonies CSF presented a concept paper, "Toward the Development of an Evaluation Component for the KB-Gizi--Family Planning/Nutrition Program--in Indonesia." On the following day three discussion groups were conducted on a general framework for evaluation of integrated nutrition programs, a design for process evaluation of the KB-Gizi program, and a design for impact evaluation of integrated nutrition programs. The last day of the technical workshop presented the results from each discussion group to the workshop participants and concluded by setting an agenda for the next steps to be taken in the evaluation planning process.

During our stay we made field trips to Bali and to Surabaya, East Java. In Denpasar, Bali BKKBN made it possible for us to visit a KB-Gizi training program at the kabupaten. In Surabaya, BKKBN extended a welcome for discussions on the KB-Gizi program evaluation planning and a report on the workshop proceedings.

We are, of course, indebted to many for assistance during this consultancy. They are too many to recognize in this preface but are listed as Appendix A of this report. However, at this time we would like to express our gratitude to Julie Klement of the USAID mission in Jakarta and to Dr. Pudjo Rahardjo of BKKBN and his staff assistant Dr. Sonya Rahardjo for their interest in involving us in the planning phase of such a worthwhile project.

The following report is an in-country draft for circulation and review. It begins with a brief introduction of our involvement in evaluating the KB-Gizi program,

followed by a brief discussion of three research areas on which Dr. Pudjo Rahardjo requested CSF emphasis, and our recommendations for implementing and assisting in the evaluation studies. A final report will follow our return to Ann Arbor. It is our hope that this paper will provide some guidance, however preliminary, to the BKKBN ^{Secretariat} ~~Executive~~ Committee on matters of considerable urgency:

↑
for Evaluation of the KB-gizi Program

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1. INTRODUCTION

In June of 1983 CSF responded to a USAID/Jakarta request for a concept paper on developing an evaluation component for KB-Gizi Terpadu (Integrated Family Planning-Nutrition Program) in Indonesia (see Appendix B). Earlier in the year CSF consulted with and reported to BKKBN (National Family Planning Coordinating Board) on expansion of the KB-Gizi program in Lombok,¹ and in an independent activity proposed to engage in an applied research project to estimate the magnitude of underreporting program impact due to anthropometric misclassification in a field setting in Indonesia² (see Appendix C). In the concept paper CSF suggested that any technical assistance we should provide be responsive to the needs and desires of our Indonesian counterparts. Therefore, it was recommended that the primary responsibility for conducting evaluation studies of the KB-Gizi program fall upon Indonesian research and academic institutions. Furthermore, technical skills and analytic techniques used by CSF in assisting in the evaluation studies should be made transferable to our Indonesian colleagues.

After participating in the three-day workshop and subsequent discussions with our Indonesian colleagues, CSF is hopeful that its role will be supportive to BKKBN and research and academic institutions, that it will facilitate the evaluation process, and that its presence will assist in embedding an evaluation monitoring component in the KB-Gizi program. Our concept paper presents specific examples of

¹David E. Sahn, Expanding the National Nutrition Program in Lombok--Recommendations for Program Planning and Policy Making (Ann Arbor, Michigan: Community Systems Foundation, 1983).

²William D. Drake, Improvements in Methodology for Evaluating the Nutritional Impact of the Mother Child Welfare/Family Planning Project (Ann Arbor, Michigan: Community Systems Foundation, 1982).

possible projects, some of which stress the use of existing data. The data required for such retrospective studies are apparently available and accessible, and verification that services are being delivered as planned is being given appropriate attention.

1.1 Background

The model program in which the KB-Gizi program operates is the Family Nutrition Improvement Program (UPGK), a multi-sectoral program implemented primarily by the Ministry of Health and the National Family Planning Coordinating Board. Some village programs are administered by the Ministry of Agriculture and the Ministry of Religion. The goal of the program is to improve nutritional status of preschool-age children and pregnant and lactating women. To do so provision is made for nutritional surveillance of preschoolers (Balita), referral and community-level follow-up when they are diagnosed as malnourished, education in nutrition, the use of oral rehydration solutions, home gardening, iron and vitamin A supplementation, and income-generating activities. Dr. Pudjo Rahardjo of BKKBN has stated that the UPGK program is targeted to reach 34,000 villages in 25 provinces during PELITA III. The KB-Gizi program in particular has reached 22,249 villages or banjars at the end of PELITA III (1984). The vehicle for such expansion has been widespread village-based family planning infrastructure used to support nutrition and health services as described above.¹ The underlying assumptions for integrating family planning and nutrition and health services are that 1) a reduction in infant and child mortality and morbidity will promote the practice of family

¹An Evaluation Framework for the Integrated Family Planning - Nutrition Program in Indonesia, a speech by Dr. Puđjo Rahardjo presented December 8, 1983 in Jakarta, p. 1.

planning (e.g., lead to greater use of family planning services); and 2) that, in turn, family planning practices will reinforce the use of nutrition and health services or foster more significant improvement in nutritional status among preschool-age children. USAID's and BKKBN's expectations are that there will be a 15 percent increase in village contraceptive continuation rate among mothers participating in the KB-Gizi program, and a 12.5 percent decrease in PCM among preschoolers, both by early 1985.¹

Currently, nutrition services, as implemented by BKKBN, are introduced only after a family planning acceptor rate of some specified proportion has been realized in a village. For this reason, it is important not only to test the assumptions of an integrated family planning/nutrition services program empirically, but also to search for an optimal strategy for integration within a community. As we investigate the "interaction" between family planning services and nutrition and health services, we must also evaluate the effects from each component. The KB-Gizi program expects to have an impact on the level of contraceptive use, birth rates, and attitudes toward family size. It also intervenes in villages to have a significant impact on the nutritional status of the targeted groups and to lower the incidence of infant mortality.

Numerous evaluations of nutrition interventions in developing countries have shown surprisingly modest impact on nutritional status. This disappointment and basic research on the validity and reliability of measurement have produced hypothesizing, theorizing, and, to a lesser extent, field testing of anthropometric misclassification. CSF has reviewed the literature (including fundamental research on misclassification appearing in epidemiology studies) and analyzed the problem by simulation techniques and found it

¹An Evaluation Framework . . ., p. 2.

to be of a magnitude expressed in our earlier writing.' To estimate anthropometric misclassification we must have empirical evidence of the sensitivity and specificity of the measure. After acquiring such evidence, we can adjust the change in prevalence of PCM to reflect the "true" change in prevalence of PCM in a community.

1.2 Data Collection

An essential part of this two-week consultancy is the enumeration of the existing data which are relevant to the evaluation and monitoring of the KB-Gizi program. Not to take advantage of data gathering already embedded in program designs, of special studies, or of baseline surveys could jeopardize the continuation of useful data gathering, not to mention the immediate waste of information and money. Such an enumeration has proven to be difficult because of the many institutions involved in collection procedures, the geopolitical scale of the data, their form (machine readable or not), the previous use to which they have been put, and whether or not they are re-occurring. The following table, therefore, should not be considered complete. It represents our efforts during this brief stay to draw together data from diverse sources. At this time we have only a superficial knowledge of some of these data sources and in-depth knowledge of others. Until these data sets are better known to us, research designs and technical advice can only be sketchy. Where baseline surveys were conducted with subsequent impact assessments in mind, variables must be well documented to avoid incompatibility for analysis. Continuation of this preliminary procedure is not only critical for carrying out selected process and impact evaluation, but crucial for effective and efficient project

'Improvements in Methodology

planning. Presently, we have some information on all of these data sources, but documentation on only a few.

Table 1.1 DATA SOURCES FOR KB-GIZI PROGRAM EVALUATION

Data	Machine Readability (Yes or No)	Re-occurring (R) or Special Study (S)
• Modular Survey	Yes	R, S
• KMS Card	?	R
• Numerical Data at Banjar or Desa	?	R
• SKDN Data (F1, F2, F3)	Yes	R
• East Java POP. Survey (Baseline 1981, 1982)	Yes	S
• 1980 Census	Yes	R
• 5% Sample	Yes	R
• PODES Survey (Village potential)	Yes	S
• Special Surveys KB-Gizi Baseline Studies (E. Java, Bali, Lampung, West Sumatera, NTB), NIPP Baseline, UNICEF Assisted Nutrition Program Baseline	?	S
• MID-Project Evaluation	Yes	S
• 1977 Ocular/Nutritional Status Study (MOH)	Yes	S

In concert with efforts to enumerate data sources, available computing facilities, both mainframe and microprocessor, should be catalogued. For the purpose of transferring technology (e.g., computer software) and expertise in analytical techniques this is a necessary step.

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Unfortunately, compatibility among computer hardware, especially microprocessors, rarely exists. Experienced users of microcomputers are also finding that compatibility has many interpretations--it does not present us with a dichotomy but with a series of questions directed at the extent to which one machine is compatible with another. As microcomputers proliferate in Indonesia and the demands placed upon their use intensify, the issue of compatibility will become more critical to the flow of information among institutions and within geopolitical levels of institutions.

2. RESEARCH PROJECTS

In the KB-Gizi evaluation project, three studies have been identified by BKKBN to receive our immediate attention. The first study is to investigate the synergistic relationship between family planning and nutrition components. The second is to proceed with an empirical study of anthropometric misclassification as proposed in Improvements in Methodology for Evaluating the Nutritional Impact of the Mother Child Welfare/Family Planning Project. Third is a four-part project to develop microprocessor capability by developing software for data entry and data cleaning; resolve problems associated with hardware incompatibility; develop a misclassification corrector; and advise on laying out a series of ways for using micros at lower geopolitical units, e.g., kabupaten, kodya, or kecamatan.

All three research projects investigate issues of importance to family planning, nutrition and health services (implementation of the UPGK model), and, in particular, the KB-Gizi program nationwide. On the other hand, there are issues of program operations peculiar to provinces. Because of these provincial needs, universities, research institutes, and governmental agencies in the provinces should consider addressing themselves to family planning and nutrition service problems locally. By developing provincial research capability sensitive to local program operations, the opportunity to embed an evaluation and monitoring component in the program is enhanced considerably. The more immediate impact of directing evaluation research in this manner is that both nationwide program issues and provincial program issues will be recognized during this KB-Gizi evaluation project.

2.1 Synergism in the KB-Gizi Program

At the time of this evaluation project, the KB-Gizi program creates an unusual opportunity to investigate not only the impact the program has on family planning practices and nutritional status in a community, but also program impact resulting from the interaction between family planning and nutrition and health services. Currently, nutrition and health services are introduced by BKKBN in a village after a 30 percent acceptor rate is realized. The assumption underlying this policy is that improving the health of children is associated with an increase in contraceptive use. Furthermore, it can be assumed that an increase in contraceptive use is associated with improved child health. The synergistic effect can be sorted out from the effects of each component when we analyze the outcome measures simultaneously.

There is considerable evidence that good outcome measures--measures that are directly related to the goals of the program--have been collected. There is also evidence that field protocol varies from desa to desa, and from banjar to banjar. Therefore, by selecting only "good" data a bias is introduced into the sample. It has also been recognized that indicators of family planning practices and nutritional status of children in use vary from province to province (e.g., indicators of nutritional status of balita in East Java may differ from those used in Bali). Any analysis of program impact must respect and account for these phenomena.

There are several possible process measures which could act as proxies for the goal of reducing fertility, namely, the contraceptive acceptor rate, the desired number of children, the number of children born to completed households, and attitudes towards large families. Although each may be a good proxy measure for reducing fertility, they vary with respect to "ease of measurement, and data

collection costs." The best proxy measure, therefore, is the most practical to measure, given constraints of time and budget. Because of the difficulties in relating attitudes to changes in behavior and the long-term time dimension of estimating the number of children born to completed families, contraceptive acceptor rates could prove a useful proxy measure of fertility reduction in a multivariate analysis of variance model that could be compared to models with the same set of predictors but with only one dependent variable--nutritional status or contraceptive acceptor rate.

Fertility has many determinants and the associations between fertility and family planning, and socioeconomic indicators are not always straightforward. (For example, as income increases parents prefer fewer children who are healthier. At lower income levels, however, the relationship is positive.) In a 1981 analysis of family planning and fertility behavior in Indonesia, family planning practice was represented by both knowledge and use of contraception.⁴ To account for alternative explanations to program impact, socioeconomic differences among regions were included in regression analyses (e.g., age of married women between 15 and 45, age at first marriage, interruption in marriage, number of surviving and deceased children, mother's work in household or in non-household enterprise, etc.). A number of socioeconomic indicators were found to be statistically significant, especially the number of living children a woman has.⁵

For nutritional status of children there exist weight-for-age data presently collected at the desa or banjar level. Data on child's age, mother's age, mother's

⁴Dov Chernichovsky and Oey Astra Meesook, Regional Aspects of Family Planning and Fertility Behavior in Indonesia (Washington, D.C.: World Bank Staff Working Paper No. 462, May 1981), p. 35.

⁵Regional Aspects of Family Planning . . ., p. 43.

education, and other socioeconomic indicators have been collected at the weighing posts. To a varying degree, KMS cards record immunization histories and infectious disease histories as well as weight gain/weight loss graphic records. From the list of data sources in Table 1.1, 1982 baseline surveys for the KB-Gizi program in East Java and Bali include low birth-weight, dietary patterns and feeding practices, and socioeconomic characteristics; and in NTB baseline data for KB-Gizi is now being collected on family planning, dietary habits, and knowledge, attitude, and practices of mothers. From these data, where some consistency is maintained among provinces, a sequence of analyses can be undertaken to look for improvement in nutritional status, an increase in contraceptive use, and synergism between the two proxy measures (e.g., an increase in the contraceptive acceptor rate once nutrition and health services are introduced above and beyond the rate of increase in the absence of nutrition and health services).

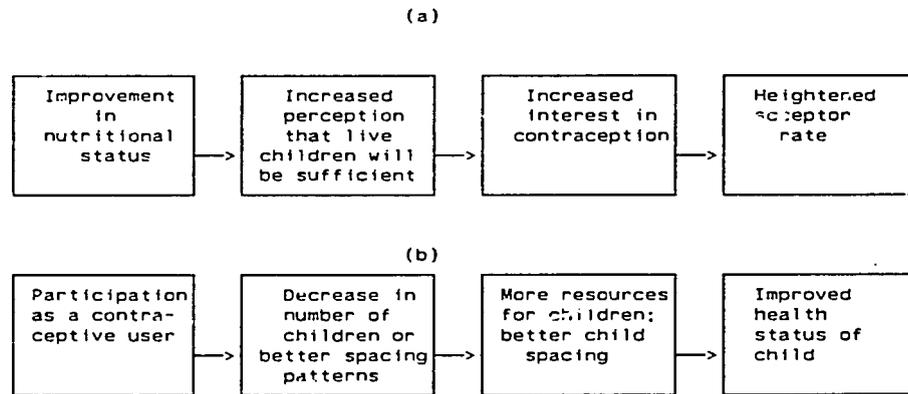
At this time, with information which is mostly anecdotal, it would seem reasonable to begin with analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA) models to analyze the predictive relationships in question after transforming variables known to be nonlinear in their relationship with other variables in the models. Important factors which have been recommended as stratifiers for such tests are mother's age, number of children in the household, child's age, and mother's educational attainment together with a selection of variables accounting for differences among communities. An analysis of this type should reveal impact from the interventions as well as from secular drift. To eliminate alternative explanations of impact it should be possible to control for duration of program participation, intervention intensity, and village acceptor rates (here one can also rely on the PODES census--potensi desa).

It is perhaps especially important to recognize two aspects of the KB-Gizi program which must be explicitly recognized in the formulation of any analysis. First, most of the important variable relations can be only partially explained by a linear model. To attempt their portrayal in a linear regression formulation without proper transformation will mask underlying relationships. Second, the KB-Gizi program has been administered in a large number of variations. Lead implementing agencies have often changed over time in a given community. Therefore careful documentation of the community's history must be established and controlled for in any analysis.

Underlying the analysis for synergism is the need to know the extent of coverage--the proportion of the targeted population actually participating--by nutrition and health services. It has been hypothesized that where nutrition and health services have been introduced, coverage by these services is not nearly as extensive as family planning coverage; e.g., very possibly the most needy children are not being reached by nutrition and health services. If this were the case, one could anticipate a reduction in the interaction between KB-Gizi program components. Given appropriate program coverage, the assumed causal chains might appear as follows (Figure 2.1).

To respond adequately to the issue of coverage, a survey of non-participants in program villages could be conducted. From this we could determine if the nutritionally neediest children are being reached by a comparison to first observations on participants. To assist in this survey the PODES-1980 census can be used to identify the total number of households and inhabitants in a village, the number of contraceptive distribution centers, whether or not there is a PKK or taman gizi, and individual community characteristics. One can anticipate difficulties in actually locating non-participants in villages, as well as

Figure 2.1 CAUSAL CHAINS EXPLAINING A SYNERGETIC RELATIONSHIP BETWEEN KB-GIZI PROGRAM COMPONENTS



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 p.12

the troublesome logistics of measuring nutritional status of individuals not active in the existing nutrition and health services infrastructure. Although a survey may provide us with the most accurate assessment of coverage, perhaps there are less accurate yet far more manageable means of responding to this issue. If we frame the question thus: does coverage increase as the duration of nutrition and health services increases?--existing data could be used. For instance, a considerable number of villages in which nutrition and health services were introduced at different times could be selected for analysis. An assessment of the relationship between coverage and program duration would not tell us directly whether the most needy were being missed, but one could infer that if coverage increases the likelihood of such a failure diminishes. Secondly, since these would be villages that also have family planning services, the question of whether the introduction of nutrition and health services increases the coverage of households targeted for family planning could also be answered in this way.

Another cautionary note is in order here. One of the most important policy decisions of the Indonesian Government has been to embark upon an ambitious program of expanding coverage of villages. (Under conditions of rapid village expansion it is reasonable to expect a temporary stability of coverage within the average village.) Therefore, one aspect of this study should be to track within-village coverage categorized by duration of program life and lead implementing agency.

Methods for studying the nature of declines in fertility rates should also be sought. Studies elsewhere suggest that the rate of decline in fertility is partially a function of the rate at any moment in time. That is to say, a rapid decline in fertility rates is more likely to occur in areas with relatively high fertility rates than in areas

with relatively low fertility rates. To investigate this phenomenon one can look at villages with various fertility rates, controlling for as many alternative explanations of fertility decline as possible. A February 1979 survey on fertility was conducted for a sample of some 36,000 across Indonesia. These data could be a valuable source of information for responding to this phenomenon as well as for interpreting our principal concern for synergistic effects in the KB-Gizi program.

If a synergistic relationship exists between contraceptive acceptor rates and nutritional status, the timing for introducing nutrition and health services may be especially important to study. For an administrator saddled with limited resources, it would be helpful to know in which villages his resources can generate the greatest nutritional impact and acceptor increase. We can anticipate such rates of improvement being a function of the socioeconomic characteristics of the villages and the current acceptor rate. So we are looking for those villages with acceptor rates and characteristics that would maximize the rate of increase of acceptorship and/or nutritional status. Thus, a prioritizing scheme for introducing the nutrition and health component in villages could be devised.

2.2 Misclassification

A research project on sources of anthropometric misclassification leading most frequently to understatement of program impact was conceived on a previous stay in Indonesia and appears here as Appendix C. The SKDN data collection and reporting system was reviewed at the desa, kabupaten, and at Central BKKBN. Seven villages in Bali and one village in Java were visited, and detailed discussions with Dr. Dewa Nyoman Wirawan were conducted.

The understatement of the impact of a nutrition program is based on the misclassification of children, that is, classifying children who are malnourished as normal and classifying normal children as malnourished. A variety of field conditions lead to misclassification: misread weights, misstated ages, improperly calibrated measuring devices, data recording errors, and mistakes made in data transcription, keypunching or coding. There are also sources of misclassification which cannot be eliminated through improved field protocol. There are inherent weaknesses in the typical measurements of nutritional status which give rise to misclassification even in situations where field procedures are executed perfectly.

One reason for reviewing the SKDN monitoring system in the last visit was to consider the ramifications of various analytic techniques on subsequent impact assessments. As with any monitoring system, there are potential problems in interpreting the data. For example, figures used to describe "S," the total number of children under five (balita), are estimates with varying degree of accuracy from banjar to banjar, desa to desa. Currently, in most locations children not weighed in consecutive months are classified as "not known" with regard to weight gain or loss and are not counted in "N" (the number of balita gaining weight that month). They are, however, counted in "D" (the number of balita weighed in that month). Thus a low ratio of "N" to "D" can be caused by either an undue number of children losing weight or an undue number not weighed in consecutive months. Third, the interpretation of weight gain (or loss) varies from kader to kader. And last, the feeding practice of mothers, especially with regard to very young children, may distort the true value of "N."

Changing field protocol to improve monitoring procedures is often a remedy that leads to additional recording responsibilities and new opportunities to

introduce errors into the system. Therefore modifications of the SKDN system were not recommended without further study. The team did conclude in November of last year that it was both feasible and practical to undertake a project which would provide for procedures and statistical methods for more accurately interpreting data obtained from the monitoring and evaluation systems used by BKKBN.

For an AID/Washington project conducted in 1983, CSF has investigated the problem of anthropometric misclassification and developed mathematical models correcting for its effects on the "true" change in prevalence of PCM. Applying corrective equations to "observed" prevalence rates from eight data sets representing data from all over the developing world, and applying realistically conservative sensitivity and specificity rates over time has resulted in reporting estimates of only 60% of the true change in prevalence of PCM. Especially because of this confirmation, CSF is committed to empirically testing this apparent problem as detailed in Appendix C. Until such a study is carried out and the results reported, impact assessment of nutrition programs may be unfairly biasing results against positive outcome. Upon delineation of one of the field studies which will retrieve data from desas, a protocol will be suggested for appending the study outlined in Appendix C to that field activity. Analysis can proceed as described earlier and can become part of the activities assisted by CSF during the course of this overall project.

2.3 Microcomputers

The need for rapid feedback on program process and impact outputs is a position CSF has advocated and one on which we have recently contributed literature.* As the use

*Three articles have recently been published by William D. Drake, Roy I. Miller, and Donald A. Schon: "Nutrition

of microprocessors for data collection and analysis (for facilitating rapid information feedback) increases, the demand imposed on the technology also increases. As with any rapidly advancing, highly competitive technology there are serious problems of compatibility and obsolescence. Most would recognize, however, that with microprocessors not only can information pass from one level to another more rapidly, it also passes with greater precision and accuracy.

Our experience with microprocessors as "stand alone" computers and as terminals interfacing with a mainframe computer has instructed us on the need for careful planning before and after investing. Experience has also taught us that there is considerable potential for the use of microprocessors for data collection, analysis, and education in nutrition and health services and family planning services. Toward this end, we have identified four areas that require study: (1) development of software for data entry and data cleaning; (2) resolution of problems associated with hardware incompatibility; (3) development of software to correct for misclassification; and (4) development of a system for reporting between geopolitical levels--from desa up to Central BKKBN and back to desa--facilitated by microprocessors.

To develop a strong research capability, the same amount of attention must be given to data entry techniques and data cleaning as is given to analytical techniques. The adage "garbage in, garbage out" can be applied to this process when an analysis is done properly but the data are coded incorrectly and/or are not cleaned of "bad" data

Intervention and Evaluation: A Call for Reflection-In-Action," Food and Nutrition Bulletin, Vol. 5, No. 2, 1983; "Social Experimentation as Reflection-In-Action: Community Level Nutrition Intervention Revisited," forthcoming in Knowledge: Creation, Diffusion, Utilization; "The Study of Community-Level Nutrition Interventions: An Argument for Reflection-In-Action," forthcoming in Human Systems Management.

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(e.g., a change in a child's sex from observation to observation, a decrease in a child's height, etc.). CSF has had a great deal of experience in processing data for analysis, and is currently using the University of Michigan computing system (MTS). For data entry and data manipulation, Data Base Management Systems (DBMS) are currently being developed for microprocessors and can be made adaptable for use in the family planning and nutrition and health fields.

In advising on the development of a system for using microprocessors at lower geopolitical levels, CSF would endeavor to coordinate with the Westinghouse "DDD" project. Embedded in such a project would be careful planning to avoid problems of incompatibility (e.g., by developing and advising on appropriate software for available machinery), and development of a misclassification corrector for use at a kabupaten or kecamatan for rapid information feedback. Given the present SKDN system and other monitoring systems already in place, a unique opportunity exists in Indonesia for developing such a system with practical usefulness.

Software suggested by CSF for utilization during this evaluation will be programmed for the specific small computers used by BKKBN and its closely associated research institutions. These computers include the proposed IBM/PC's and Apple II within BKKBN, and the Apple II and HP9845B recently acquired in Denpasar and Surabaya respectively.

3. RESEARCH PROGRAM

In the preceding section we discussed some of the dimensions of three specific research areas. We now turn to the issue of the overall research program. When trying to suggest an implementation process and time schedule, a balance must be struck between detail and clarity of overall design. Our approach was first to attempt to delineate very specific tasks in each research category and then to aggregate by category. Table 3.1 represents the research implementation time schedule organized by broad task category (note: RT under "Responsibility" in Table 3.1 is an abbreviation for Research Team). It should be kept in mind that the individual research projects under each of these broad task categories are of widely differing character; they include both longitudinal and cross sectional designs, they draw upon existing data in some cases and newly commissioned field surveys in others, and they are both in-depth case studies and ones which involve many observations of relatively few variables. In the ensuing section we suggest the types of activities required for each of these major task categories. Tables 3.2 and 3.3 provide yearly estimates of manpower required of Community Systems Foundation in those categories which could utilize its capabilities.

3.1 Research Task 1 - Preparation of Annotated Bibliography on Selected Nutrition/Family Planning Documents and Research Studies.

Many research institutions in Indonesia have substantial libraries on family planning and nutrition literature. Some other institutions have less complete libraries. However, in the field of nutrition program evaluation, there has been a significant expansion of literature which renders most libraries incomplete.

Table 3.2.

MANPOWER ESTIMATE FOR RESEARCH TASK INVOLVING CSF DURING FIRST YEAR

Task No.	Task Categories Utilizing CSF Capability	Estimated Mandays (range where applicable)	CSF Resource Persons (see code below)	Location of Activity I=Indonesia M=Michigan
1.	Preparation of annotated bibliography on selected nutrition-family planning documents	15-25	1,2,3,5,6	M (all)
2.	Retrieval, reproduction & shipment of documents to BKKBN and identified units in Indonesia	2-4	3,4,6,7	M (all)
6.	Develop test program(s) for microcomputer together with associated documentations (Apple, IBM)	15	1,7	M (all)
7.	Participate in detailed discussions and adjustments if desired for each research design. (Process studies are first time priority, impact second.)	100 + 25	1,2,5	I (80) M (20)
8.	Implement research projects - including where applicable, field pilot, information handling protocol, trial analysis, field team training, data gathering, coding and first full analysis. (CSF emphasis upon misclassification and synergism projects with advisory role on others)	90-120 + 40	1,2,5,6,7	I (20-40) M (70-80)
9.	Participate in some field visits with BKKBN policy staff, research staff and local leaders in order to interpret analysis results	10-20 + 10	1,2,5	I (10-20)
TOTAL		207-259		

CSF Resource Person Code:

1. W. D. Drake
2. J. D. Nystuen
3. Susan Go
4. Naomi Gottlieb
5. D. H. Sahn
6. R. J. Timmons
7. M. J. Rycus, J. C. Benavente and CSF support staff

$$\begin{array}{r}
 70 \\
 90 \\
 \hline
 160 + 225 \times 1.6 = 587.5
 \end{array}$$

Table 3.3

MANPOWER ESTIMATE FOR RESEARCH TASK INVOLVING CSF DURING SECOND YEAR

Task No.	Task Categories Utilizing CSF Capability	Estimated Mandays (range where applicable)	CSF Resource Persons (see code below)	Location of Activity I=Indonesia M=Michigan
1a.	Provide supplemental documents to BKKBN and to each research team	4	3,4,6	M (all)
8.	Assist implementing research projects including where applicable, field pilot, information handling protocol, trail analysis, field team training, data gathering, coding and first full analysis. (CSF emphasis upon misclassification and synergism projects with advisory role on others)	5 60-90 +20	1,2,5,6,7	I (40-50) M (20-40)
9.	Participate in some field visits with BKKBN policy staff, research team and local leaders to interpret analysis results	3 20-30 +30	1,2,5	I (20-30)
10.	Perform on-the-spot reanalysis as required and undertake supplemental case studies	3 40-60	1,2,5	I (40-60)
12.	Participate in seminars on preliminary findings	1 10-15	1,2,5	I (10-15)
14.	Assist in preparation of draft report for entire program, participate in workshop and assist in publishing results	5 20-30 +30	1,2,3,4,5,6,7	I (20-30)
	TOTAL	15 154-229		

CSF Resource Person Code:

1. W. O. Drake
2. J. D. Nystuen
3. Susan Go
4. Naomi Gottlieb
5. D. H. Sahn
6. R. J. Timmons
7. M. J. Rycus, J. C. Benavente and CSF support staff

One of the most useful and enduring ways of linking various programs together is to provide a common literature among all units. It is therefore quite important to ensure that there exists a common knowledge base for all research facilities which will be participating in the KB-Gizi family planning/nutrition program evaluation. Task one would be to prepare an annotated bibliography on selected nutrition and family planning documents. Emphasis will be placed upon evaluation methodology for nutrition programs but will also include family planning program evaluation. Since much of the work is recent, some has not yet been formally published in peer-reviewed journals but has already received such review. CSF will draw upon the Nutrition Planning Information Service which it currently maintains in Ann Arbor and upon the Journal of Nutrition Planning, as well as upon the informal network of researchers in these areas and CSF's Southeast Asia bibliographer, when compiling this bibliography. An attempt will be made to select a relatively limited set of documents for annotation in order to keep the burden of obtaining a common literature base within reasonable bounds.

Subsequent to preparing an annotated bibliography on program evaluation techniques applied to family planning and nutrition and health services, we believe that assisting with developing appropriate research designs and providing detailed evaluation research projects for review are necessary next steps for CSF in the KB-Gizi evaluation program. Coordination and consensus among institutions involved in this project are considerable tasks. The three-day workshop initiated these processes, but now the burden must fall on the BKKBN Executive Committee and USAID to keep this process "on track" as important decisions are made. CSF can facilitate this process by devoting time, while in Ann Arbor, to help develop research designs for consideration by BKKBN. By CSF playing this role, perhaps

opportunities for coordination among agencies and research institutions will be enhanced.

3.2 Research Task 2 - Retrieve, Reproduce and Ship Documents to Selected Research Institutions

Often the seemingly simple task of acquiring the literature enumerated in a bibliography is very time-consuming and frustrating, especially for entries which have not yet been published formally. It is therefore proposed that multiple copies of the fifteen most useful documents from the annotated bibliography mentioned in Research Task 1 be provided to BKKBN. Sufficient copies should be provided so that each research organization has a complete "library shelf" of all documents. Of course, there should also be copies available to the BKKBN Executive Committee, the BKKBN Research Coordinator, the appropriate office(s) in the Ministries of Health, Agriculture, Religion, Planning, Internal Affairs, and USAID/Indonesia. While these materials will concentrate on literature in English, a more focused and therefore perhaps more important body of literature exists in-country and generally in Bahasa Indonesian. Dr. Darwin Karyadi (Center for Research and Development in Nutrition) has already compiled such a listing, which should also be reproduced and distributed. These first two tasks should be commenced as soon as possible in order to maximize the usefulness of the end result.

3.3 Research Task 3 - Identification and Selection of the BKKBN Research Coordinator (BRC)

The BKKBN decision to appoint a research coordinator during the life of the evaluation is strongly endorsed by Community Systems Foundation. We believe that both the efficiency and the overall effectiveness of the evaluation project will be greatly enhanced by the implementation of

this decision. As is true for any personnel appointment, tradeoffs will have to be made between the "ideal" individual and any particular candidate. Some of the desired traits would include: fluency in Bahasa Indonesian, the capacity to provide undivided attention to the enterprise, substantive knowledge of nutrition and family planning, substantive knowledge of Indonesian nutrition and health programs and family planning, research experience, likelihood of acceptance by groups working on the evaluation, and availability during the entire prescribed time of the evaluation program.

Availability is perhaps especially important during the initial stages because if the BKKBN Research Coordinator is identified and selected early, he or she can play a very useful role in framing each research component and ensuring that they all tie into accomplishing the intended result.

3.4 Research Task 4 - Identification and Selection of Research Areas and Organizations which will Implement Evaluations(s)

Under ideal circumstances with no time constraints, selection of groups to undertake the research endeavors might be based upon formal detailed research proposals submitted by the research institutions. However, under the real conditions of time constraint and busy research schedules, it may be helpful for BKKBN to make at least tentative decisions prior to the establishment of detailed proposed research programs. Not only would time be saved by this procedure but an additional benefit might occur as well. The BKKBN ^{Steering Committee for Evaluation of KB-Gizi Program} [~~Executive Committee~~], working through the BRC, could play a more active role in shaping the specific research designs and ensuring that they mesh into the more useful complete program. Especially if the BRC is available during the early stages to promote communication between the

Executive Committee and the various research institutions, this procedure could provide substantial payoff. In some instances it might even be helpful for the BRC to play an active role in assisting the research institutions in developing the specifics of their proposed programs.

3.5 Research Task 5 - Development of Initial Research Designs, Field Instruments, Existing Data Source Utilization, and Analysis Approach

In carrying out the previous task, selecting the research organization and areas of emphasis, some of the research design issues undoubtedly will arise. However, many of the specific issues will remain to be resolved. Research task 5 will consist of the development of detailed research designs, development of procedures for utilizing existing information, acquiring new data where necessary, and defining the approach to analysis. Hopefully this process will be facilitated by the BRC, and through him, by the BKKBN Executive Committee.

It is our experience that attempting to utilize existing data is not without cost. Often relatively mundane yet critical problems arise in the process. This is one reason why existing data are underutilized. Existing data at the local desa or kecamatan level may be of variable quality and generally must be interpreted and re-recorded in a different format. At the other extreme, data already in machine-readable form can be difficult to access for any number of reasons. While it may be frustrating and time consuming to attempt to resolve these access problems, the long-term benefits could be substantial. If one has as a goal the embedding of the evaluation process into the KB-Gizi program beyond the life of this exercise, then the resolution of these issues is of paramount importance. The most effective resolving device is to actually implement a

scheme rather than to merely plan for it. Planning alone cannot help but miss many of the practical yet critical problems, while in actually implementing the scheme these problems will surface, thereby allowing for their resolution.

This overall task of developing the initial specifics of the research approach should be thought of as an iterative process which will benefit from successive stages.

3.6 Research Task 6 - Development of Test Programs for Microcomputers Utilized by BKKBN

The year 1984 is here and computer hardware technology is no longer a limiting factor. (True, specifics of system configuration, given financial constraints, support servicing, and the rapidly changing mix of products available in the marketplace present interesting design questions.) But this factor is perhaps overpowered by software issues. Given the time constraints of this evaluation endeavor and the policy-oriented, problem-solving character of BKKBN, software must be readily available for systems already in existence or in the process of implementation. Currently, BKKBN has Apple computers and is planning on acquiring IBM PC's as input devices to the Data General mainframe. In order to ensure that all software developed and/or used during this evaluation is directly transferable to BKKBN, one or more test programs will be written and configured for the specific computers available at BKKBN. Even the particular configuration for each computer must be accounted for in order to accomplish this transfer. Accordingly, the specific configuration for each computer type was obtained during this consultancy. Upon return to Michigan test programs will be written based upon these specifications, so that during the next visit to Indonesia they can be tested for usability. Once these

tests are successfully accomplished, it will be certain that any other software will be compatible. While this process may seem a bit cumbersome, we have found that it is a particularly effective method especially if undertaken at the onset of the endeavor. Documentation will also be provided for the program(s) used for testing.

3.7 Research Task 7 - Detailed Discussions and Adjustments If Necessary for Each Research Design

The research tasks carried out under category 5 above will in most cases be enhanced by more than one iteration of review. No matter how well formulated at the onset, problems will arise upon beginning their implementation. Data thought to be available and usable will not be. Factors not deemed necessary to be controlled for will become more important than previously thought. Analysis methods which were expected to be easily implemented will in some instances become more problematic. In short, unforeseen problems will arise as the designs become more specific. Community Systems Foundation has had considerable experience in dealing with these real problems in other settings and may be of help in these resolutions. This task envisions CSF's staff working separately with each individual research team in discussing the details of the designs and helping to resolve any problems prior to implementation of the design. Any available literature on methodology will also be provided where applicable. Because CSF along with the BRC will be participating in the specifics of each design, they will be in a position to ensure that there are no logical flaws in the overall design approach. During the periods that the CSF technical staff are not in country, the BRC, who will also have participated in these discussions, can provide follow-through when needed.

3.8 Research Task 8 - Implement Research Project

This task includes field pilot, information handling protocol, trial analysis, field team training, data gathering, coding, and implementing the first full analysis.

Again during each of these stages technical problems will arise in many instances which call for attention. It is our experience that unless "midcourse corrections" are explicitly planned for and dealt with as they arise, the outcomes are less satisfactory than desired. In many instances there is simply no way of anticipating all problems in advance; rather they must be resolved during the course of the project.

One very helpful approach is to attempt an analysis of the data early in the implementation process even though the result is of little numerical significance. If there are problems in either field protocol or analysis method they will more readily surface with this approach. It is anticipated that CSF will participate in these preliminary analyses, and when problems are identified assist in their resolution.

3.9 Research Task 9 - Conduct Field Visits to Interpret Analysis Results

Once the research designs have been successfully implemented and the results of the analyses have been made available, some of the most interesting components of the endeavor begin, namely, the interpretation of the results. Did the indicators improve because of the program or were there other forces which caused the observed change? If the change could be attributed to the program, which combination of activities was responsible for that change? Ideally the research design would yield unambiguous results. However,

in practice there is ample ambiguity in interpretation. This reality, which can be deemed a problem, can also become an asset under certain circumstances. If knowledgeable policy-oriented persons are asked for their interpretations of the results prior to completion of the research project, new inquiries may arise which can often be addressed during the course of the research project. It is suggested that a team, which would of course include the researchers as well as BKKBN staff and perhaps other policy-oriented resource persons, plan on visiting the research sites and assist in the interpretation of the findings. This interpretative exercise should occur at least four months prior to the completion of the project, thereby allowing for follow-up analysis.

3.10 Research Task 10 - Perform On-the-Spot Re-analysis and Undertake Supplementary Case Studies as Required

During this phase questions of attribution raised from prior analysis are studied further. Data which already may exist but which were not deemed important earlier are brought forth. Under conditions which permit further original inquiry, case studies may be undertaken to help in understanding the results of the analysis. As mentioned earlier, time and resources should be provided for this iteration because the potential payoff can be large. Without this stage the result of the prior analysis can be easily attributed to the wrong cause. It should be recognized however, that there still may be ambiguity of attribution even after this iteration.

3.11 Research Tasks 11 & 12 - Prepare Draft Reports on Individual Projects and Conduct Seminars on Preliminary Findings

In a program such as this, communication among the disparate research groups is especially important. The BRC is one communication link during the entire program. Another mechanism should be the circulation and discussion of the various draft reports. It is suggested that informal seminars or discussions of preliminary findings be undertaken well before the end of the project. Participants should include the research teams, BKKBN, and other resource persons.

3.12 Research Task 13 - Prepare Report for Entire Program

One individual or small group should be assigned the task of preparing a draft report for the entire research program. Perhaps the BRC advised by the BKKBN Executive Committee and assisted by Community Systems Foundation could assume the task of preparing the initial draft. It should be initiated at least six months prior to the completion of the entire program and should be available for first review by the BKKBN Executive Committee within four months of program completion.

3.13 Research Task 14 - Prepare Reports, Conduct a Workshop, and Publish Results

Each individual research team is of course responsible for the preparation of a report on its endeavors. These reports and the draft report for the entire research program should constitute the basis for a workshop. This workshop should focus upon those results which lead to potential policy recommendations. Restricting the agenda to findings of this nature will allow policy-

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oriented personnel from BKKBN and elsewhere in government to benefit from participation and to provide timely feedback on research results which can then be incorporated into the products.

It is suggested that some resources be earmarked in order to facilitate the publication of some of the most interesting findings in peer-reviewed journals.

APPENDIX A
PERSONS CONTACTED

USAID - Jarkarta

William Fuller, Director
David Calder, Chief (POP/H)
David Piet - POP/H
Julie Klement - POP/H
Dr. Sonya Rahardjo - BKKBN Consultant
Tim Mahoney - Program
David Denman - POP/H
Nick Studzinski - POP/H
Tom D'Agnes - BKKBN Consultant

BKKBN

Dr. R. H. Pardoko - Deputy for Population Program
Dr. Pudjo Rahardjo - Chief, Bureau of Program Research and
Development
Dra. Soeyatni - Chief, Bureau of Field Operations
Drs. Soedarmadi - Chief, Bureau of Reporting and Evaluation
Drs. Mazwar Nurdin - Bureau of Reporting and Evaluation

BKKBN - Bali

Dr. Astawa - Chairman, BKKBN/Bali
Staff at KB-Gizi training center, near Denpasar

BKKBN - East Java

BAPPENAS

Dr. Soekirman - Bureau Chief, Health and Nutrition

Ford Foundation

Dr. Henry Mosley

Udayana University

Dr. D. N. Wirawan

P4K

Airlangga University

Dr. Hoepoediono Soewondo

Universitas Brawidjaya

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University of Indonesia

Dr. F. G. Winarno
Dr. Ascobat Gani

Radjadjaran University

Dr. Anna Alisjahbana

UNICEF

Dr. Terrel Hill - Chief, Nutrition
Dr. Peter Fajans - Consultant

Helen Keller International

Robert Tilden

Yayasan Kusuma Buana

Dr. Firman Lubis

Westinghouse

Richard Sturgis - Project Director, Demographic Data for
Development Project

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APPENDIX B

TOWARD THE DEVELOPMENT OF AN EVALUATION COMPONENT FOR THE
KB-GIZI--FAMILY PLANNING/NUTRITION PROGRAM--IN INDONESIA

June 15, 1983

Community Systems Foundation
1130 Hill Street
Ann Arbor, Michigan 48104
U.S.A.
(313) 761-1357

Contact persons:

William D. Drake, President
David. E. Sahn, Vice President

INTRODUCTION

This document responds to a USAID/Jakarta request for a short prospectus on developing an evaluation component for the KB-Gizi (Family Planning/Nutrition Program) in Indonesia. During the past year, Community Systems Foundation (CSF) has engaged in formal and informal conversations with persons at the USAID/Jakarta mission and with representatives of several agencies concerned with the improvement of nutrition intervention in Indonesia. Specifically, CSF consulted with BKKBN (National Family Planning Coordination Board) on the expansion of the KB-Gizi Program in Lombok¹ and, in an independent activity, proposed to engage in an applied research project to estimate the magnitude of underreporting due to misclassification in a field setting in Indonesia.² This prospectus integrates the concepts developed in this earlier work and provides a framework for proceeding within the context of the KB-Gizi Program.

In general, but especially in Indonesia, technical assistance must be responsive to the perceived needs and desires of the host country counterparts. For this reason, it is strongly suggested that the effort to evaluate the KB-Gizi program become the primary responsibility of Indonesian research and academic institutions. In the design phase of such an effort, BKKBN should assist in identifying and orienting such institutions. In this phase and in all subsequent work, the role of CSF should be limited to the provision of technical assistance to improve and enhance the

¹David E. Sahn, Expanding The National Nutrition Program In Lombok--Recommendations For Program Planning and Policy Making (Ann Arbor, Michigan: Community Systems Foundation, 1983).

²William D. Drake, Improvements In Methodology For Evaluating The Nutritional Impact Of The Mother Child Welfare/Family Planning Project (Ann Arbor, Michigan: Community Systems Foundation, 1982).

quality of the work--the nature and direction of the effort should be selected by the Indonesian counterpart agencies. The extensive institutional experience of CSF in the areas of program evaluation and operations research, coupled with the previous history of CSF involvement in the KB-Gizi and related programs in Indonesia, provide unique qualification with which to approach this task.

Because of the CSF belief that its role be limited to the provision of technical assistance, we feel that it is inappropriate for us to delineate unilaterally an evaluation methodology, or even to specify the questions to be asked in undertaking evaluative research. At this juncture, we only outline an approach and a way of thinking about the process of evaluating a large-scale program of the size of the KB-Gizi. We do not go into great depth regarding our philosophy; instead, we refer the reader to our previous publications. These are enclosed or available in Indonesia at the USAID mission." Therefore, we present a few pages describing our general approach to evaluation of KB-Gizi, followed by some specific examples of projects to be undertaken within this general framework. It is emphasized that if there is any interest in pursuing further evaluation of KB-Gizi, these ideas must be developed further, jointly with our Indonesian counterparts.

William D. Drake, Roy I. Miller and Margaret Humphrey, Final Report: Analysis of Community-Level Nutrition Programs (Ann Arbor, Michigan: Community Systems Foundation, 1980).

David E. Sahn and Robert M. Pestronk, A Review Of Issues In Nutrition Program Evaluation, A.I.D. Program Discussion Paper No. 10 (Washington, D.C.: U.S. Agency For International Development, 1981).

William F. Drake, Roy I. Miller and Donald A. Schon, "Nutrition Intervention And Evaluation: A Call For Reflection-In-Action" forthcoming in Food and Nutrition Bulletin Vol. 5, No. 2 (1983).

A BASIC FRAMEWORK FOR EVALUATION

A full-scale evaluation of a nutrition intervention calls for the verification of the delivery of services as planned and the measurement of impact attributable to those services. Verification of service delivery is generally considered a necessary precondition for an impact assessment; if service delivery is shoddy, impact should not be anticipated. However, the delivery of services does not guarantee the desired effect. This needs to be verified as well.

Impact evaluation often entails the implementation of an experimental or quasi-experimental research design to facilitate the comparison of the response to intervention in a treatment group to the response (or presumed lack of response) in a comparable control group. This often involves sophisticated sampling and requires careful selection of impact indicators and the rigorous monitoring of data collection activities throughout the program. In our experience, comprehensive evaluations of large-scale projects utilizing complex experimental designs are difficult to carry out and, more importantly, prohibitively expensive. Moreover, even the most sophisticated designs are riddled with potential pitfalls and drawbacks--in social settings, it is virtually impossible to eliminate all potential competing explanations for the observed changes in both the treatment and control groups and implausible to assume that the two groups were identically matched and remained matched throughout the experiment.

While we would certainly assist in any effort at such large-scale evaluation, we would like to suggest an alternative or parallel approach, one calling for a series of small scale evaluative research efforts. Each effort should address salient points concerning relevant issues of program design and/or implementation. As an alternative to large-scale evaluation, a series of smaller studies can be

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managed more easily and can be implemented more cheaply. Also, the studies can be targeted to specific issues of relevance to program planners and managers as well as to overall program effectiveness. Knowledge gained through highly focused studies can be translated into action quickly and easily to improve the larger program; therefore the evaluation exercise is equally relevant for formative evaluation objectives as for impact assessment. Finally, in the Indonesian context, such studies can serve as the vehicle for the transfer of evaluation skills from an experienced organization--CSF--to a series of counterparts in Indonesia who will then be better equipped to undertake other evaluation activities.

POSSIBLE STUDIES

For convenience, we categorize possible studies for consideration by BKKBN into three groups: research to refine design parameters for the KB-Gizi program as it is now implemented, small-scale evaluation studies to help foster greater confidence in the overall KB-Gizi program design, and methodological studies to improve evaluation technique in Indonesia and elsewhere.

A. RESEARCH TO REFINE DESIGN PARAMETERS

1. Investigate Referral Criteria - One of the key elements of the UPGK (Family Nutrition Improvement Program), the parent program for the nutrition component of KB-Gizi, is the referral of at-risk children to the Puskesmas for supplementary feeding and other medical attention. Referrals are based on data generated at the weighing post. The selection of a decision rule to guide the referral process is critical. The rule must identify all at-risk children in greatest need without overloading the health system by including children not at risk. (In the jargon of statistical epidemiologists, the indicator used to formulate the rule must be both sensitive and specific.)

Presently, failure to gain weight for three consecutive months and/or being below 60 percent of the Harvard Growth Standard are the criteria most often used to guide referrals. A rule predicated on less demanding criteria might bring problem cases to the attention of the health service sooner or, alternatively, a more demanding rule might keep marginal cases from overburdening the health system. A simple study could be undertaken in which the results of referrals are sought while, at the same time, disease histories are maintained for children not referred. If it is found that those referred cannot be helped with available supplementary food and other treatment facilities at the Puskesmas, it may be necessary to relax the referral criterion to facilitate earlier referral; that is, referral

while there is still time for the treatment to stimulate the desired response. (It may well be that by waiting until serious malnutrition has set in, the potential benefit of a food supplement is lost due to the onset of diarrheal disease which so often causes and is caused by undernutrition.) Through statistical analysis of the disease histories of all children it might be possible to find indicators that identify problem cases earlier and/or more accurately.

2. Investigate Use of Supplementary Food - A costly, and somewhat controversial, aspect of the KB-Gizi Program is the use of supplementary food to rehabilitate seriously malnourished children. The controversy arises because severe malnutrition, brought about in part or in total by infectious disease, may not respond to increased food intake alone. Similarly, the type of food used, the duration of treatment with food, and the quantity of the supplement are subjects needing empirical investigation to determine optimal practices for administering supplements under varying conditions.

A study into these aspects of supplementary feeding in the context of the KB-Gizi Program might require some on-line experiments to measure the response of seriously malnourished children to varying treatment types administered with differing intensity. Rates of recovery can be correlated with treatment to ascertain the most cost-effective institutional reactions to severe malnutrition. Also, experiments could be undertaken to explore the preventive use of supplementation. In such experiments, children could be given supplements in different village groups, where each group uses a different rule for selecting beneficiaries.

3. Investigate The Synergistic Relationship Between The Nutrition And The Family Planning Components - The KB-Gizi Program creates a unusual possibility to explore the

relationship between acceptor rates for family planning services and the distribution of nutrition services. Currently, it is assumed that 30 percent of all villagers can be easily attracted to the family planning program; therefore, nutrition services are introduced only after that first 30 percent are already acceptors. It is further assumed that the addition of nutrition services helps promote additional acceptance of family planning practices.

Each of these hypotheses or assumptions can and should be subjected to empirical verification. More importantly, by varying the rules for merging the two sets of service activities, data can be generated to identify the optimum mix under given conditions. (For example, it may well be that the optimal strategy is the introduction of nutrition services some fixed time after the initiation of family planning services regardless of the rate of acceptance for family planning.)

B. SMALL-SCALE EVALUATION STUDIES

1. Quasi-Experimentation In New Geographical Areas - One approach to the evaluation of social service programs is the comparison of similar geographic areas on variables of interest where the primary difference in the geographic areas is the length of time spent in the program. This is a quasi-experimental design which relies on the use of "reflexive controls." In the literature, this is referred to as the recurrent institutional cycle design.¹² According to this design, villages would be randomly assigned to begin the delivery of program services at different points in time over a period of years. Measurements of selected process and impact indicators are taken in all villages, whether or not the intervention is underway. (This becomes somewhat difficult regarding many social interventions because the

¹²Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs For Research (Chicago: Rand McNally, 1966) p. 57.

act of generating the data is, itself, an intervention. This is especially true of weighing programs in nutrition.) A comparison of the impact indicators among villages with varying tenure in the program, making simple statistical adjustments for varying success in delivery as measured by the process indicators, enables the determination of the effect of participation in the program on the impact indicators.

The introduction of the program in Lombok creates the opportunity to initiate an experiment based on the experience in Lombok. If such an experiment were launched, it would neither reconfirm or invalidate the KB-Gizi program throughout Indonesia; however, it would offer evidence of the validity of the overall program design in a single instance.

2. Retrospective Data Analysis - While the experiment described in "B.1" calls for the prospective collection of data according to a pre-defined experimental design, an alternative approach would be the reclamation of data from sites which have participated in the program in the past. Data have been collected at the weighing posts throughout the KB-Gizi; in some cases, the actual weights and ages of participating children are recorded while, in others, only a notation of whether or not the child gained weight was recorded. Often data on participation in other program components is also available. These include data on receipt of food supplements, iron tablets and seeds for home gardening, and participation in various training activities such as for income generation.

By retrieving data from weighing posts which have kept adequate records, it should be possible to design a retrospective cross-sectional or longitudinal analysis. Community Systems Foundation used this approach in an

evaluation of the P.L. 480 Title II Program in Sri Lanka.¹³ It should be noted that caution must be displayed when using this method. The mere fact that a center has kept adequate records is indicative that it is running more smoothly than some others; therefore, conclusions may not be generalizable to the program as a whole. Also, this approach tends to be costly and subject to overly large errors in the data. A more precise design of such a study can be done only after a more detailed examination of the nature and quantity of data available in the weighing posts.

3. Coverage and Participation - One of the most difficult and most important issues for any social program is coverage--are the program participants those most in need or are entire areas of the country or segments of participating communities not included despite their need? Studies of the relative need of geographical areas included in a program require data from national surveys or census activities and may best be undertaken outside the context of this pre-proposal. However, coverage within geographic areas selected for participation remains central.

By exploring the data available at selected weighing posts, it should be possible to determine which children and families participate most frequently, those in need or those who do not need assistance. One indicator might be the proportion of second and third degree malnourished children who fail to be weighed in consecutive months as compared to that same proportion in normal and first degree children. In some villages, it may be possible to initiate special census activities to determine if segments of the population exist which do not participate in program activities at all.

¹³William D. Drake, John N. Gunning, Abraham Horwitz, Roy I. Miller, Harold L. Rice and Gnani Thenabadu, Nutrition Programs In Sri Lanka Using U.S. Food Aid (An Evaluation of P.L. 480 Title II Programs) (Ann Arbor, Michigan: Community Systems Foundation, 1982).

C. METHODOLOGICAL STUDIES

1. Underreporting Due To Misclassification - CSF has already submitted a detailed proposal regarding "Underreporting" to the USAID/Indonesia mission. Since that submission, work on the theoretical aspects of the problem as well as on the design of simulations to help correct for underreporting has been undertaken with funding from USAID/Washington.

To recapitulate our findings, the inherent misclassification of children as to nutritional status often results in the understatement of change in the prevalence of malnutrition as a result of intervention. Any study which uses change in prevalence as an impact indicator may give incorrect results due to this bias in calculating change. Thus, this issue is critical, not only for BKKBN in its evaluation of KB-Gizi but also for anyone else attempting to evaluate nutrition programs.

The proposal submitted earlier calls for a field test to quantify the various components of misclassification. The reliability of both weight-for-age and weight gain-no weight gain as indicators of nutritional change would be tested by comparing the accuracy of weighing by field personnel as compared to specially trained staff. The validity of the indicators would be tested by comparing the anthropometry to clinical diagnoses performed by medical students. The benefit of undertaking this project in conjunction with some subset of those described earlier are: 1) the cost will be lower because the structure to administer the field work will be in place, and 2) the results of the study will be easily integrated into the activities of the other ongoing evaluation projects.

2. Vital Registration System - Currently, the KB-Gizi, like most nutrition interventions world-wide, relies on anthropometry for measures of nutritional impact. Other indicators which, in theory, should prove useful--birth

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weight and infant mortality--are rarely used because data are unavailable. By experimenting with a Vital Registration System in the context of the KB-Gizi, BKKBN could explore the use of these other indicators in the evaluation of a nutrition intervention.

To initiate such a study, training would have to be administered to special cadres or village volunteers in the recording of relevant data for all births and deaths. Once underway in selected villages, exploration of the analytic methods for reviewing such data could proceed.

Note, the experience with initiating vital registration systems has been mixed. The types of problems encountered are not insignificant--reporting is typically shoddy and certain types of events, such as fetal deaths, still births, and perinatal deaths are often overlooked. Therefore, the first phase of research into Vital Registration Systems should be a validation study, designed to assess the precision and feasibility of widespread implementation.

3. Utilization of Microprocessors for Management and Evaluation - Historically, the use of computer technology in the management and evaluation of large-scale social interventions has been extremely limited due to the expense of gaining access to adequate hardware and the distance between most computer installations and the field settings in which intervention data originate. Due to the unprecedented expansion of computer technology through relatively low-cost, high-powered microprocessors (personal and small business computers), these historic limitations are no longer operable. Now, the primary limitation on computer usage is the lack of adequate software and, in the "non-scientific" disciplines, a lack of systems analysts capable of framing systems, programming them and getting them implemented.

CSF has its own Apple II E microprocessor and is already developing software for several applications in the

field of nutrition evaluation. In particular, CSF is developing computer programs to assist in the correction of evaluation results in the face of misclassification leading to underreporting. Moreover, CSF plans to adapt software developed for large computers during a research project, the Analysis of Community-Level Nutrition Interventions, for smaller computers. This software cleans, organizes and does selected simple analyses of nutrition oriented data.

Within the context of the KB-Gizi program, a systems review of the feasibility of introducing microprocessor technology into the management and evaluation of the program is a logical first step toward full utilization of modern computer technology. The results of such a study would dictate the development of specific software packages which, ultimately, would reduce costs, facilitate more sophisticated and rapid data analysis in Indonesia, improve training opportunities, and promote transferability to other countries.

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APPENDIX C

IMPROVEMENTS IN METHODOLOGY FOR EVALUATING THE NUTRITIONAL
IMPACT OF THE MOTHER CHILD WELFARE/FAMILY PLANNING PROJECT

(A short term consultancy to explore the
feasibility of conducting a research
project on sources of misclassification and
consequent understatement of program impact.)

William D. Drake, Ph.D.

November 30, 1982

PDS/MCW/FP Consulting (Project No. 498-0249)
Contract PDC-0262-I-14-1010-00 Work Order No. 14

Community Systems Foundation
1130 Hill Street
Ann Arbor, Michigan 48104

Phone: (313) 761-1357

SUMMARY

- It is both feasible and practical to implement the project on "Understatement of Results of Nutrition Programs: A Theoretical and Field Level Review."

- Since the indicator weight gain/loss is central to the Indonesian monitoring system, it is suggested that this indicator be studied in addition to nutritional status as measured by weight-for-age.

- It is suggested that both Bali and East Java become sites for the study with Bali having the emphasis upon weight gain/loss and East Java the emphasis upon nutritional status. The study in each site, however, should include both indicators.

- The Bali component could be completed by December 1983. East Java completion would depend upon initiation dates but should take no more than six additional months.

- The design requires 3000 child observations stratified by geographic region, program phase and child age. Data collection is feasible during July by utilizing fourth year medical students. Four teams of four students are needed to gather observations in seventy-five different villages.

- In order to gather field data during July, the project should commence by February 1983.

BACKGROUND

The principle purpose of this two-week project was to determine the feasibility of a study designed to improve the reliability and validity of assessing nutritional impact in Government of Indonesia programs. Special emphasis was to be placed on the nutrition component of the Mother-Child Welfare/Family Planning Project.

A review of the data collection and analysis procedures was carried out at all levels of the reporting system--village (desa), regency (kabupaten) and Central BKKBN. Eight villages were visited, one in Java and seven in Bali. Interviews were held with officials at all levels, the mid-project evaluation conference was attended (November 10, 1982), visits were made to the Institute Pertanian at Bogor, West Java, and detailed discussions were conducted with Dr. Dewa Nyoman Wirawan of Udayana University in Denpasar, Bali (see Attachment A).

The current data collection scheme centers around the computation of four indicators at each participating Banjar (sub-village). These are:

- S: the total number of eligible preschool children in the Banjar,
- K: the total number of preschool children registered in the program,
- D: the number of children weighed in a month, and
- N: the number of children exhibiting adequate weight gain in a month.

In theory, successful Banjars should have "K" converging to "S" over time with a steadily increasing ratio of "N" to "D." The extent of convergence is an indication of outreach, the increasing ratio, an indication of positive response to program services. Based on our field visit, this scheme is well established, including the monthly transmission of the "SKDN" figures to higher levels of

program management. The logic of the system is sound and we feel that it should be continued, as is, for some time longer until additional evidence of its effectiveness can be garnered.''

As in any such monitoring system, there are potential problems in interpreting the data. With the "SKDN" scheme, several problems arise from the circumstances surrounding implementation of the scheme. First, figures used to describe "S," the number of children under five (balitas), are estimates with varying degree of accuracy from banjar to Banjar. One of the most difficult tasks in any intervention is the maintenance of an accurate count of potential participants who, for one reason or another, choose not to take advantage of program services. Of course, the degree of convergence of "K" to "S" is related to the accuracy of the estimate of "S." Note, this problem is well known to the University staff people with whom we worked.

Second, a child must be weighed in two consecutive months in order to be identified as having gained or lost weight. Currently, in most locations, children not weighed in consecutive months are classified as "not known" with regard to weight gain or loss and are not counted in "N." But they are counted in "D". Thus a low ratio of "N" to "D" can be caused by either an undue number of children losing weight or an undue number not weighed in consecutive months. As currently reported, one can not distinguish which phenomenon accounts for a poor showing in the ratio of "N" to "D." In the extreme, it is possible to imagine cases where successful outreach brings children of higher

'One byproduct of the implementation of the proposal to explore misclassification and the ensuing underreporting contained in this document may be added insight into the sensitivity of the "SKDN" scheme. If substantial quantities of retrospective data are gathered for enough children, it may be possible to compare the "output" from the "SKDN" scheme to that generated by more traditional impact measurement schemes.

nutritional risk into the program, causing the ratio of "N" to "D" to drop. Particularly in months when successful outreach causes a fair number of new enrollments, the ratio of "N" to "D" will drop because there are no previous weighings for those new registrants.

Third, the interpretation of weight gain varies from kabupaten to kabupaten. In some locations, any weight gain, no matter how small, is sufficient to justify including the child in the count of weight-gainers ("N"). In others, a child must gain close to the amount prescribed by the standard before being classified as a weight gainer. Thus "N" is not defined identically throughout the program. (In older children, this is less of a problem because the prescribed monthly weight gain is so small that any gain capable of registering on the scales will approximate the gain called for by the standard.)

Finally, the feeding practice of the mothers, especially with regard to very young children, may distort the true value of "N." Because weighing is usually done early in the morning, the size of the child's breakfast may well influence his/her weight by as much as .3 kilograms--more than the amount of growth prescribed by the standard in most months. Thus, the morning food intake of a child may overshadow weight gain performance. In banjars administering the food supplement (in Stage 1 of implementation), it is hardly likely that mothers will feed their children prior to attending the weighing sessions; they are more likely to anticipate the supplement by skipping breakfast. Considerable misrepresentation of weight gain may result, especially in comparisons involving children from sites in the different stages of program implementation, that is, in sites with and without feeding.

Any monitoring system such as the "SKDN" scheme will always have difficulties during implementation. This system has considerable merit and constitutes a strong base upon

which to build. Refinements at the field level, such as distinguishing between "don't know" and "no weight gain" only add further data recording functions. Therefore, we do not recommend any such "improvement" until it is clear that the problem is sufficiently important or that some other method cannot be found to adjust the results.

One reason for reviewing the "SKDN" system during this consultancy was to consider the ramifications of various analytic techniques on subsequent impact assessments. In this regard, the team has concluded that it is both feasible and practical to undertake a project which would provide for procedures and statistical methods for more accurately interpreting data obtained from the monitoring and evaluation systems used by BKKBN. The balance of this document describes such a project.

Of particular concern is the understatement of impact resulting from misclassification. It is suggested that the study be carried out in both Bali and East Java and focus upon misclassification rates for the two principal indicators used in determining program impact: 1) moderate and severe malnutrition and 2) child weight gain/loss. Misclassification and the consequent potential for understating program impact exist for both indicators. Since weight gain is the principal program monitoring index, any project which does not include this index probably would be less than optimal.

The remaining section of this report delineates the specific field level tasks described in general terms in the proposal entitled "The Understatement of the Results of Nutrition Programs: A Theoretical and Field Level Review."

BRIEF DESCRIPTION OF SCHEDULE OF ACTIVITIES

Table 1 describes the time schedule for implementing the proposed project. In the following section, we briefly describe each task. Some portions of the schedule are relatively fixed and others allow for some flexibility. For instance, data collection (task 10) is best done during the month of July if medical students are to be used during their vacation periods. On the other hand, the time between data gathering and completion of the analysis could be stretched out if necessary. The estimates provided are our best approximations of the times required.

Task 1: Estimation of Misclassification Arising from Weight-for-age Standards and Genetic Variation

Misclassification of nutritional status can occur in several ways as described in the proposal dated August 10, 1982 (see Attachment B). The field portion of this research project will concentrate upon misclassification arising from weighing, recording, transcribing and analysis stages. However, there are other sources of misclassification which require assessment. In task 1, we will explore misclassification stemming from the use of the weight-for-age standard and from genetic variation in any population. The principle source of information will be recent literature and a numerically generated sensitivity analysis. This task will be initiated prior to field work but will continue for approximately three months.

Task 2: Complete Initial Research Design

Field Level Procedures

Considerable thought has already been devoted to the design of the field research component. Work under this task would lead to the completion of the initial design.

At present, the design calls for relating the various sources of field-level misclassification to characteristics observed during the weighing, recording, transcribing and

TABLE 1--PROPOSED SCHEDULE OF ACTIVITIES

Function/Task	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
1. Estimation of misclassification arising from weight-for-age standards and genetic variation	XXXXX	XXXXX	XXX									
2. Complete initial research design	XXX											
3. Adjust initial design, write field instruments and protocol, and establish Research Study Committee	XXX	XX										
4. Pretest field instruments and protocol	XX	XXX										
5. Implement field pilot		XXX										
6. Develop information handling protocol and test with pilot		XX	XXX									
7. Perform trial analysis		XX	XXXXX	XXX								
8. Adjust design, field instruments and protocol and begin modifications for application in second Province			XX	XXXXX	XXX							
9. Train field team					XX							
10. Implement field data gathering						XXXXX						
11. Coding and data entry						XXXX	XXX					
12. Clean data and perform first full analysis								XXXXX	XXXXX	---		
13. Write first draft							XXX	XXX	XXXXX	XXXX-	---	
14. Design detail for second Province component										XXXXX	XXXXX	
15. Perform on-the-spot reanalysis as required										XXX	XXXXX	---
16. Prepare final report on the first Province and hold seminar on findings											XXXXX	XXX--
Indonesian Research team	XXX	-----	-----	XXXXX	-----	XXXXX	-----	-----	XXX--	-----	XXXXX	XXX--
Dr. Drake	XXXXX	-----	-----	XXXXX				XXXXX	XXXXX	XXXX	XXXXX	
Dr. Miller	--XXX	XXXXX	XXX--				XXX	XXXXX	XXXXX	XXXXX	XXXXX	
Mr. Sahn									XXX	XXXXX	XXX	

analysis phases. A team of trained medical students will record the conditions observed as each child is processed through a monthly weighing session. Conditions such as clothing and footwear attire, the activity level of the child, the congestion at the weighing and recording positions, the stability of the balance arm, and the method of transmitting information from weighing kader to weight recorder will be documented for each child. The medical student data gatherer will also directly observe the weight determined by the kader for each child, thereby facilitating a comparison between observers. The mother will be asked how long it has been since the child has last eaten and when body eliminations occurred.

The mother also will be requested to leave the KMS card at the banjar so that retrospective weight data can be transcribed onto coding sheets and the general condition of the card observed. Two observers will be required for this task. Two more observers will weigh the child on an accurate scale under ideal conditions, thereby establishing conditions for determining misclassification arising during the weighing and recording stages.

If medical students are, in fact, the data gatherers, it becomes feasible to relate clinical observations of malnutrition to those children below the red line, those in a state of high nutritional risk. It is premature at this time to outline specific procedures for doing this but at least an attempt should be made to capitalize on the potential opportunity presented by the medical students.

Upon completion of a weighing session (usually by 10:00 in the morning), the four-person field team will record the retrospective weight data from each KMS card and the corresponding information from the registry kept at the banjar. Comparable summary statistics will be obtained from forms F1, F2, and F3. The retrospective data will be used to establish the "normal" pattern for weight gain at a site.

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This pattern will be compared to the pattern of the weighing done in the presence of the team of medical students. Differences may be indicative of a modified behavior by the staff during the visit of the outside observers.

Sample Characteristics

Child observations should be stratified by geographic region, the duration of program implementation and child age. Geographic region is important because malnourishment rates and specific procedures vary by kabupaten. The stage of program implementation determines the package of nutritional services offered and probably affects measurement and recording precision. Similarly, child age is important because underlying malnutrition and expected monthly weight gain are a function of age. Based on such a three dimensional stratification and the need to perform multivariate analysis on all local conditions, approximately 2500 "good" child observations are needed. Allowing for some "bad" data, approximately 3000 observations should be sought. Assuming 40 observations per village, data from 75 villages will be required. If one four-person team can complete one village per day, or twenty villages in a month, then four teams are required in the field during the month of July in order to complete this task.

Further development of this research design and more precise definition of the statistical procedures for maximizing the information obtained from the study will also be sought during Task 2. Also, selection and acquisition of the most appropriate, high precision scales will be made.

Task 3: Adjust Initial Design and Write Field Instruments and Protocol

During this task, we will make adjustments to the initial design proposed above and construct the forms required for gathering field-level information on each child and coding the information from weight cards and registers. Field procedures will be written for later use in training

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the data gathering teams. This task will be carried out entirely in Indonesia by a four to five person research team. Prior to initiating this task, a Study Committee will be formed by BKKBN. This committee will be briefed at the onset of the project and then be asked to review the preliminary and final drafts of the project report. The purpose of this study committee will be to provide advice during the initial stages and to ensure that the results of the project are incorporated into future decisions.

Task 4: Pretest Field Instruments and Protocol

Both the recording instruments and the written protocol will be tested under field conditions. The last-year medical student who will eventually become the field supervisor will be involved in this process both for the assistance he can provide and for training purposes.

Task 5: Implement Field Pilot

A single four-person field team will be trained in the use of the field instruments and protocol by the supervisor. This team will gather a complete set of data from a single village. If two provinces are undertaken simultaneously, one village will be selected from each province. The purpose of this pilot effort is two-fold. First, it will further test the field instruments, procedures, and training material. Second, and equally important, it will provide a set of approximately forty observations with which a preliminary analysis can be performed. This data set is clearly insufficient in size and scope to allow for the formation of conclusions or other substantive results, but the process of attempting an analysis will serve to highlight any flaws in the design or procedures. It will also provide a sample of observations for coding and data entry procedure development. This step, which is often avoided in research projects, is felt to be especially important in a study of this nature.

Task 6: Develop Information Handling Protocol

The observations gathered under task 5 will be used to develop coding and data entry procedures. These procedures, which will include preliminary editing and data cleaning, will then be tested using real observations. Sufficient effort expended on this task should yield substantial returns when task 11 is implemented.

Task 7: Perform Trial Analysis

As mentioned earlier, an actual attempt at conducting a complete analysis prior to the full data gathering phase can be especially helpful in uncovering flaws. This trial analysis will probably be performed manually and will constitute the basis for generating any special purpose computer programs required for data cleaning and analysis.

Task 8: Adjust Design, Field Instruments and Protocol and Begin Modifications for Application in Second Province

Based on the trial analysis, the research design, field instruments and protocol will undoubtedly require adjustment. It is quite probable that these adjustments will be relatively minor but, nevertheless, important in determining the effectiveness of the final result. It is virtually impossible in most real settings to know which variables will constitute a problem during data gathering and/or analysis. The implementation of the trial analysis will shed light on any emerging problems.

If it is decided to begin work in one of the provinces slightly after the other, it would be most appropriate to initiate modifications for application in the second province at this time.

Task 9: Train Field Team

The entire field team will be trained during this week-long task. The supervisor who was involved in the field pilot data gathering task (task 5) could act as one of the

trainers. Any adjustments to procedures and instruments can be incorporated at this time. It is envisioned that four teams of four data gatherers will be required for each province.

Task 10: Implement Field Data Gathering

Data gathering should be scheduled to occur during the month of July, which is the vacation period for medical students. In this project, it is especially helpful to enlist the aid of fourth-year medical students because of the relative ease of training them to detect malnutrition from clinical signs. Four teams will be supervised by the field supervisor and by others on the research team. Data coming from the field should be checked as frequently as possible in preparation for data entry and editing. If data entry, editing and preliminary cleaning overlap data gathering, error can be more easily corrected.

Task 11: Coding and Data Entry

It is envisioned that the coding, data entry, editing and preliminary cleaning will lag behind data gathering by approximately one week. This overlap will both shorten the elapsed time of the project and allow problems to be corrected prior to completion of the data gathering phase. The procedures developed under Task 6 will be invoked and adjusted as required. The size of the data entry team depends on the technology used. A rough estimate of the manpower required is four persons working for five weeks.

Task 12: Clean Data and Perform First Full Analysis

The analysis design developed under Task 2 and modified under Task 7 will be implemented. It is suggested that this portion of the analysis be carried out in Ann Arbor, Michigan by the entire research team. Since the data will have been entered and edited in Indonesia, a copy can be easily forwarded to Michigan. Performing this analysis task at Michigan affords several benefits. First, and most

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important, costs will be lower. Second, some additional analysis packages and systems are more readily available. We propose, however, that the microcomputer facilities utilized in Indonesia be duplicated in Ann Arbor. If this is done, any special purpose programs developed for data cleaning and/or analysis will be directly transferable in either direction without modification. If it is decided to phase the analysis of the two provinces, it would be especially helpful if representatives from both sites could participate in this task in Ann Arbor. Both the results of the analysis and the lessons learned from the analysis process itself could be transferred to the second site. If a time lag is decided upon, the analysis of the second province could be carried out in Indonesia using the procedures and programs developed under this task.

Task 13: Write First Draft

Writing the first draft of the final report for phase I would commence before the analysis is completed. This phasing will ensure that the entire team participates in drafting the first portion of the document. In addition, writing a draft early in the analysis phase often points up additional dimensions of the analysis. Completion of the first draft can be accomplished through exchange of documents between teams.

Task 14: Design Detail for Second Province

This task presumes that there is a time phasing of the second province. The lessons learned from the first phase will be incorporated into the design of the second province. If East or West Java is selected as the second phase, the design will also be modified to reflect emphasis on the malnutrition indicator rather than the weight gain/loss indicator. However, most of the statistical design, data gathering procedures and analysis should be directly transferable, thereby reducing completion time substantially.

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Task 15: Perform On-The-Spot Studies and Reanalysis

Regardless of the care with which prior tasks are implemented, undoubtedly there will be ambiguities in interpreting the results of some of the analysis. For instance, we may be able to deduce the magnitude of a particular misclassification component but not be completely certain of the exact source of the error. Often these kinds of ambiguities can be resolved by a relatively simple on-the-spot supplementary investigation. This task will provide for the incorporation of such an effort if necessary.

Task 16: Prepare Final Report on the First Province and Hold a Seminar on Study Findings

The final report will be prepared after drafts have been exchanged and any necessary on-the-spot studies have been completed. After the Study Committee described under Task 2 has reviewed the report, a seminar will be held to describe the findings. Special emphasis will be placed on the policy implications of the project and the manner in which adjustments can be made to impact study outcomes.

ATTACHMENT A

PERSONS WITH WHOM DISCUSSIONS WERE HELD
DURING CONSULTANCY, NOVEMBER 7 THRU 23, 1982

BKKBN - Jakarta

Dr. R.H. Pardoko - Deputy for Population Programs
Dr. Pudjo Rahardjo - Director, Research and Program
Development
Dra. Soejatni - Director, Field Program Supervision
Drs. Soetedjo - Director, Program Planning
Drs. Sudarmadi - Director, Reporting and Evaluation
Drs. Mazwar Nurdin - Bureau of Reporting and Evaluation,
staff
Mr. Sonni - Bureau of Research and Program Development,
staff

BKKBN - Bali

Dr. Astawa - Bali Provincial Director

DepKes - Directorate Gizi

Mr. Tarwotjo - Director, Nutrition Services
Mr. Suaspendi - Nutrition Services, staff

CRDN - Bogor

Dr. Darwin Karyadi - Director, Nutrition Research Center

Consultants

Dr. E.G.P. Haran - BKKBN-East Java/Population Council

Bali - University of Udayana, Denpasar

Dr. Dewa Nyoman Wirawan - Team Research Leader,
KB/Gizi Evaluation Project
Dr. N.T. Suryadi - Researcher, KB/Gizi Evaluation Project

USAID/Indonesia

William Fuller - Director
Robert Simpson - Deputy Director

Charles Johnson, Chief, POP
Rebecca W. Cohn, VFP/MCW Project Manager, POP

David Calder, Chief, HN
Julie Klement, HN
Nicholas Studzinski, HN